QVR *NIH Business System (NBS) Accounting Details*

PRINT DOWNLOAD CLOSE

PI: KIM, SEUNG K FY: 2019

Total IMPACII Award Amt: $1,535,336

Obligation Details for Project:

5P30DK116074-03

External Organization:

STANFORD UNIVERSITY

Accounting System Totals

PMS Account Type:	Subaccount:domestic(P)	
Award Document Number:	PDK116074A	*Click hyperlink for accounting details for all projects with this document number*

TIMING INFORMATION: QVR gathers disbursement data from NBS/nVision on a nightly basis, however, PMS data in NBS may lag as much as 2 weeks.

Accounting System

IC	CAN	Budget FY	Obligated Dt	Last Disburse. Dt	NBS Obligated $	NBS Disbursed $	Obligated Balance
DK	8472281	2019	2019-07-18		$1,535,336.00	$ 0.00	$1,535,336.00

Accounting System Transactions

Accounting System Transactions

IC	CAN	OCC	NBS Doc Num	NBS Transact. Dt	Obligation Amt	Disbursement Amt
DK	8472281	414E	380PDK116074A*10001	2019-07-18	$1,535,336.00	$ 0.00
				Grand Totals:	$1,535,336.00	$ 0.00

Notice of Award

CENTER GRANT
Department of Health and Human Services
National Institutes of Health

Federal Award Date: 08/22/2019

NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES

Grant Number: 5P30DK116074-03 REVISED
FAIN: P30DK116074

Principal Investigator(s):
Seung K Kim, MD

Project Title: Stanford Diabetes Research Center

Linda Murtagh
Board of Trustees of the Leland Stanford Junior Un
3172 Porter Drive
Palo Alto, CA 943041212

Award e-mailed to: NIHAWARDS@lists.stanford.edu

Period Of Performance:
Budget Period: 07/01/2019 – 06/30/2020
Project Period: 09/15/2017 – 06/30/2022

Dear Business Official:

The National Institutes of Health hereby revises this award (see "Award Calculation" in Section I and "Terms and Conditions" in Section III) to STANFORD UNIVERSITY in support of the above referenced project. This award is pursuant to the authority of 42 USC 241 42 CFR 52 and is subject to the requirements of this statute and regulation and of other referenced, incorporated or attached terms and conditions.

Acceptance of this award including the "Terms and Conditions" is acknowledged by the grantee when funds are drawn down or otherwise obtained from the grant payment system.

Each publication, press release, or other document about research supported by an NIH award must include an acknowledgment of NIH award support and a disclaimer such as "Research reported in this publication was supported by the National Institute Of Diabetes And Digestive And Kidney Diseases of the National Institutes of Health under Award Number P30DK116074. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health." Prior to issuing a press release concerning the outcome of this research, please notify the NIH awarding IC in advance to allow for coordination.

Award recipients must promote objectivity in research by establishing standards that provide a reasonable expectation that the design, conduct and reporting of research funded under NIH awards will be free from bias resulting from an Investigator's Financial Conflict of Interest (FCOI), in accordance with the 2011 revised regulation at 42 CFR Part 50 Subpart F. The Institution shall submit all FCOI reports to the NIH through the eRA Commons FCOI Module. The regulation does not apply to Phase I Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) awards. Consult the NIH website http://grants.nih.gov/grants/policy/coi/ for a link to the regulation and additional important information.

If you have any questions about this award, please contact the individual(s) referenced in Section IV.

Sincerely yours,

MARY K. ROSENBERG
Grants Management Officer
NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES

Additional information follows

SECTION I – AWARD DATA – 5P30DK116074-03 REVISED

Award Calculation (U.S. Dollars)

Salaries and Wages	$401,776
Fringe Benefits	$123,345
Personnel Costs (Subtotal)	$525,121
Materials & Supplies	$3,000
Travel	$16,800
Other	$433,000
Federal Direct Costs	$977,921
Federal F&A Costs	$557,415
Approved Budget	$1,535,336
Total Amount of Federal Funds Obligated (Federal Share)	$1,535,336
TOTAL FEDERAL AWARD AMOUNT	$1,535,336
AMOUNT OF THIS ACTION (FEDERAL SHARE)	$0

SUMMARY TOTALS FOR ALL YEARS		
YR	**THIS AWARD**	**CUMULATIVE TOTALS**
3	$1,535,336	$1,535,336
4	$1,521,079	$1,521,079
5	$1,505,236	$1,505,236

Recommended future year total cost support, subject to the availability of funds and satisfactory progress of the project

Fiscal Information:

CFDA Name:	Diabetes, Digestive, and Kidney Diseases Extramural Research
CFDA Number:	93.847
EIN:	1941156365A1
Document Number:	PDK116074A
PMS Account Type:	P (Subaccount)
Fiscal Year:	2019

IC	CAN	2019	2020	2021
DK	8472281	$1,535,336	$1,521,079	$1,505,236

Recommended future year total cost support, subject to the availability of funds and satisfactory progress of the project

NIH Administrative Data:
PCC: DJH DCTR / **OC**: 414E / **Released**: eRA Commons User Name 08/21/2019
Award Processed: 08/22/2019 12:03:24 AM

SECTION II – PAYMENT/HOTLINE INFORMATION – 5P30DK116074-03 REVISED

For payment and HHS Office of Inspector General Hotline information, see the NIH Home Page at http://grants.nih.gov/grants/policy/awardconditions.htm

SECTION III – TERMS AND CONDITIONS – 5P30DK116074-03 REVISED

This award is based on the application submitted to, and as approved by, NIH on the above-titled project and is subject to the terms and conditions incorporated either directly or by reference in the following:

a. The grant program legislation and program regulation cited in this Notice of Award.
b. Conditions on activities and expenditure of funds in other statutory requirements, such as those included in appropriations acts.
c. 45 CFR Part 75.
d. National Policy Requirements and all other requirements described in the NIH Grants Policy Statement, including addenda in effect as of the beginning date of the budget

period.
e. Federal Award Performance Goals: As required by the periodic report in the RPPR or in the final progress report when applicable.
f. This award notice, INCLUDING THE TERMS AND CONDITIONS CITED BELOW.

(See NIH Home Page at http://grants.nih.gov/grants/policy/awardconditions.htm for certain references cited above.)

Research and Development (R&D): All awards issued by the National Institutes of Health (NIH) meet the definition of "Research and Development" at 45 CFR Part§ 75.2**.** As such, auditees should identify NIH awards as part of the R&D cluster on the Schedule of Expenditures of Federal Awards (SEFA). The auditor should test NIH awards for compliance as instructed in Part V, Clusters of Programs. NIH recognizes that some awards may have another classification for purposes of indirect costs. The auditor is not required to report the disconnect (i.e., the award is classified as R&D for Federal Audit Requirement purposes but non-research for indirect cost rate purposes), unless the auditee is charging indirect costs at a rate other than the rate(s) specified in the award document(s).

This institution is a signatory to the Federal Demonstration Partnership (FDP) Phase VI Agreement which requires active institutional participation in new or ongoing FDP demonstrations and pilots.

An unobligated balance may be carried over into the next budget period without Grants Management Officer prior approval.

This grant is excluded from Streamlined Noncompeting Award Procedures (SNAP).

This award is subject to the requirements of 2 CFR Part 25 for institutions to receive a Dun & Bradstreet Universal Numbering System (DUNS) number and maintain an active registration in the System for Award Management (SAM). Should a consortium/subaward be issued under this award, a DUNS requirement must be included. See http://grants.nih.gov/grants/policy/awardconditions.htm for the full NIH award term implementing this requirement and other additional information.

This award has been assigned the Federal Award Identification Number (FAIN) P30DK116074. Recipients must document the assigned FAIN on each consortium/subaward issued under this award.

Based on the project period start date of this project, this award is likely subject to the Transparency Act subaward and executive compensation reporting requirement of 2 CFR Part 170. There are conditions that may exclude this award; see http://grants.nih.gov/grants/policy/awardconditions.htm for additional award applicability information.

In accordance with P.L. 110-161, compliance with the NIH Public Access Policy is now mandatory. For more information, see NOT-OD-08-033 and the Public Access website: http://publicaccess.nih.gov/.

In accordance with the regulatory requirements provided at 45 CFR 75.113 and Appendix XII to 45 CFR Part 75, recipients that have currently active Federal grants, cooperative agreements, and procurement contracts with cumulative total value greater than $10,000,000 must report and maintain information in the System for Award Management (SAM) about civil, criminal, and administrative proceedings in connection with the award or performance of a Federal award that reached final disposition within the most recent five-year period. The recipient must also make semiannual disclosures regarding such proceedings. Proceedings information will be made publicly available in the designated integrity and performance system (currently the Federal Awardee Performance and Integrity Information System (FAPIIS)). Full reporting requirements

and procedures are found in Appendix XII to 45 CFR Part 75. This term does not apply to NIH fellowships.
Treatment of Program Income:
Additional Costs

SECTION IV – DK Special Terms and Conditions – 5P30DK116074-03 REVISED

Clinical Trial Indicator: No
This award does not support any NIH-defined Clinical Trials. See the NIH Grants Policy Statement Section 1.2 for NIH definition of Clinical Trial.

Revision#1: Revised award issued to remove restriction placed on award due to noncompliant publications. The restriction is removed based on receipt of this revised award.

The following terms from the previous Notice of Award also apply to this award:

The issuance of this award has been delayed due to the late submission of an acceptable application. According to NIH policy, if preaward costs are necessary, they may be approved by the authorized Institution Official(s).

In accordance with the Salary Limitation in NIH Guide Notice NOT-OD-19-031, Notice of Fiscal Policies in Effect for FY2019, none of the funds in this award shall be used to pay the salary of an individual at a rate in excess of Executive Level II. Therefore, this award and/or future years are adjusted accordingly, if applicable. See the Salary Cap Summary for a historical record of the salary cap, including effective dates.

This grant is in response to RFA-DK-16-020. Acceptance of this award requires compliance with this solicitation. See the NIH Guide at http://grants.nih.gov/grants/guide/index.html for copy of the RFA/PA that includes administrative and programmatic requirements specific to this award.

Pilot and Feasibility Studies
This award includes $392,500 ($250,000 direct costs and $142,500 associated F&A costs) for pilot and feasibility studies. These funds are restricted and may not be used for any other purpose without the written prior approval of the Awarding Office.

Funds awarded for pilot and feasibility studies and/or for support of a New Investigator Award, though restricted and not available for expenditure for other purposes, may be carried over to the next budget period and used for the originally awarded purposes.

Future Years of Support: Each budget period will be individually negotiated based on study progress and availability of funds.

No funds may be drawn down from the payment system and no obligations may be made against Federal funds for research involving human subjects at any site engaged in such research for any period not covered by both an OHRP-approved Assurance and by an IRB approval consistent with 45 CFR Part 46.

No funds may be drawn down from the payment system and no obligations may be made against Federal funds for research involving live vertebrate animals for any site engaged in such research for any period not covered by both an OLAW-approved Assurance and an IACUC approval consistent with the PHS Policy on Humane Care and Use of Laboratory Animals.

Funds are provided to support only the following cores; no additional cores may be supported with awarded funds without prior approval from NIDDK.

Islet Core, Diabetes Immune Monitoring Core, Clinical and Translational Core, and Diabetes Genomics and Analysis Core

In addition to the PI, the following individuals are named as key personnel:

Islet Core (Seung Kim, Director)
Diabetes Immune Monitoring Core (Holden Maecker, Director)

Clinical and Translational Core (Christopher Gardner, Director)
Diabetes Genomics and Analysis Core (Hassan Chaib, Director)

Written prior approval is required if any of the individual(s) named above withdraws from the project entirely, is absent from the project during any continuous period of 3 months or more, or reduces time devoted to the project by 25 percent or more from the level that was approved at the time of award.

In accordance with NIH policy http://grants.nih.gov/grants/policy/hs/index.htm and the NIH Guide Notice NOT-OD-15-078, the awardee institution is required to submit the following documentation in their annual progress report for any P&F projects selected in the prior year that involve human subjects: http://grants.nih.gov/grants/how-to-apply-application-guide/forms-d/supplemental-instructions-forms-d.pdf

- Institutional Review Board (IRB) approval
- Protection of Human Subjects section
- Inclusion Enrollment Report
- Education in the Protection of Human Research Participants certifications
- Description of progress on previously awarded projects

No funds may be drawn down from the payment management system and no obligations/expenditures may be made against Federal funds for research involving human subjects at any site engaged in such research for any period not covered by both an OHRP-approved Assurance and by an IRB approval consistent with 45 CFR Part 46.

The NIH is mandated by law (Public Health Service Act sec. 492B, 42 U.S.C. sec. 289a-2) to ensure the inclusion of women and minority groups in clinical research. The goal is to ensure that individuals are included in clinical research in a manner that is appropriate to the scientific question under study.

Investigators must report sex/gender, race, and ethnicity information using the Human Subjects System (HSS) module in the eRA Commons.

For more information see the NIH Guide Notice NOT-OD-18-179. Separate Inclusion Data Records should be created for each individual P&F project.

STAFF CONTACTS

The Grants Management Specialist is responsible for the negotiation, award and administration of this project and for interpretation of Grants Administration policies and provisions. The Program Official is responsible for the scientific, programmatic and technical aspects of this project. These individuals work together in overall project administration. Prior approval requests (signed by an Authorized Organizational Representative) should be submitted in writing to the Grants Management Specialist. Requests may be made via e-mail.

Grants Management Specialist: Christina Coriz
Email: corizc@niddk.nih.gov **Phone**: 301-594-8848

Program Official: James F Hyde
Email: hydej@niddk.nih.gov **Phone**: (301) 594-7692 **Fax**: (301) 480-3503

SPREADSHEET SUMMARY
GRANT NUMBER: 5P30DK116074-03 REVISED

INSTITUTION: STANFORD UNIVERSITY

Budget	Year 3	Year 4	Year 5
Salaries and Wages	$401,776	$394,828	$387,107
Fringe Benefits	$123,345	$121,212	$118,842
Personnel Costs (Subtotal)	$525,121	$516,040	$505,949

Materials & Supplies	$3,000	$3,000	$3,000
Travel	$16,800	$16,800	$16,800
Other	$433,000	$433,000	$433,000
TOTAL FEDERAL DC	$977,921	$968,840	$958,749
TOTAL FEDERAL F&A	$557,415	$552,239	$546,487
TOTAL COST	$1,535,336	$1,521,079	$1,505,236

Facilities and Administrative Costs	Year 3	Year 4	Year 5
F&A Cost Rate 1	57%	57%	57%
F&A Cost Base 1	$977,921	$968,840	$958,749
F&A Costs 1	$557,415	$552,239	$546,487

A. OVERALL COVER PAGE

Project Title: Stanford Diabetes Research Center	
Grant Number: 5P30DK116074-03	**Project/Grant Period:** 09/15/2017 - 06/30/2022
Reporting Period: 07/01/2018 - 06/30/2019	**Requested Budget Period:** 07/01/2019 - 06/30/2020
Report Term Frequency: Annual	**Date Submitted:** 05/07/2019
Program Director/Principal Investigator Information: SEUNG K KIM , AB MD PHD **Phone number:** (650) 723-6230 **Email:** SEUNGKIM@STANFORD.EDU	**Recipient Organization:** STANFORD UNIVERSITY STANFORD UNIVERSITY 450 Serra Mall STANFORD, CA 943052004 **DUNS:** 009214214 **EIN:** 1941156365A1 **RECIPIENT ID:**
Change of Contact PD/PI: N/A	
Administrative Official: SUMEETA VASISHTA 3172 Porter Drive Palo Alto, CA 94304 **Phone number:** 650-736-3227 **Email:** sumeeta1@stanford.edu	**Signing Official:** VIVIAN LEUNG Research Management Group 3172 Porter Drive Palo Alto, CA 943041212 **Phone number:** 650-721-1214 **Email:** vleung@stanford.edu
Human Subjects: Yes HS Exempt: No Exemption Number: Phase III Clinical Trial: No	**Vertebrate Animals:** Yes
hESC: No	**Inventions/Patents:** No

B. OVERALL ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The Stanford Diabetes Research Center (SDRC) embodies the culmination of a long-term strategic plan by the Stanford University School of Medicine to create a premier research program founded on a base of superb, collaborative investigators studying basic, clinical and translational problems, and focused on improving diabetes care. The SDRC mission is to foster discovery, application, and translation of scientific knowledge about diabetes and its complications by enabling and focusing its remarkable investigators to innovate advnaces inn diabetes research and improved diabetes care. To realize these goals, the SDRC proposes the following specific aims:
1. Promote research by establishing outstanding Research Cores that enhance discovery and foster collaborative, interdisciplinary innovative diabetes research. Modern Research Cores will drive collaborative and innovative research in the SDRC. These Cores provide expertise and state-of-the-art technical resources to promote and accelerate advances in basic, translational and clinical research. The four Cores in the SDRC include: 1) the Islet Procurement and Research Core, 2) the Diabetes Immune Monitoring Core, 3) the Clinical & Translational Core, and 4) the Diabetes Genomics & Analysis Core.

2. Enable and encourage multidisciplinary interactions and learning in a collaborative Center. The SDRC Administrative Core, Enrichment, and Pilot and Feasibility Programs will leverage resources within the SDRC to foster productive local, national and international collaborations, including Silicon Valley innovators. The P&F Program will support bold hypotheses and innovation by SDRC members, and promote interactive science. Coordination and communication about SDRC opportunities in funding, research progress, and other enrichment opportunities will spark discoveries that advance diabetes research.

3. Encourage and enable research programs by future leaders of diabetes research. Through a focus on advancing the research of an outstanding cadre of junior investigators and trainees, the SDRC will foster and mentor the development of the next generation of leading diabetes researchers. Through programs like the P&F awards, unique industrial-academic partnerships focused on job placement in diabetes-related research, and leadership by SDRC members of training programs, including 10 T32 programs, we aim to provide leadership to the national and international diabetes research effort.

4. Support ongoing SDRC evolution, growth and innovation, work with DRC research base, and local community to expand awareness about diabetes research and care. SDRC Programs will promote and enhance education about diabetes research and opportunities to impact clinical care within Stanford and the community. This includes Enrichment Programs that organize scientific exchange and interactions and SDRC interactions with health care providers. The SDRC will emerge as a crucial hub to connect all stakeholders, especially patients and their families, to the dynamic advances and possibilities of emerging discoveries in diabetes research and care.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: Overall-accomplishments-2019.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

For this reporting period, is there one or more Revision/Supplement associated with this award for which reporting is required?

No

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: Overall_Training_2019.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

1. Diabetes Prevention and Wellness Health Fair -11/14/18 - included free diabetes risk assessment, nutrition education, diabetes prevention tips, living healthy with diabetes guidelines, up-to-date diabetes technologies, state of the art wellness tools, food demonstrations, exhibit booths features diabetes product and equipment, diabetes advocacy and prevention groups available to answer questions
2. Public forum for dissemination of research projects of SDRC – 4th annual Frontiers in Diabetes Research Symposium on April 24th 2018 where SDRC members and their laboratories will do research presentations and posters describing their latest work in the field of diabetes
3. Bay Area Diabetes Summit – SDRC program manager and administrative staff disseminated flyers describing research goals and initiative and introducing the SDRC to the general public. There were also 3 presentations by SDRC investigators – Drs. Marina Basina, David Maahs and Everett Meyer
4. CHRI Seminar on Diabetes Research on 12/3/18: Bruce Buckingham, Rayhan Lal and Tom Soh presented on the topic of Diabetes Technology
5. Dr. David Maahs, Associate Director of SDRC talked about specific SDRC research programs at JDRF OneWalk Kickoff in August

2018
6. Program Manager presented poster/abstract titled ‘Structure and Process of an NIH-funded Diabetes Research Center’ at ISPAD2018 in Hyderabad, India to spark a conversation and coerce other similar models to be developed in other countries outside United States. 1011 attendees from 59 countries. Poster was blogged by Indian attendees – Kartik Balachandran and Mohan Shenoy from JIPMER and Amrutha (https://medicalruminations.wordpress.com/2018/10/14/centralizing-diabetes-research/). Thomas Meissner from Germany was moderator for poster session and raised the question of how interested individuals from outside US can visit and participate in the activities of SDRC to get insights directly by participation. David responded that they can reach out to SDRC members and arrange for a month or 2 month visiting opportunity which can help them to view SDRC activities directly. No direct coverage through NIH funding for such opportunity. Several European, Canadian and Australian attendees discussed SDRC resources and utility with Dr. David Maahs and Kiran Kocherlakota during the 4 day conference.
7. SDRC faculty Dr. Joy Wu and Dr. Howard Chang presented at ReMS forum in Beckman Center
8. SDRC members contributed at all 4 JDRF OneWalk venues in Silicon Valley with medical and research stations.
9. SDRC published its first e-Newsletter in February 2019 with the idea of making it a quarterly publication
10. SDRC partnered with VLab at their 'Breakthroughs in diabetes technology" event on Stanford campus
11. Dr. Marina Basina presented at the CDH & eWEAR Workshop: Health Monitoring in March 2019 to extend partnerships with these Stanford centers
12. Dr. Seung Kim, Director of SDRC, presented in Chicago to Stanford, Exeter and Lawrenceville alumni groups about SDRC activities in March 2019
13. SDRC was medical partner at the Bay Area Diabetes Summit organized by CarbDM in April 2019. SDRC program manager distributed flyers promoting the clinical research registry. A half page advertisement about clinical registry was published in the event materials

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

1. SDRC leadership will follow advice from the External Advisory Board to enhance the enrichment, research core and pilot and feasibility components of the center and strengthen research collaborations of the user base.
2. SDRC leadership will work with individual Biomedical Research Core Directors to increase accrual of users and expansion of services for each of the 4 cores
2. SDRC leadership and Administrative Core will promote and announce the P&F program RFA in July to solicit excellent proposals
3. SDRC leadership is keen on partnering opportunities with, and in, local bay area diabetes community activities to spread awareness about the research activities at SDRC - details are outlined within the Enrichment section.

Overall accomplishments of the Stanford Diabetes Research Center (SDRC)

Period: 07/01/18-05/01/19

1) **Major activities**

- Weekly seminar series for discussion of research-in-progress
- 2 annual symposia – Diabetes Research Forum and Frontiers in Diabetes Research Symposium
- P&F awards – 21 applicants of which 8 were awarded pilot grants
- Diabetes Prevention and Wellness Health Fair
- Presentations by all 4 research cores to encourage greater use of core services
- Bay Area Islet Biology meeting

2) **Major findings, developments, or conclusions**

- Accrual of users for core facilities – By working with the core facility directors and personnel, the SDRC leadership and administrative core have helped solicit more users and usage (see core reports)
- Inducted 7 new members to SDRC roster; three each in the affinity groups of Bioengineering and Behavioral Sciences and Metabolism and Signaling and one in the Immunology and Islet Transplantation affinity group. There are also three membership applications pending review by the SDRC leadership for new membership.
- Recruitment of Dr. Danny Chou and Dr. Anna Gloyn – As originally proposed, the SDRC has been played a key role in recruitment not only of new SDRC members from within Stanford, but for new recruits to Stanford University itself. The presence of a consolidated center to support diabetes research at Stanford has been instrumental in encouraging Dr. Danny Chou from University of Utah and Dr. Anna Gloyn from University of Oxford to considering joining the research base at Stanford University. (More details in Administrative core section). While neither of these investigators are yet at Stanford, we will update the progress on these recruitments in the next RPPR.

3) **Key outcomes**

• Three **significant findings** and supporting center citations that typify activity at our center

1. Horton TM, Allegretti PA, Lee S, Moeller HP, Smith M, Annes JP. Zinc-chelating small molecules preferentially accumulate and function within pancreatic β cells. Cell chemical biology. 2019 February 21;26(2):213-222.e6. PubMed PMID: 30527998; PubMed Central PMCID: PMC6386607.

   SDRC investigators: Dr. Justin Annes

   Supported by Stanford Islet Research Core, Pilot funding and T32DK00721743

   To precisely send a drug to its intended target in the body requires two things: One, the intended target must possess a unique quality that distinguishes it from everything else surrounding it, and two, the drug must be able to recognize and use this unique property to then specifically seek the target alone and nothing else. Dr Justin Annes' group achieved this by designing a drug that specifically targets insulin-producing beta cells by tapping into a unique property of beta cells - their propensity to accumulate zinc within their insulin granules.

2. Arda HE, Tsai J, Rosli YR, Giresi P, Bottino R, Greenleaf WJ, Chang HY, Kim SK. A Chromatin Basis for Cell Lineage and Disease Risk in the Human Pancreas. Cell

systems. 2018 September 26;7(3):310-322.e4. PubMed PMID: 30145115; PubMed Central PMCID: PMC6347013.

SDRC investigators: Drs. William Greenleaf, Howard Chang, Seung K Kim
Supported by Stanford Islet Research Core and SDRC Enrichment

An outstanding challenge in diabetes genetics is to identify the cellular, physiological, and molecular mechanisms linking GWAS identified genetic variants and disease risk. This publication combined a robust cell purification strategy with chromatin analysis using ATAC-seq asnd ChIP-seq to generate cell-type-specific chromatin maps of the human pancreas as a framework to investigate the genetic basis of these pancreatic exocrine-endocrine disease associations. This work shows that disease risk variants related to pancreas are significantly enriched in regulatory regions and reveals previously unrecognized links between endocrine and exocrine pancreas in diabetes risk.

3. Nagy N, Gurevich I, Kuipers HF, Ruppert SM, Marshall PL, Xie BJ, Sun W, Malkovskiy AV, Rajadas J, Grandoch M, Fischer JW, Frymoyer AR, Kaber G, Bollyky PL. 4-Methylumbelliferyl glucuronide contributes to hyaluronan synthesis inhibition. The Journal of biological chemistry. 2019 March 26. PubMed PMID: 30914479. PubMed PMID: 30707291.

   SDRC investigators: Drs. Nadine Nagy and Paul Bollyky
   Supported by SDRC pilot funding

   In a previous publication, this group showed treatment with an inhibitor of hyaluronan (HA) synthesis, 4-methylumbelliferone (4-MU), halted progression to diabetes even after the onset of insulitis. Unfortunately, 4-MU has poor pharmacokinetics that are thought to limit its use as a drug treatment. In this latest publication, this group demonstrate that 4-MUG contributes to the bioactivity of 4-MU both in vitro and in vivo via conversion into 4-MU. Indeed, 4-MU and 4- MUG were almost equally effective over a range of concentrations at inhibiting HA synthesis by cancer cell lines in vitro. Both were likewise equally effective in treating autoimmunity in a mouse model of T1D. Oral administration of 4-MUG to mice inhibits HA synthesis, promotes FoxP3+ regulatory T-cell expansion, and prevents autoimmune diabetes. Mice fed either 4-MUG or 4-MU had equivalent 4-MU:4-MUG ratios in serum, liver and pancreas, indicating that 4-MU and 4-MUG reach an equilibrium in these tissues. These findings greatly alter the experimental and therapeutic possibilities for HA synthesis inhibition.

• Progress along a **translational continuum** in our center for a selected topic area/project

SPIRIT program – This program is a part of the strategic initiatives put forward by the SDRC – “Development of an islet transplantation program at SHC through the Stanford DRC”

SDRC investigators: Drs. Everett Meyer, Paul Bollyky, Avnesh Thakor, Walter Park, Marina Basina, Seung Kim, Brendan Visser

The above mentioned multi-disciplinary team of investigators has been meeting weekly and are working towards a functional islet transplantation program at Stanford called the Stanford Pancreatic Islet Regeneration and Immune Tolerance (SPIRIT) program. The program has two arms: autologous islet transplant for pancreatitis (which is reimbursed by insurance) and allogeneic islet transplantation in combination with allogeneic hematopoietic stem cell transplantation for tolerance induction. The autologous program involves a collaboration between our world-class pancreatitis gastrointestinal team, endocrinology, surgery and bone marrow transplantation. The allogeneic program involves surgery, bone marrow transplantation, interventional radiology, endocrinology, infectious diseases and immunology.

Support from the SDRC has been critical to advance the Stanford Pancreatic Islet Regeneration and Immune Tolerance (SPIRIT) clinical program. Due to this support, the SPIRIT program investigators worked together with the hospital business development to author a

comprehensive financial proposal which was submitted to the Stanford Health Care leadership in April, 2019. The report benefited from visits from world experts in islet transplantation to see our facility and help our program including Dr. Rita Bottina (Cincinatti), Dr. Camillo Ricordi (Miami), Dr. Mark Kay (Melbourne), Dr. Andrew Posselt (UCSF) and Dr. Greg Szot (UCSF). Each gave a talk sponsored by the DRC. Dr. James Shapiro (Edmonton) has on numerous occasions provided guidance to the SPIRIT group. Each of these program leaders has pledged to support our program and would like to pursue collaboration.

In addition, members of the SPIRIT team visited the University of Miami, UCSF and Edmonton, Canada to see their islet transplant programs first-hand. Dr. Stephan Busque was able to fulfill training that will allow him to apply to the national transplantation accreditation organization as medical director of a nascent program at Stanford. Dr. Avnesh Thakor was further able to develop approaches for islet introduction in patients. Dr. Marina Basina was able to see and coordinate with experts in peri-transplant endocrine care. Dr. Walter Park was able to also see and coordinate with experts in islet autotransplantation. Dr. Everett Meyer was able to gain insight into the requirements for our cellular therapy laboratory, as well as clinical care, clinical trial and correlative science efforts. Support from the DRC allowed us to renovate and retrofit the Cellular Therapy Facility to be able to receive shipped islets and also to possibly begin islet isolation and bone marrow isolation for cadaveric islet transplantation.

• **New Collaborative activities**

The creation of the Stanford DRC created an opportunity for discussions on pancreas cancer research and ultimately the organization of the Frontiers in Pancreatic Cancer Research symposium supported by the Dean of Medicine and led by SDRC members such as Dr. Seung Kim and Dr. Aida Habtezion with Dr. Steven Artandi, Professor of Biochemistry. This interaction expanded focus in pancreas cancer research and led to the creation of the **Stanford Pancreas Research Group** which includes SDRC investigators (Drs. Seung Kim, Aida Habtezion, Monte Winslow, Edgar Engleman, Walter Park, Stephen Quake, Brendan Visser). The group is currently working on a P01 center grant submission to formally be recognized as a research base in pancreas cancer.
URL: https://pcrg.stanford.edu

• **Activities raising awareness** and interest in diabetes research and clinical care at center institutions, locally, regionally, and nationally:

1. Diabetes Education and Prevention Program – Monthly classes held in three Bay Area locations to help patients live well and keep informed. East-bay location was added during the last year due to interest and need.
2. Diabetes Prevention and Wellness Health Fair organized at Stanford Hospital on the World diabetes day (11/14/17) to create awareness, provide free diabetes risk assessment, provide nutrition education and diabetes prevention tips. Vendors were given the opportunity to showcase their up-to-date diabetes technologies
3. VLAB Breakthroughs in Diabetes panel discussion at Stanford – VLAB is a non-profit, volunteer-run organization that connects entrepreneurs, founders, investors and industry experts around ideas and technologies with the potential to disrupt industries. They organized a panel discussion regarding the advances in diabetes technologies and the potential for a cure in the future. SDRC helped support this event and several SDRC members participated. We distributed flyers promoting the Clinical Registry and SDRC funded Diabetes Care Programs.
4. Frontiers in Diabetes Research Symposium, May 2nd – This symposium organized annually by SDRC is open to public and features several cutting edge presentations about the latest research in diabetes by both SDRC members and invited guest

speakers. There will also be poster presentations from graduate students and post-doctoral fellows to increase engagement and discussion of various center projects
5. Summer Picnic sponsored by SDRC and co-organized with JDRF was a community building event aimed at raising awareness regarding diabetes. Kyle Cochran, who has type 1 diabetes and won American Ninja Warrior series gave a speech about the lack of awareness about t1d and what kids go through in school post-diagnosis. Everett Meyer spoke as t1d parent and SDRC member to introduce research at SDRC and the SPIRIT transplantation program efforts to the bay area diabetes community.
6. 'Feel Good Food' Celebrity Chef series with Curtis Aikens – Chef Aikens engaged the audience to think creatively in the kitchen and apply ways of tailoring recipes to lifestyle needs. He discussed three specific recipes to present ways in which dietary restrictions and caloric intake can be managed while retaining flavor and excitement of cooking and enjoying the food you prepare.
7. ISPAD 2018 – SDRC Program Manager presented a poster regarding the support provided by a central entity such as the Stanford Diabetes Research Center for diabetes related research at Stanford University. The idea was to generate a conversation among attendees from other countries where such a model as DRCs does not exist and for them to consider ways to build a community that can support common research cores and enable highly collaborative research leading to better outcomes.

• **Regional and national presentations** (list all that were sponsored by or supported with Diabetes Center funds; i.e. presentations of research that was supported by Diabetes Center funds)
1. Dr. Danny Chou (Developmental Biology special presentation)
2. Dr. Alice Long (SDRC guest seminar series)
3. Dr. Anna Gloyn (Endocrinology division grand rounds)
4. Dr. Jon Piganelli (SDRC guest seminar series)
5. Dr. Melena Bellin (Endocrinology and Pediatrics grand rounds)
6. Dr. Randi Epstein (Endocrinology division grand rounds
7. Dr. Philip Scherer (Cutting lecture series by Chemical and Systems Biology)
8. Dr. Andrew Posselt (SDRC guest seminar series)
9. Dr. Greg Szot (SDRC guest seminar series)
10. Dr. Paolo Sassone Corsi (Cutting lecture series by Chemical and Systems Biology)
11. Dr. Rafael Scharfman (SDRC guest seminar series)
12. Dr. Richard Bergman (Endocrinology grand rounds)
13. Dr. Tony Lam (SDRC guest seminar series)
14. Dr. Peter Robinson (SDRC guest seminar series)
15. Dr. Gerald Shulman (Reaven memorial lecture)
16. Keystone conference was co-organized by Dr. Seung Kim, Director of SDRC

• Diabetes Research Center-**sponsored seminars & symposia**
1. Diabetes Research Forum (11/29/17) – see agenda in enrichment section
2. Frontiers in Diabetes Research Symposium (05/02/18) – see agenda in enrichment section
3. Weekly research seminars pertaining to each of the 4 affinity groups (https://sdrc.stanford.edu/conferences)
4. Bay Area Islet Biology meeting – see agenda in enrichment section
5. Bay Area Young Diabetes Investigator Retreat – see details in enrichment section
6. Disrupt Diabetes – SDRC sponsored this event organized by two Stanford undergraduates from Human Biology department which was a culmination of a three-month patient led design challenge where 12 teams created 12 innovative design

solutions with the potential to disrupt the field of diabetes. Presentations from Drs. David Maahs and Diana Naranjo about their ECHO and NICH projects demonstrated the ways in which Stanford clinicians work towards making an impact for t1d patients everywhere. Bruce Buckingham was on the panel of judges to identify the best design proposals. One of the product designs that was chosen as a winner is being developed into a real world solution with the help of a diabetes-focused startup incubator in London.

• Activities **enhancing diabetes education** and training opportunities for patients, students, scientists and clinicians:

1. Diabetes Education and Prevention Programs classes – The interdisciplinary team of healthcare providers at Stanford Health Care led by Dr. Marina Basina assist individuals to gain optimization of blood glucose management and attain their health goals. A new east-bay location was added due to demand and interest from the patient community in that region. Topics include:
    a. Pre-diabetes: Take control
    b. Diabetes core concepts
    c. Carbohydrate counting, the basics
2. MED218SI - Diabetes 101 for healthcare providers organized by Dr. Marina Basina. This course is designed to teach these practical skills about diabetes care, treatment and the latest research in the field for 1st and 2nd year medical students to raise awareness about living with diabetes and resulting medical complications of diabetes

Training grants listed in training section of the enrichment component

• **Joint activities**

Pending Support

B.4 What opportunities for training and professional development has the project provided?

Please see details in the individual components for efforts by the Stanford Diabetes Research Center to attract, support and train future diabetes research leaders who will advance diabetes-related knowledge and improve patient care. Briefly, SDRC leadership has reached a decision to include Instructors at Stanford as associate members of SDRC to promote their career development. Molly Tanenbaum, who was inducted as new member last year just received a K23 award and will be mentored by Dr. Korey Hood, leader of the SDRC Bioengineering and Behavioral Sciences affinity group. In 2018, Dr. Seung Kim organized a grant-writing course for 7 junior faculty members (6 belong to SDRC and 1 non-member) and this has benefited their grant writing abilities. Dr. Kyle Loh has received a Pew Scholar award as a result of this training in grant-writing.
The Enrichment section provides a detailed list of SDRC members who serve as mentors on training grants that support trainees working on projects related to the field of diabetes. One of the post-doctoral trainees, Dr. Hadi Harati, mentored by Dr. Josh Knowles on a training grant has published the work in Diabetologia. Tim Horton, mentored by Dr. Justin Annes on endocrinology division training grant published his trainee project in Cell Chemical Biology. This work was further supported by the SDRC Clinical and Translational Core. Each of the SDRC research cores provides year-round training and consultation services for best study design and execution. The pilot and feasibility program also provides opportunities for trainees to apply their research to research relevant to the understanding and prevention of diabetes. Specific trainees and their accomplishments have been mentioned in the pilot program section of this RPPR, but briefly, the trainees receive an opportunity to present their ideas and research progress via presentations at the annual Diabetes Research Forum organized by SDRC in November each year. They also have the opportunity to present posters at a public forum organized by SDRC called the Annual Frontiers in Diabetes Research Symposium where they are eligible to win best poster awards as has been the case for example with Dr. Sooyeon Lee's work which received a pilot award in 2018.

C. OVERALL PRODUCTS

C.1 PUBLICATIONS

Are there publications or manuscripts accepted for publication in a journal or other publication (e.g., book, one-time publication, monograph) during the reporting period resulting directly from this award?

Yes

Publications Reported for this Reporting Period

Public Access Compliance	Citation
Complete	Enge M, Arda HE, Mignardi M, Beausang J, Bottino R, Kim SK, Quake SR. Single-Cell Analysis of Human Pancreas Reveals Transcriptional Signatures of Aging and Somatic Mutation Patterns. Cell. 2017 October 5;171(2):321-330.e14. PubMed PMID: 28965763; PubMed Central PMCID: PMC6047899; DOI: 10.1016/j.cell.2017.09.004.
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Complete	Ueno M, Suzuki J, Hirose M, Sato S, Imagawa M, Zenimaru Y, Takahashi S, Ikuyama S, Koizumi T, Konoshita T, Kraemer FB, Ishizuka T. Cardiac overexpression of perilipin 2 induces dynamic steatosis: prevention by hormone-sensitive lipase. American journal of physiology. Endocrinology and metabolism. 2017 December 1;313(6):E699-E709. PubMed PMID: 28851734; PubMed Central PMCID: PMC6415650; DOI: 10.1152/ajpendo.00098.2017.
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Complete	Mahajan A, Wessel J, Willems SM, Zhao W, Robertson NR, Chu AY, Gan W, Kitajima H, Taliun D, Rayner NW, Guo X, Lu Y, Li M, Jensen RA, Hu Y, Huo S, Lohman KK, Zhang W, Cook JP, Prins BP, Flannick J, Grarup N, Trubetskoy VV, Kravic J, Kim YJ, Rybin DV, Yaghootkar H, Müller-Nurasyid M, Meidtner K, Li-Gao R, Varga TV, Marten J, Li J, Smith AV, An P, Ligthart S, Gustafsson S, Malerba G, Demirkan A, Tajes JF, Steinthorsdottir V, Wuttke M, Lecoeur C, Preuss M, Bielak LF, Graff M, Highland HM, Justice AE, Liu DJ, Marouli E, Peloso GM, Warren HR, Afaq S, Afzal S, Ahlqvist E, Almgren P, Amin N, Bang LB, Bertoni AG, Bombieri C, Bork-Jensen J, Brandslund I, Brody JA, Burtt NP, Canouil M, Chen YI, Cho YS, Christensen C, Eastwood SV, Eckardt KU, Fischer K, Gambaro G, Giedraitis V, Grove ML, de Haan HG, Hackinger S, Hai Y, Han S, Tybjærg-Hansen A, Hivert MF, Isomaa B, Jäger S, Jørgensen ME, Jørgensen T, Käräjämäki A, Kim BJ, Kim SS, Koistinen HA, Kovacs P, Kriebel J, Kronenberg F, Läll K,

	Lange LA, Lee JJ, Lehne B, Li H, Lin KH, Linneberg A, Liu CT, Liu J, Loh M, Mägi R, Mamakou V, McKean-Cowdin R, Nadkarni G, Neville M, Nielsen SF, Ntalla I, Peyser PA, Rathmann W, Rice K, Rich SS, Rode L, Rolandsson O, Schönherr S, Selvin E, Small KS, Stančáková A, Surendran P, Taylor KD, Teslovich TM, Thorand B, Thorleifsson G, Tin A, Tönjes A, Varbo A, Witte DR, Wood AR, Yajnik P, Yao J, Yengo L, Young R, Amouyel P, Boeing H, Boerwinkle E, Bottinger EP, Chowdhury R, Collins FS, Dedoussis G, Dehghan A, Deloukas P, Ferrario MM, Ferrières J, Florez JC, Frossard P, Gudnason V, Harris TB, Heckbert SR, Howson JMM, Ingelsson M, Kathiresan S, Kee F, Kuusisto J, Langenberg C, Launer LJ, Lindgren CM, Männistö S, Meitinger T, Melander O, Mohlke KL, Moitry M, Morris AD, Murray AD, de Mutsert R, Orho-Melander M, Owen KR, Perola M, Peters A, Province MA, Rasheed A, Ridker PM, Rivadineira F, Rosendaal FR, Rosengren AH, Salomaa V, Sheu WH, Sladek R, Smith BH, Strauch K, Uitterlinden AG, Varma R, Willer CJ, Blüher M, Butterworth AS, Chambers JC, Chasman DI, Danesh J, van Duijn C, Dupuis J, Franco OH, Franks PW, Froguel P, Grallert H, Groop L, Han BG, Hansen T, Hattersley AT, Hayward C, Ingelsson E, Kardia SLR, Karpe F, Kooner JS, Köttgen A, Kuulasmaa K, Laakso M, Lin X, Lind L, Liu Y, Loos RJF, Marchini J, Metspalu A, Mook-Kanamori D, Nordestgaard BG, Palmer CNA, Pankow JS, Pedersen O, Psaty BM, Rauramaa R, Sattar N, Schulze MB, Soranzo N, Spector TD, Stefansson K, Stumvoll M, Thorsteinsdottir U, Tuomi T, Tuomilehto J, Wareham NJ, Wilson JG, Zeggini E, Scott RA, Barroso I, Frayling TM, Goodarzi MO, Meigs JB, Boehnke M, Saleheen D, Morris AP, Rotter JI, McCarthy MI. Refining the accuracy of validated target identification through coding variant fine-mapping in type 2 diabetes. Nature genetics. 2018 April 9;50(4):559-571. PubMed PMID: 29632382; PubMed Central PMCID: PMC5898373; DOI: 10.1038/s41588-018-0084-1.
Complete	Tikkanen E, Gustafsson S, Amar D, Shcherbina A, Waggott D, Ashley EA, Ingelsson E. Biological Insights Into Muscular Strength: Genetic Findings in the UK Biobank. Scientific reports. 2018 April 24;8(1):6451. PubMed PMID: 29691431; PubMed Central PMCID: PMC5915424; DOI: 10.1038/s41598-018-24735-y.
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Complete	DeSalvo DJ, Miller KM, Hermann JM, Maahs DM, Hofer SE, Clements MA, Lilienthal E, Sherr JL, Tauschmann M, Holl RW. Continuous glucose monitoring and glycemic control among youth with type 1 diabetes: International comparison from the T1D Exchange and DPV Initiative. Pediatric diabetes. 2018 November;19(7):1271-1275. PubMed PMID: 29923262; PubMed Central PMCID: PMC6175652; DOI: 10.1111/pedi.12711.
Complete	Iacocca MA, Chora JR, Carrié A, Freiberger T, Leigh SE, Defesche JC, Kurtz CL, DiStefano MT, Santos RD, Humphries SE, Mata P, Jannes CE, Hooper AJ, Wilemon KA, Benlian P, O'Connor R, Garcia J, Wand H, Tichy L, Sijbrands EJ, Hegele RA, Bourbon M, Knowles JW. ClinVar database of global familial hypercholesterolemia-associated DNA variants. Human mutation. 2018 November;39(11):1631-1640. PubMed PMID: 30311388; PubMed Central PMCID: PMC6206854; DOI: 10.1002/humu.23634.
Complete	Mahajan A, Taliun D, Thurner M, Robertson NR, Torres JM, Rayner NW, Payne AJ, Steinthorsdottir V, Scott RA, Grarup N, Cook JP, Schmidt EM, Wuttke M, Sarnowski C, Mägi R, Nano J, Gieger C, Trompet S, Lecoeur C, Preuss MH, Prins BP, Guo X, Bielak LF, Below JE, Bowden DW, Chambers JC, Kim YJ, Ng MCY, Petty LE, Sim X, Zhang W, Bennett AJ, Bork-Jensen J, Brummett CM, Canouil M, Ec Kardt KU, Fischer K, Kardia SLR, Kronenberg F, Läll K, Liu CT, Locke AE, Luan J, Ntalla I, Nylander V, Schönherr S, Schurmann C, Yengo L, Bottinger EP, Brandslund I, Christensen C, Dedoussis G, Florez JC, Ford I, Franco OH, Frayling TM, Giedraitis V, Hackinger S, Hattersley AT, Herder C, Ikram MA, Ingelsson M, Jørgensen ME, Jørgensen T, Kriebel J, Kuusisto J, Ligthart S, Lindgren CM, Linneberg A, Lyssenko V, Mamakou V, Meitinger T, Mohlke KL, Morris AD, Nadkarni G, Pankow JS, Peters A, Sattar N, Stančáková A, Strauch K, Taylor KD, Thorand B, Thorleifsson G, Thorsteinsdottir U, Tuomilehto J, Witte DR, Dupuis J, Peyser PA, Zeggini E, Loos RJF, Froguel P, Ingelsson E, Lind L, Groop L, Laakso M, Collins FS, Jukema JW, Palmer CNA, Grallert H, Metspalu A, Dehghan A, Köttgen A, Abecasis GR, Meigs JB, Rotter JI, Marchini J, Pedersen O, Hansen T, Langenberg C, Wareham NJ, Stefansson K, Gloyn AL, Morris AP, Boehnke M, McCarthy MI. Fine-mapping type 2 diabetes loci to single-variant resolution using high-density imputation and islet-specific epigenome maps. Nature genetics. 2018 November;50(11):1505-1513. PubMed PMID: 30297969; PubMed Central PMCID: PMC6287706; DOI: 10.1038/s41588-018-0241-6.
Complete	Tanenbaum ML, Adams RN, Iturralde E, Hanes SJ, Barley RC, Naranjo D, Hood KK. From Wary Wearers to d-Embracers: Personas of Readiness to Use Diabetes Devices. Journal of diabetes science and technology. 2018 November;12(6):1101-1107. PubMed PMID: 30132692; PubMed Central PMCID: PMC6232751; DOI: 10.1177/1932296818793756.
Non-Compliant	Varni JW, Delamater AM, Hood KK, Driscoll KA, Wong JC, Adi S, Yi-Frazier JP, Grishman EK, Faith MA, Corathers SD, Kichler JC, Miller JL, Raymond JK, Doskey EM, Aguirre V, Heffer RW, Wilson DP. Diabetes management mediating effects between diabetes symptoms and health-related quality of life in adolescents and young adults with type 1 diabetes. Pediatric diabetes. 2018 November;19(7):1322-1330. PubMed PMID: 29927039; DOI: 10.1111/pedi.12713.
Complete	Medina CO, Nagy N, Bollyky PL. Extracellular matrix and the maintenance and loss of peripheral immune tolerance in autoimmune insulitis. Current opinion in immunology. 2018 December;55:22-30. PubMed PMID: 30248522; PubMed Central PMCID: PMC6286219; DOI: 10.1016/j.coi.2018.09.006.

Complete	Rego S, Dagan-Rosenfeld O, Zhou W, Sailani MR, Limcaoco P, Colbert E, Avina M, Wheeler J, Craig C, Salins D, Röst HL, Dunn J, McLaughlin T, Steinmetz LM, Bernstein JA, Snyder MP. High-frequency actionable pathogenic exome variants in an average-risk cohort. Cold Spring Harbor molecular case studies. 2018 December 17;4(6). PubMed PMID: 30487145; PubMed Central PMCID: PMC6318774; DOI: 10.1101/mcs.a003178.
PMC Journal - In process	Deng B, Shen WJ, Dong D, Azhar S, Kraemer FB. Plasma membrane cholesterol trafficking in steroidogenesis. FASEB journal : official publication of the Federation of American Societies for Experimental Biology. 2019 January;33(1):1389-1400. PubMed PMID: 30133326; DOI: 10.1096/fj.201800697RRR.
N/A	Lee JJ, Kim SK. Spheroid Culture of Human Pancreatic Ductal Cells to Reconstitute Development of Pancreatic Intraepithelial Neoplasia. Methods in molecular biology (Clifton, N.J.). 2019;1882:63-71. PubMed PMID: 30378044; DOI: 10.1007/978-1-4939-8879-2_6.
Non-Compliant	Azhar S, Bittner S, Hu J, Shen WJ, Cortez Y, Hao X, Han L, Lagerstedt JO, Kraemer FB, Johansson JO. Novel ABCA1 peptide agonists with antidiabetic action. Molecular and cellular endocrinology. 2019 January 15;480:1-11. PubMed PMID: 30290217; DOI: 10.1016/j.mce.2018.09.011.
Non-Compliant	Ren G, Rezaee M, Razavi M, Taysir A, Wang J, Thakor AS. Adipose tissue-derived mesenchymal stem cells rescue the function of islets transplanted in sub-therapeutic numbers via their angiogenic properties. Cell and tissue research. 2019 February 1. PubMed PMID: 30707291; DOI: 10.1007/s00441-019-02997-w.
Complete	Singh M, Bittner S, Li Y, Bittner A, Han L, Cortez Y, Inayathullah M, Arif Z, Parthasarathi R, Rajadas J, Shen WJ, Nicolls MR, Kraemer FB, Azhar S. Anti-hyperlipidaemic effects of synthetic analogues of nordihydroguaiaretic acid in dyslipidaemic rats. British journal of pharmacology. 2019 February;176(3):369-385. PubMed PMID: 30374952; PubMed Central PMCID: PMC6329620; DOI: 10.1111/bph.14528.
Complete	Horton TM, Allegretti PA, Lee S, Moeller HP, Smith M, Annes JP. Zinc-Chelating Small Molecules Preferentially Accumulate and Function within Pancreatic β Cells. Cell chemical biology. 2019 February 21;26(2):213-222.e6. PubMed PMID: 30527998; PubMed Central PMCID: PMC6386607; DOI: 10.1016/j.chembiol.2018.10.019.
Complete	Kahkoska AR, Crandell J, Driscoll KA, Kichler JC, Seid M, Mayer-Davis EJ, Maahs DM. Dysglycemia among youth with type 1 diabetes and suboptimal glycemic control in the Flexible Lifestyle Empowering Change trial. Pediatric diabetes. 2019 March;20(2):180-188. PubMed PMID: 30536572; PubMed Central PMCID: PMC6367932; DOI: 10.1111/pedi.12805.
Complete	Kim SH, Abbasi F. Myths about Insulin Resistance: Tribute to Gerald Reaven. Endocrinology and metabolism (Seoul, Korea). 2019 March;34(1):47-52. PubMed PMID: 30912338; PubMed Central PMCID: PMC6435844; DOI: 10.3803/EnM.2019.34.1.47.
Complete	Ong SB, Lee WH, Shao NY, Ismail NI, Katwadi K, Lim MM, Kwek XY, Michel NA, Li J, Newson J, Tahmasebi S, Rehman J, Kodo K, Jang HR, Ong SG. Calpain Inhibition Restores Autophagy and Prevents Mitochondrial Fragmentation in a Human iPSC Model of Diabetic Endotheliopathy. Stem cell reports. 2019 March 5;12(3):597-610. PubMed PMID: 30799273; PubMed Central PMCID: PMC6411483; DOI: 10.1016/j.stemcr.2019.01.017.
PMC Journal - In process	Nagy N, Gurevich I, Kuipers HF, Ruppert SM, Marshall PL, Xie BJ, Sun W, Malkovskiy AV, Rajadas J, Grandoch M, Fischer JW, Frymoyer AR, Kaber G, Bollyky PL. 4-Methylumbelliferyl glucuronide contributes to hyaluronan synthesis inhibition. The Journal of biological chemistry. 2019 March 26. PubMed PMID: 30914479; DOI: 10.1074/jbc.RA118.006166.
In Process at NIHMS	Sweere JM, Van Belleghem JD, Ishak H, Bach MS, Popescu M, Sunkari V, Kaber G, Manasherob R, Suh GA, Cao X, de Vries CR, Lam DN, Marshall PL, Birukova M, Katznelson E, Lazzareschi DV, Balaji S, Keswani SG, Hawn TR, Secor PR, Bollyky PL. Bacteriophage trigger antiviral immunity and prevent clearance of bacterial infection. Science (New York, N.Y.). 2019 March 29;363(6434). PubMed PMID: 30923196; DOI: 10.1126/science.aat9691.
Complete	Harati H, Zanetti D, Rao A, Gustafsson S, Perez M, Ingelsson E, Knowles JW. No evidence of a causal association of type 2 diabetes and glucose metabolism with atrial

	fibrillation. Diabetologia. 2019 May;62(5):800-804. PubMed PMID: 30810766; PubMed Central PMCID: PMC6451665; DOI: 10.1007/s00125-019-4836-y.
N/A: Not Peer Reviewed	Modeling Cardiovascular Risks of E-Cigarettes with Human Induced Pluripotent Stem Cell-Derived Endothelial Cells. Journal of the American College of Cardiology.

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Nothing to report

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Have inventions, patent applications and/or licenses resulted from the award during the reporting period? No

If yes, has this information been previously provided to the PHS or to the official responsible for patent matters at the grantee organization?

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. OVERALL PARTICIPANTS

D.1 WHAT INDIVIDUALS HAVE WORKED ON THE PROJECT?

Commons ID	S/K	Name	Degree(s)	Role	Cal	Aca	Sum	Foreign Org	Component(s)	Country	SS
eRA Commons User Name	Y	Kim, Seung K	AB,PHD, MD	PD/PI	EFFORT				Admin Core-5984 (Administrative Core), Core-5985 (Islet Procurement and Research Core)		NA
	N	Addleman, Nicholas John		Core Research Professional					Core-5988 (Diabetes Genomics and Analysis Core)		NA
	N	Chakravarthy, Harini		Core Research Professional					Core-5985 (Islet Procurement and Research Core)		NA
	N	Enslen, Brooke Meredith		Core Research Professional					Core-5988 (Diabetes Genomics and Analysis Core)		NA
	N	Fuentes, Blanca		Core Research Professional					Core-5987 (Clinical and Translational Core)		NA
	N	Gu, Xueying		Core Research Professional					Core-5985 (Islet Procurement and Research Core)		NA
	N	Jensen, Kent		Core Research Professional					Core-5986 (Diabetes Immune Monitoring Core)		NA
	N	Kaimal, Rajani		Core Research Professional					Core-5987 (Clinical and Translational Core)		NA
	N	Kocherlakota, Sreelakshmi K		Program Manager					Admin Core-5984 (Administrative Core)		NA
	N	Lasovich, Kimberlie		Core Research Professional					Core-5987 (Clinical and Translational Core)		NA
	N	Maguire, Peter		Bioinformatician					Core-5988 (Diabetes Genomics and Analysis Core)		NA

					EFFORT				
	N	Nair, Ramesh		Bioinformatic an			Core-5988 (Diabetes Genomics and Analysis Core)		NA
	N	Petlura, Christina		Clinical Research Coordinator			Core-5987 (Clinical and Translational Core)		NA
	N	Qin, FeiFei		Core Research Professional			Core-5987 (Clinical and Translational Core)		NA
	N	Zhou, Wenyu		Bioinformatic an			Core-5988 (Diabetes Genomics and Analysis Core)		NA
eRA Commons User Name	Y	GARDNER, CHRISTOPH ER D	PHD,BA	Core Lead			Core-5987 (Clinical and Translational Core)		NA
	Y	CHAIB, HASSAN	PHD,MS	Core Lead			Core-5988 (Diabetes Genomics and Analysis Core)		NA
	Y	Kim, Seung K	AB,MD,PHD	Core Lead			Admin Core-5984 (Administrative Core), Core-5985 (Islet Procurement and Research Core)		NA
	Y	Maecker, Holden T.	PHD,BS	Core Lead			Core-5986 (Diabetes Immune Monitoring Core)		NA

Glossary of acronyms:
S/K - Senior/Key
DOB - Date of Birth
Cal - Person Months (Calendar)
Aca - Person Months (Academic)
Sum - Person Months (Summer)
Foreign Org - Foreign Organization Affiliation
SS - Supplement Support
RE - Reentry Supplement
DI - Diversity Supplement
OT - Other
NA - Not Applicable

D.2 PERSONNEL UPDATES

D.2.a Level of Effort

Will there be, in the next budget period, either (1) a reduction of 25% or more in the level of effort from what was approved by the agency for the PD/PI(s) or other senior/key personnel designated in the Notice of Award, or (2) a reduction in the level of effort below the minimum amount of effort required by the Notice of Award?

No

D.2.b New Senior/Key Personnel

Are there, or will there be, new senior/key personnel?

Yes

File uploaded: Park_Biosketch.pdf

D.2.c Changes in Other Support

Has there been a change in the active other support of senior/key personnel since the last reporting period?

Yes

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D.2.d New Other Significant Contributors

Are there, or will there be, new other significant contributors?

No

D.2.e Multi-PI (MPI) Leadership Plan

Will there be a change in the MPI Leadership Plan for the next budget period?

NA

OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Walter Gwang-Up Park

eRA COMMONS USER NAME (credential, e.g., agency login): eRA Commons User Name

POSITION TITLE: Assistant Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Georgetown University, Washington, D.C.	B.S.	05/98	Science, Technology & International Affairs
Johns Hopkins University, Baltimore, M.D.	M.D.	06/03	Medicine
Stanford University, Stanford, C.A.	Postdoctoral	06/06	Internal Medicine Residency
Stanford University, Stanford, C.A.	Postdoctoral	06/09	Gastroenterology Fellowship
Stanford University, Stanford, C.A.	M.S.	06/09	Health Services Research

A. Personal Statement

Within my subspecialty of Gastroenterology, my career focus is on clinical investigation, teaching, and care of patients with pancreatic disorders. As a pancreatologist, I focus on the diagnosis and management of acute pancreatitis, chronic pancreatitis, pancreatic cysts, and the early diagnosis of pancreatic cancer. To complement this focus, I have competency in endoscopic ultrasound as part of my endoscopic practice. In addition to my interest in pancreatology, I also am interested in the broader issue of quality improvement and measurement in gastroenterology.

I will support the P30 funded Stanford Diabetes Research Center (SDRC) by managing tissue banking efforts within the Clinical and Translational Core Component for relevant biological correlation in the respective studies of SDRC members in the field of Diabetes. As these tissues will be shared between Stanford scientists of varying disciplines, we hope to develop a multi-faceted understanding of diabetes. This interdisciplinary research can be applied to develop new and more effective approaches for treating diabetes.

B. Positions and Honors

Positions

2009	Visiting Pancreas Fellow (March - May), Mayo Clinic, Rochester, M.N.
2009 - 2012	Instructor of Medicine, Gastroenterology, Stanford University, Stanford, C.A.
2012 – Present	Assistant Professor of Medicine, Gastroenterology, Stanford University, Stanford, C.A.
2012 – Present	Medical Director, Pancreas Clinic, Stanford Digestive Health Center, Stanford Hospital, Stanford, C.A.
2016 – Present	Member, Stanford Diabetes Research Center (SDRC)

Honors

1995	American Cancer Society Undergraduate Research Fellowship
1998	Phi Beta Kappa, Georgetown University
2002	Henry Strong Denison Award for Excellence in Research, Johns Hopkins University

2005	Franklin G. Ebaugh Jr. Research Award, Stanford University
2007 – 2009	National Research Service Award, T32
2009	American Pancreatic Association, Young Investigator Award
2009	Chief Fellow, Division of Gastroenterology, Stanford University
2011	Collaborative Alliance for Pancreatic Education & Research Scholarship Award
2014	Hans Fromm Memorial Lecture, Dartmouth Medical School
2015	American Gastroenterological Association Future Leaders Program

C. Contributions to Science

1. A primary focus of my current research focuses on identifying and validating novel cyst fluid biomarkers for pancreatic cysts. Using team science, my approach relies on collaborations with a network of laboratory-based scientists where novel insights into the biology of pancreas cancer are studied to a growing bio-repository of pancreatic cyst fluid being prospectively collected at my institution under my direction. A database is maintained that captures a comprehensive array of clinical and imaging information related to each sample. Highlighted below is a list of studies that I served as the first or last author:

a. **Park, WG**, Mascrenhas, R, Palaez, M, Smyrk, T, O'Kane, D, Clain, JE, Levy, MJ, Pearson RK, Petersen, BT, Topazian, MD, Vege SS, Chari, ST. The Diagnostic Performance of Cyst Fluid Carcinoembryonic Antigen (CEA) and Amylase in Histologically Confirmed Pancreatic Cystic Lesions (PCL). Pancreas 2011;40(1):42-5. (PMID: 20966811)

b. Tun, MT, Pai, RK, Visser, B, Norton, J, Poultsides, GA, Banerjee, S, Van Dam, J, Chen, AM, Friedland, S, Scott, B, Verma, R, Lowe, AW, **Park, WG**. The Diagnostic Utility of Amphiregulin in Pancreatic Cysts. BMC Gastro 2012 Feb 14;12:15. (PMID: 22333441)

c. **Park, WG,** Wu, M, Bowen, R, Zheng, M, Fitch, WL, Pai, RK, Wodziak, D, Visser, BV, Poultsides, GA, Norton, JA, Banerjee, SB, Chen, AM, Friedland, S, Scott, BA, Pasricha, PJ, Lowe, AW, Peltz, G. Metabolomic Markers Differentiate Mucinous from Non-Mucinous Pancreatic Cysts. Gastrointest Endosc 2013 Aug;78(2):295-302. (PMID: 23566642)

d. Zikos T, Pham K, Bowen R, Chen AM, Banerjee S, Friedland S, Dua MM, Norton JA, Poultsides GA, Visser BC, **Park WG.** Cyst Fluid Glucose is Rapidly Feasible and Accurate in Diagnosing Mucinous Pancreatic Cysts. Am J Gastroenterol 2015; epub ahead of print. (PMID: 25986360)

2. As the medical director of the pancreas clinic and active clinician, I am involved in seeing numerous patients with complex pancreatic disorders involving pancreatitis, pancreatic cysts, and pancreatic cancer. The following studies highlight several clinical case series of various pancreatic disorders that provide observations and hypotheses that may support future clinical studies.

a. **Park, WG**, Yan, BM, Schellenberg, D, Kim, J, Chang, DT, Koong, A, Patalano, C, Van Dam, J. EUS-Guided Gold Fiducial Insertion for Image-Guided Radiation Therapy of Pancreatic Cancer: 50 Successful Cases without Fluoroscopy. Gastrointest Endosc. 2010; 71(3):513-8. (PMID: 20189509)

b. Quan SY, Visser BC, Poultsides GA, Norton JA, Chen AM, Banerjee S, Friedland S, **Park WG**. Predictive Factors for Surgery Among Patients with Pancreatic Cysts in the Absence of High-Risk Features for Malignancy. J Gastrointest Surg 2015 Epuh ahead of print. (PMID: 25749855)

c. Xue, J, Zhao, Q, Sharma, V, Nguyen, LP, Lee, YN, Pham, KL, Edderkaoui, M, Pandol, SJ**, Park, W**, Habtezion, A. Aryl Hydrocarbon Receptor Ligands in Cigarette Smoke Induce Production of Interleukin-22 to Promote Pancreatic Fibrosis in Models of Chronic Pancreatitis. Gastroenterology 2016 Dec;151(6):1206-1217 (PMID: 27769811)

d. Aivaliotis, VI, Lee, Y, Zia, J, Wassef, W, Abramson, M, **Park, W**. Telephone-based Mindfulness Therapy Intervention for Patients with Chronic Pancreatitis. Dig Dis Sci 2016 Dec 8. (PMID: 27933469).

3. As an academic gastroenterologist with formal training in health services research, I am very interested in quality improvement and cost-effectiveness around important gastroenterology topics including endoscopic utilization and colon cancer screening. Listed below are studies that highlight some of my recent accomplishments.

a. **Park, WG**, Shaheen, NJ, Cohen, J, Pike, IM, Adler, DG, Inadomi, JM, Laine, LA, Lieb, JG 2nd, Rizk, MK, Sawhney, MS, Wani, S. Quality Indicators for EGD. Am J Gastroenterol 2015 Jan; 110(1):60-71 (PMID: 25448872)

b. **Park, WG**, Yeh, RW, Triadafilopoulos, G. Injection Therapies for Non-Variceal Bleeding Disorders of the Gastrointestinal Tract. Gastrointest Endosc. 2007;66(2):343-54. (PMID: 17643711)

c. Soetikno, RM, Kaltenbach, T, Rouse, RV, **Park, W**, Maheshwari, A, Sato, T, Matsui, S, Friedland, S. Prevalence of nonpolypoid (flat and depressed) colorectal neoplasms in asymptomatic and symptomatic adults. JAMA 2008 Mar 5;299(9)1027-35. (PMID: 18319413)

d. Ladabaum, U., Brill, JV, Sonnenberg, A, Shaheen, NJ, Inadomi, JM, Wilcox, CM, **Park, WG**, Hur, C, Pasricha, P. How to Value Technological Innovation: A Proposal for Determining Relative Clinical Value. Gastroenterology 2012;Nov 12: epub. (PMID: 23153872)

D. Additional Information: Research Support and/or Scholastic Performance

Current Research Support

1. NIDDK/NCI Consortium (U01) 09/28/2015 – 08/31/2020
   Consortium for the Study of Chronic Pancreatitis, Diabetes, and Pancreatic Cancer
   Role: Contact PI
   A Clinical Center to Study Immunological and Hormonal Biomarkers for the Diagnosis, Prediction, and Treatment of Chronic Pancreatitis and its Associated Development to Diabetes, and Pancreas Cancer

   The overall goal of this project is to collaborate with other clinical centers in this consortium to design and perform studies that delineate the mechanisms that govern the interplay between chronic pancreatitis, diabetes and the formation of pancreas cancer.

2. NCI Consortium (U01) 05/01/2017 – 04/30/2022
   Pancreatic Cancer Detection Consortium
   Role: PI (Contact PI: Andrei Iagaru)
   Molecular Imaging Methods for the Detection of Pancreatic Ductal Adenocarcinoma

   The overall goal of this project is to collaborate with other clinical centers within the consortium to develop early detection strategies for pancreatic cancer. Our project specifically focuses on performing first-in-human clinical trials of 2 different molecular imaging strategies.

3. NCI Early Detection Research Network (U01) 09/01/2012 – 05/31/2017
   Role: Site PI
   Validation of Biomarkers for Early Diagnosis and Risk Prediction of Pancreatic Neoplasms

   The overall goal of this project is to develop a national pancreatic cyst reference repository to facilitate biomarker evaluation and validation for pancreatic cystic neoplasms. This is a multi-center effort and the repository will be physically held at the NCI.

4. NCI Early Detection Research Network (U01) 09/01/2017 – 03/31/2019
   Role: Site PI
   Pancreatic Cyst Biomarker Validation Study

The goal of this multi-center project is to validate promising cyst biomarkers using a standard reference and then comparing its performance to other tested biomarkers using the same reference set.

5. NCI Division of Cancer Prevention (U01) 05/29/2018 – 09/16/2019
Role: Site PI
Statin Therapy to Reduce the Risk of Recurrent Pancreatitis

The goal of this multi-center pilot clinical trial is to determine whether statin therapy reduces the risk of recurrent pancreatitis and pancreatic function, with the long-term goal of reducing pancreatic cancer incidence.

6. Private Source 11/26/2017 – 08/06/2020
Role: Site PI
A Phase 1, Single Dose PK and Safety Study with NI-03 Followed by a Phase 2, Randomized, Double-Blind, Parallel-group Dose-ranging Study to Evaluate the Safety and Efficacy of NI-03 Compared to Placebo in Subjects with Chronic Pancreatitis

The goal of this multi-center project is to complete a Phase 2 randomized trial for a novel agent to treat pain from chronic pancreatitis.

Completed Research Support

1. T32, DK007056 7/01/2007 – 06/31/2009
NIH/NIDDK
Health Services Research and Outcomes Assessment in Gastroenterology and Hepatology.

This award provided Dr. Park with support to develop an expertise in methodologies of health services research to apply to the field of Gastroenterology. Dr. Park obtained a Masters Degree in Health Services Research at Stanford with this support.

2. Junior Faculty Development Award 07/01/2013 – 06/30/2016
Private Source
Role: PI
Translating Novel Cyst Fluid Biomarkers from the Bench to the Bedside

This career development award will support Dr. Park in developing the necessary skill sets to become a productive clinical and translational scientist in biomarker discovery in pancreatic disorders.

Other Support – Seung Kim

Active:

1 UC4 DK104211-01 (Powers) 09/30/14 – 06/30/19
NIH $166,053 (Kim)
EFFORT
"Molecular Mechanisms of Physiologic Beta Cell Growth in Juvenile Human Pancreas"
This application to join the Consortium on Targeting And Regeneration as part of the Human Islet Research Network (HIRN) seeks to understand and define the molecular signatures and proliferative properties of "juvenile" (< 10 years of age) human β cells in order to develop strategies to promote adult human β cell function, proliferation, and regeneration.
We propose three aims: 1) Investigate in vivo proliferation of juvenile human β Cells in response to PDGF, GLP-1, and Prolactin. 2) Reconstitute in vitro and in vivo responsiveness of adult human β cells to PDGF and Prolactin. 3) Decode the signaling basis for age-dependent human β cell proliferation.

R01 CA21192701 (Kim) 02/01/17 – 01/31/20
NIH $261,598
EFFORT
"Reconstituting human pancreatic cancer development for translational research"
Here we propose to validate and optimize this new system for generating stable human PanIN-like lesions to enhance its uses for addressing unmet translational needs. In Aim 1 we propose to generate new hiPanIN clones whose mutational spectrum matches that found in native PanIN and PDA development. We will also assess prioritized biomarkers identified in the hiPanIN system in native human PanIN and PDA specimens. In Aim 2 we propose collaborative studies to test whether pancreatitis, further genetic modification, or extrinsic signals relevant to PDA can promote invasive or metastatic PDA in the hiPanIN orthotopic transplantation model.

U01 DK108300 (Park) 09/28/15 – 08/31/20
NIH $51,864 (Kim)
EFFORT
"A Clinical Center to Study Immunological and Hormonal Biomarkers for the Diagnosis, Prediction and Treatment of Chronic Pancreatitis and its associated development to Diabetes and Pancreas Cancer"
Chronic pancreatitis has no cure, is associated with significant disability, and a higher risk of diabetes and pancreas cancer. By aligning our resources with several other clinical centers to form a consortium, we propose to pursue further studies regarding the role of the immune and hormonal system chronic pancreatitis. These may lead to new insights into understanding how chronic pancreatitis progresses and complication develop including diabetes and pancreas cancer. New diagnostic tests and treatments can subsequently be developed and then validated by this consortium.

Private Source (Atkinson) 2/01/17 – 1/31/20
Private Source $115,000 (Kim)
EFFORT
"Human Atlas of the Neonatal Development and Early Life Pancreas (Handel-P)"
The successful completion of this project should: 1. Identify the age in human development at which islet and more specifically beta cell number and mass becomes "fixed" and investigate factors (e.g., genetic) that contribute to islet/beta cell number and mass. 2. Define the role for exocrine pancreas (i.e., the part involved in digestion) in determining pancreatic size and how this might relate to the pathogenesis of T1D.
3. Provide guidance towards molecular pathways relevant to human beta cell replication; a key therapeutic notion for T1D. 4. Afford the development of a new class of pancreatic islet biomarkers capable of determining disease risk as well as progression towards T1D. 5. Establish a human juvenile pancreatic atlas and tissue repository that will inform and assist investigators working on human pancreatic islets in T1D, the interaction of the immune system and the pancreatic islet in T1D, and the timing and etiology of beta cell-directed autoimmunity.

NIDDK AMP T2D (Co-Investigator: Kim) 05/01/18- 04/30/20
Sub-contract Sponsor (Broad Institute) $135,000 (Kim)
EFFORT
"Large-scale functional validation of candidate transcripts emerging from GWAS and exome sequencing studies"

In this proposal, we focus primarily, but not exclusively, on islets, and particularly beta-cells and the impact of candidate genes on development of, and function of this key tissue.

Private Source
Private Source
Meyer) 04/01/18 – 03/31/20
$114,143 (Kim)
EFFORT
"Targeting CAR-expressing regulatory T cells to pancreatic islets"
Here we will optimize use of monoclonal antibody-directed CARs to target Treg cells to murine and human islets *in vivo*. Our approaches will allow us to test hypotheses about Treg interactions with islets in vivo.

UC4 DK116252 (UC4-003) (Kim) 12/01/17 – 11/30/21
NIH $183,020
EFFORT
"CAR T cell targeting of human islets"
This application to join the Consortium on Targeting And Regeneration as part of the Human Islet Research Network (HIRN) seeks to develop cell-based strategies to target pancreatic islets and overcome two central problems in type 1 diabetes: to (1) provide immunoregulation that is targeted to islets and shuts down autoimmune destruction without broad immune-suppression, and (2) deliver factors that improve β-cell survival, regeneration and function.

1 R01 DK107507-01A1A (Kim) 04/01/17 – 03/31/22
NIH $250,000
EFFORT
"Regulation of gastrointestinal hormone signaling and metabolism by Neuromedin U"
We propose specific aims to: 1. Assess the requirement for enteric Nmu in metabolic homeostasis. 2. Identify mechanisms regulating enteric Nmu secretion and production in obesity. 3. Decode Nmu signal transduction mechanisms by G proteins in pancreatic islets.

NIH 1 P30 DK116074-01 (Kim) 09/15/17-06/30/22
"Stanford Diabetes Research Center "
Administrative Core (Core Director: Kim) 09/15/17 – 06/30/22
Research Core-001 (Core Director: Kim) 09/15/17 – 06/30/22
"Islet Procurement and Research Core" $150,314
EFFORT
The specialized islet biology expertise of the Islet Procurement and Research Core (IPRC) will provide SDRC investigators with the capacity to perform modern molecular, cellular and functional studies of high-quality islets and pancreata from rodents and humans. The SDRC's large group of collaborative investigators study a broad spectrum of islet biology in physiological or pathological settings, including islet development, functional maturation, maintenance of mature cell fate, proliferation, genetics, epigenetics, gene regulation, inter-organ signaling, intra-islet cell signal transduction, islet immunology, and aging, to name a few

1 U01 DK120447-01 (PI: MacDonald) 09/25/18 – 08/31/22
NIH $2,471 Kim
EFFORT
"Linking islet cell function and identity from in vitro to in situ"
This project is designed to examine and understand heterogeneous gene and protein expression, and function, of human pancreatic islet cells in their native environment in health and in diabetes. These cells produce the glucose-controlling hormones glucagon and insulin which are known to be dysregulated in diabetes, although the underlying mechanisms are not clear. Approaches to restore islet cell function, or to manipulate islet cell identity, may prove beneficial to metabolic control in diabetes.

R01 DK108817 (Kim) 04/01/18 – 03/31/23
NIH $250,000
EFFORT
"Discovering genetic and hormonal mechanisms underlying diabetes risk from flies to humans"
We propose to develop and use innovative *in vivo* and human islet cell systems to investigate the genetic basis of diabetes risk.

No Overlap

OTHER SUPPORT
JUSTIN ANNES

ACTIVE

R01DK119955 (Annes, Justin) 7/1/2019-6/30/2024 EFFORT
NIH/NIDDK Advisory Council meeting pending
Development of Beta-Cell-Targeted Regenerative Therapeutics Using a Novel Prodrug Strategy
*The goal of this work is to develop a regenerative therapeutic for diabetes that selectively acts on β-cells.
Role: PI

NIDDK Research Agreement (R03) 1/1/2019-12/31/2019 EFFORT
Stanford Diabetes Center P&F Award $50,000
Development of beta-cell-targeted regenerative therapeutics using a novel prodrug strategy.
* The Aim of this proposal is to develop a platform technology for beta-cell-targeted drug delivery.
Role: PI on P&F (sub-award of P30DK116074-01 (Kim, Seung))

R01DK101530-03 (Annes, Justin) 9/01/15 – 8/31/20 EFFORT
NIH/NIDDK $236,725
The Role of Adenosine Kinase in Controlling Beta-Cell Regeneration
*The major goals of this project are to understand the molecular basis of chemical-induced β-cell replication.
Role: PI

P30DK116074-01 (Kim, Seung) 9/15/17 – 6/30/22 EFFORT
NIH/NIDDK $988,011
Stanford Diabetes Research Center
*The Aims of this proposal are to build the Diabetes Research Community at Stanford.
Role: PI of Enrichment, Training and Outreach Program

R01EB025867-01 (Arbabian, Amin) 4/01/18 – 1/31/22 EFFORT
NIH/NBIB $348,673
A Wireless, Implantable Microdevice for Closed-Loop Drug Delivery to Prevent the Morbidity of Diabetes Therapy-Induced Hypoglycemia
*The Aim of this proposal is to develop a device for preventing insulin-induced hypoglycemia.
Role: Co-Investigator

Private Source 1/1/2019-12/31/2019 EFFORT
(Annes, Justin)
NETRF $100,000
NET-Smart Therapy: A Targeted Prodrug Strategy
* The Aim of this proposal is to develop a method for targeting chemotherapeutics to neuroendocrine tumors.
Role: PI

OVERLAP: The NIDDK Research Agreement (R03) provided critical support for obtaining the R01DK119955. There is overlap in these proposals by intent.

Other Support – Marina Basina

Active:

3U01DK10830004S1 (Walter Park) 09/28/2015 - 08/31/2020 EFFORT
National Institutes of Health $430,295
"A Clinical Center to Study Immunological and Hormonal Biomarkers for the Diagnosis, Prediction and Treatment of Chronic Pancreatitis and its associated development to Diabetes and Pancreas Cancer"
To set up a clinical center to study immunological and hormonal biomarkers for the diagnosis, prediction and treatment of chronic pancreatitis and its associated development to diabetes and pancreas cancer.

Private Source (Marina Basina - SPO 127434) 06/22/2017 - 06/30/2021 EFFORT
Private Source $299,081
"A Trial Comparing the Efficacy and Safety of Insulin Degludec and Insulin Glargine 300 Units/Ml in Subjects with Type 2 Diabetes Mellitus Inadequately Treated with Basal Insulin with or Without Oral Antidiabetic Drugs"
A trial designed for comparing the efficacy and safety of insulin degludec and insulin glargine 300 units/mL in subjects with type 2 diabetes mellitus inadequately treated with basal insulin with or without oral antidiabetic drugs.

Private Source (David Maahs) 01/01/2018 - 06/30/2019 EFFORT
Private Source / University of Florida $309,457
"ECHO Type 1 Diabetes: A Feasibility and Planning Proposal"
A feasibility and planning study for ECHO project for type 1 diabetes

Private Source (Linda Nguyen) 05/22/2018 - 10/31/2019 EFFORT
$113,229
"A 12-week, Randomized, Double-blind, Placebo-controlled, Phase 3 Study to Evaluate the Safety and Efficacy of Relamorelin in Patients with Diabetic Gastroparesis"
A phase 3 study to evaluate the safety and efficacy of relamorelin in pateients with diabetic gastroparesis in a 12-week, randomized, double-blinded and placebo-controlled manner.

1P30DK11607402 (Seung Kim) 09/15/2017-06/30/2022 EFFORT
National Institute of Health
Stanford Diabetes Research Center
The goal of the project is to support basic and clinical research to discover, apply and translate science about diabetes and its complications, to improve health and wellness.

OTHER SUPPORT

Chaib, Hassan

ACTIVE

5U24DK11234802 (Snyder) 12/13/2016 - 11/30/2022 EFFORT
National Institutes of Health $1,348,687
Stanford/Salk MoTrPAC Site for Genomes, Epigenomes and Transcriptomes
The overall goal of this proposal is to elucidate molecular changes in response to physical activity

1P30DK11607401 (Kim) 09/15/2017 - 06/30/2022 EFFORT
National Institutes of Health $999,020
Stanford Diabetes Research Center
The mission of the Stanford Diabetes Research Center (SDRC) is to foster knowledge, support training, and promote innovative basic and translational research in biomedical, epidemiological, and behavioral research in diabetes.

NIH 1S10OD025212-01 (Snyder) 05/01/2018 - 04/30/2019
National Institutes of Health $600,000
Ultra-high throughput sequencer for sustaining and enhancing multi-scale genomic studies

OTHER SUPPORT

DESAI, M.
ACTIVE

SPO 133927 (Desai) 7/31/2018-9/30/2019
Private Source $149,985
EFFORT

Novel methods for generalizing randomized clinical trial findings by calibrating missingness through propensity score-based methods
The goal is to develop novel methods to calibrate missingness when generalizing findings from randomized clinical trials to other populations using propensity score-based methods.
Role: **Principal Investigator**

Private Source (Desai) 05/10/2017- 09/30/2020
Private Source $240,262
EFFORT

A Randomized, Double-blind, Placebo-controlled Study to Investigate the Efficacy and Safety of Injectafer® (Ferric Carboxymaltose) as Therapy for Patients with Heart Failure and Iron Deficiency
The goal of this project is to lead and provide statistical support for the DSMB.
Role: **Principal Investigator**

1P01CA225597 (MPI: Henriksen/Luke/Ribisl) 05/01/2018 – 03/31/2023
NIH/NCI $795,162 (sub only)
EFFORT

ASPiRE: Advancing Science & Practice in the Retail Environment
The goal of this multi-site, national Program Project is to build a scientific evidence base for effective tobacco control.
Role: **Princial Investigator of Data Core**

HHSN26820110003C (Stefanick) 10/15/2015 - 10/14/2020
NIH-NHLBI-WH-11-10 $1,127,170
EFFORT

Women's Health Initiative Extension 2010-2015
The goal of this project is to provide statistical support including study design, database management, and analysis for WHI studies.
Role: **Director of Western Analytic Center**

5P30CA124435-11 (Artandi) 06/01/2015-05/31/2021
National Institutes of Health (NIH) $3,338,488
EFFORT

Stanford University Cancer Center
The goal of this project is to provide infrastructural support for cancer related activity
Role: **Director of the Biostatistics Shared Resource for the Stanford Cancer Institute**

Private Source (Mahaffey) 01/07/2015-04/30/2019
Private Source $925,658.00
EFFORT

A Multi-Center, Randomized, Open-Label, Assessor-Blinded, Controlled Trial Comparing the Occurrence of Major Adverse Cardiovascular Events (MACEs) in Patients with Prostate Cancer and Cardiovascular Disease Receiving Degarelix (GnRH antagonist) or Leuprolide (LHRH agonist)
The goal of this project is to provide statistical support for the DSMB
Role: **Lead of the Independent Statistical Group**

Private Source (Desai) 03/01/2017-06/20/2020
Private Source $1,052,691
EFFORT

VICTORIA
A randomized parallel-group, placebo-controlled, double-blind, event-driven, multi-center pivotal phase III clinical outcome trial of efficacy and safety of the oral sGC stimulator vericiguat (BAY 1021189) in patients with

heart failure and reduced ejection fraction (HFrEF) - VerICiguaT glObal study in patients with heart failure and Reduced ejectIon frAction (VICTORIA)
The goal of this project is to insure the integrity of the trial
Role: **Principal Investigator**

5U54MD010724-02 (Cullen) 04/11/2016-03/31/2021
National Institute of Health $2,309,824
EFFORT
Stanford Precision Health for Ethnic and Racial Equity (SPHERE) Transdisciplinary Collaborative Center
The goal of this project is to study the role of genetic and other biologic differences impacting disparate health among groups in the US.
Role: Biostatistician

Private Source (Desai) 08/01/2017-11/30/2022
Private Source $1,023,434
EFFORT
AEGIS II: A phase 3 multicenter, double-blind, randomized, placebo-controlled, parallel-group study to investigate the efficacy and safety of CSL 112 in subjects with acute myocardial infractioin.
The goal of this project is to insure the integrity of the trial
Role: **Principal Investigator**

1R01AI127250-01A1 (Bendavid) 04/10/2017- 03/31/2021
National Institute of Health $691,929
EFFORT
Big Data Analysis of HIV Risk and Epidemiology in Sub-Saharan
The goal of this project is to lead the study design and statistical analysis.
Role: Co-Investigator

Private Source (Turakhia) 10/01/2017-07/31/2019
Private Source $1,522,407
EFFORT
The goal of this project is to lead the study design and statistical analysis.
Role: Faculty Statistician

5P30DK11607402 (Kim) 09/15/2017-06/30/2022
National Institute of Health
EFFORT
Stanford Diabetes Research Center
The goal of the project is to support basic and clinical research to discover, apply and translate science about diabetes and its complications, to improve health and wellness.
Role: Princial Investator of Clinical Traslatoinal Core

Private Source (Perez) 10/29/2018-12/15/2019
Private Source $717,454
EFFORT
The goal of this project is to assess the utlitiy of novel application in detecting atrial fibrillation.
Role: Co-Investiator and Principal Investigaor of Data Coordinating Center

1R01HL139751-01A1 (Walkey) 07/15/2018-04/30/2022
NIH / Boston University $24,291 (sub only)
EFFORT
Targeting cardiovascular events to improve patient outcomes after sepsis.
The goal is to target cardiovascular events to improve patient outcomes after sepsis
Role: Co-Investigator

1R01LM01296601 (Lungren) 09/11/2018-05/31/2022
National Instutie of Health $1,389,636
EFFORT
Deep learning for pulmonary embolism imaging decision support: a mutiinstitutional collaboration

The goal is to create a precision health predictive model that leverages real-time electronic medical record data to arrive at a patient-specific imaging prediction in order to enhance imaging decision making at the point of care and optimize advanced image utilization.
Role: Co-Investigator

SPO (Desai) 11/12/2018-08/31/2020 EFFORT
Private Source $489,873
The Vitality Study
The goal of this project is to uphold the integrity of the trial by providing statistical support to the DSMB
Role: **Principal Investigator**

OVERLAP:
There is no scientific overlap with any of these funded or pending projects and the proposed project. If this application is funded and if such funding in combination with other sources of funding at that time would result in salary support in excess of 100%, reductions will be made in proportions of effort devoted to various projects in such manner to insure that each project receives an appropriate level of effort but that total effort devoted to and supported from all projects does not exceed 100%. Reductions of effort to any one project will be minimized, will be appropriate to the stage of the project, and will be compensated by delegation of duties to other project personnel as appropriate to their role on the project.

GARDNER, CHRISTOPHER

ACTIVE

1R01HL117736-04 (Prochaska) 04/15/2014-03/31/2019
NIH/NHLBI $2,429 (Gardner)
EFFORT
Technology Innovations for Supporting Health Among Alaska Native People
This study aims to identify effective and cost-effective interventions for tobacco use and other risk behaviors for cardiovascular disease among Alaska Native people in rural villages. In a randomized controlled trial, the study will compare interventions using telemedicine to promote the American Heart Association's identified ideal health behaviors (nonsmoking and physical activity) relative to ideal health factors (managing cholesterol and blood pressure). Role: Co-Investigator

R01HL132814 (Basu) 07/01/2016 - 06/30/2021
NIH/NHLBI $24,174 (Gardner)
EFFORT
Designing Food Voucher Programs to Reduce Disparities in Healthy Diets
This study aims to contrast the impact of multiple strategies for augmenting SNAP with $20 worth of vouchers for foods and beverages among a population of food insecure adults in the San Francisco area using a randomly assigned trial. Role: Co-Investigator

(THIS AWARD)
1P30DK116074-01 (Kim) 09/15/2017 – 06/30/2022
NIH $35,993 (Gardner)
EFFORT
Stanford Diabetes Research Center (SDRC)
The SDRC embodies the culmination of a long-term strategic plan by the Stanford University School of Medicine to create a premier program founded on a base of superb, collaborative investigators studying basic, clinical and translational problems focused on improving diabetes care. Role: Core Director

(NEW)
Private Source **(Sonnenberg/Gardner)** 12/18/2018 – 12/17/2020
Private Source $373,007
EFFORT
Impact of a Prebiotic Supplement on Microbiome, Immune System and Metabolic Status of Older Adults
The objective of this study is to define the impact of a prebiotic supplement on microbiome, immune system, and metabolic status in older adults. This study will determine the degree to which a prebiotic supplement can 1) regulate immune status and function including reducing chronic, systemic inflammation as assessed by high dimensional immune profiling, 2) after microbiota composition Role: Co-PI

OVERLAP
NONE

Other Support – Fredric Kraemer

Active:

5P30DK11607402 9/15/17 – 6/30/22 EFFORT
NIH $988,011
Stanford Diabetes Research Center
The overall goal of this proposal is to take advantage of the known interplay between adipose cells and osteoblasts by manipulating specific genes involved in adipose metabolism to favor the differentiation of mesenchymal stem cells into bone and, thus, accelerate bone healing following injury.
Role: Project Leader of Pilot and Feasibility Program

I01 BX000398 04/1/17 – 03/31/21 EFFORT
Department of Veterans Affairs $150,000
Lipid Trafficking for Steroidogenesis
The overall goal of this proposal is to elucidate the mechanisms underlying the trafficking of cholesterol for steroidogenesis.
Role: PI

Other Support – David Maahs

Active:

UC4DK108483 (PI- B. Buckingham, Co- PI D. Maahs 1/1/2016 - 12/31/19
University of Virginia (Primary: NIH) $186,674
EFFORT
Clinical Acceptance of the Artificial Pancreas: the International Diabetes Closed Loop Trial (iDCLT)
Goal: Pivotal trial of artificial pancreas system

UC4DK108520 (PI – B. Buckingham Co-PI D. Maahs) 1/01/16-12/31/20
JAEB Center for Health Research (Primary: NIH) $53,179
EFFORT
One-year day-and-night home closed loop in young people with type 1 diabetes
Goal: Pivotal trial of artificial pancreas system

(PI- D. Wilson, Co- PI D. Maahs) 09/01/17-08/30/19
Private Source $780,158
EFFORT
Improving Antibody Detection by Agglutination-PCF (ADAP) for Predictive Population-Based Screening of Type 1 Diabetes (T1D) Risk
Goal: Prevention of auto-immune mediated Type 1 diabetes.

1P30DK11607401 (PI- S. Kim, Co- PI D. Maahs) 09/15/17-06/30/22
NIH $999,020
EFFORT
Stanford Diabetes Research Center
Goal: To foster discovery, application and translation of scientific knowledge about diabetes and it's complications to innovate advances in diabetes research and improved diabetes care.

DP3 DK113358-01 (PI D. Maahs) 04/01/17-03/31/21
The University of North Carolina at Chapel Hill (Primary: NIH) $247,323
EFFORT
Accelerating Solutions to Optimize Glycemic Control and Weight Management in Young Adults with Type1 Diabetes
Goal: Develop data to inform clinical practice on weight management and glucose control in T1D

(PI- D. Maahs) 1/01/18-06/30/19
U of Florida Private Source $664,802
EFFORT
ECHO Type 1 Diabetes: A Feasibility Study and Planning Proposal
Goals: To promote and improve health outcomes within highly vulnerable populations with Type 1 diabetes

1RO1DK11925401 (PI- R. Appel, Co-PI D. Maahs) 1/15/19-12/31/23
NIH $1,690,363
EFFORT
Co-Formulation of Amylin Analogues with Insulin Analogues for Treatment of Diabetes
Goals: To develop a novel co-formulation of insulin analogues with an amylin analogue to enable a transformational new treatment for diabetes constituting a true replacement therapy.

UC4DK108612 (PI- B. Buckingham, Co- PI D. Maahs) 9/30/15 – 9/29/19
Boston University (Primary: NIH) $562,733
EFFORT
Final clinical studies for submission of a pre-market approval application to the FDA for a Bionic Pancreas that automates type 1 diabetes management
Goal: Pivotal trial of artificial pancreas system

Other Support - Holden T Maecker

Active:

Private Source (Davis) 11/04/2014–09/30/2024
Private Source $769,286
EFFORT
Stanford Human Systems Immunology Center
This center provides access to specialized human systems immunology assays and analysis for Private Source funded projects and clinical trials. CyTOF, Luminex, flow cytometry, immune repertoire analysis, and other services will be offered.
Role: Co-Investigator

5U19AI104209-06 (Galli) 02/01/2019-1/31/2024
National Institutes of Health $889,947
EFFORT
Integrated Genomic and Functional Studies of Tolerance Therapy for Peanut Allergy
This grant provides for a clinical trial and associated basic science projects directed towards discovering mechanisms of tolerance development for peanut allergy
Role: Core Leader

5U19AI057229-14 (Davis) 04/01/2014–03/31/2023
National Institutes of Health $100,000
EFFORT
Adaptive and Innate Immunity, Memory and Repertoire in Vaccination and Infection
This cooperative center project continues our studies of influenza vaccination with special emphasis on the role of memory phenotype T cells and innate immunity, pregnancy, and development of new technology.
Role: Core Leader

1U01AI140498-01 (Nadeau) 02/07/2018-01/31/2023
National Institutes of Health $236,000
EFFORT
T Cell Reagent Research for Monitoring T Cells in Food Allergy
This project will create, test, and apply tetramer reagents to track T cells specific for novel epitopes of food allergens.
Role: Other Significant Contributor

1U24CA224309-01 (Maecker) 09/01/2017-08/31/2022
National Institute of Health $1,600,000
EFFORT
Immune Monitoring and Analysis of Cancer at Stanford (IMACS)
This grant establishes a Cancer Immune Monitoring and Analysis Center at Stanford, to offer and develop CyTOF, Luminex, TCRseq, Multiplexed Ion Beam Imaging, and ATACseq assays for selected NCI clinical trials.
Role: PI

5P30DK11607402 (Kim) 12/01/2017-11/30/2022
National Institute of Health $999,020
EFFORT
Stanford Diabetes Research Center
This grant creates a Diabetes Research Center at Stanford, with shared resources for clinical services and biobanking, islet cell generation, and immune monitoring.
Role: Core Leader

U01TR001801 (Maecker) 09/15/2016-06/30/2021
National Institutes of Health/J. Craig Venter Institute $100,362
EFFORT
Transformative Computational Infrastructures for Cell-Based Biomarker Diagnostics
This subcontract provides for programming a user interface for a new, online suite of flow cytometry analysis tools under development through a consortium of CTSA institutions in California.
Role: Subcontract PI

1UM1HG00944201 (Snyder) 02/01/2017-01/31/2021
National Institutes of Health $605,137
EFFORT
Production Center for Mapping Regulatory Regions of the Human Genome
As part of the ENCODE consortium, this project will map regulatory regions in the genome to their functional activity in various human cell types.
Role: Co-Investigator

Private Source (Maecker) 08/29/18-08/28/2020
Private Source $89,172
EFFORT
Non-Human Primate Immune Monitoring by CyTOF
This project will develop and use a non-human primate CyTOF panel on selected samples from Ionis pre-clinical trials.
Role: PI

5U24AI118648-02 (Maecker) 06/26/2015-05/31/2020
National Institutes of Health $368,042
EFFORT
Miniaturized Automated Whole Blood Cellular Analysis System
This project will create, in collaboration with Smart Tube, Inc., a miniaturized and automated system for stimulation and stabilization of small-volume whole blood samples. The system would then be tested in clinics in Kenya, to analyze T cell responses to chikungunya and dengue virus infection in children.
Role: PI

4P30CA124435 (Mitchell) 06/01/2015–05/31/2020
National Institutes of Health $77,496
EFFORT
Stanford University Cancer Center
This grant supports translational research and interdisciplinary collaborations among ten programs within the Stanford Cancer Center and supports shared resources such as the HIMC.
Role: Shared Resource Leader

5UM2 AR067678-03 (Utz/Holers) 09/24/2014 – 05/31/2019
National Institutes of Health $70,635
EFFORT
Accelerating Medicines Partnership (AMP) in Rheumatoid Arthritis & Lupus: Network Leadership Center
The overall goal of the AMP RA and Lupus Network (Network) is to define shared and disease-specific biological pathways in order to identify relevant drug targets for the treatment of RA, lupus and related autoimmune diseases.
Role: Core Leader

5U19AI110491-03 (Utz) 05/01/2014–04/30/2019
National Institutes of Health $50,000
EFFORT
Autoimmunity Center of Excellence (ACE) at Stanford
This cooperative center will perform basic science projects in cohorts of autoimmunity patients, and support mechanistic studies associated with ACE clinical trials.
Role: Core Leader

5U19AI056363-09/M10-ASC01-SU (Maecker) 12/01/2015–04/30/2019
Prime Sponsor: National Institutes of Health $165,381
EFFORT
University of California, San Francisco
Mechanisms of B Cell Responses in Autoimmune Disease
This project provides sample processing, banking, and immune assays for an ACE clinical trial (ASC01) of rituximab in systemic sclerosis.
Role: Subcontract PI

Other Support – Tracey McLaughlin

Active:

Lirglutide (McLaughlin) 09/15/2014 - 09/30/2020
Private Source $723,990
EFFORT
"Effect of Liraglutide on Microphage Polarization in Human Adipose Tissue and Peripheral Blood"
Effect of Liraglutide on Microphage Polarization in Human Adipose Tissue and Peripheral Blood.

N/A (McLaughlin) 10/01/2016 - 06/30/2019
Private Source $120,261
EFFORT
"Human Epicardial Fat and Coronary Atherosclerosis Adjacent to the Myocardial Bridge"
To study human epicardial fat and coronary atherosclerosis adjacent to the myocardial bridge.

5R01DK11018602 (McLaughlin) 04/01/2017 - 03/31/2022
National Institutes of Health $418,548
EFFORT
"Longitudinal multi-omic profiles to reveal mechanisms of obesity-mediated insulin resistance"
To investigate using obesity mediated insulin resistance using multiple -omics approaches.

Private Source (McLaughlin) 08/02/2017 - 08/31/2019
Private Source $397,913
EFFORT
"A Phase Ib, Randomized, Blinded, Placebo-Controlled, Multiple Ascending-Dose Study To Evaluate The Safety, Tolerability, and Pharmacokinetics Of Subcutaneous BFKB8488A In Patients With Type 2 Diabetes Mellitus"
To conduct a phase Ib, randomized, blinded, placebo-controlled, multiple ascending-dose study to evaluate the safety, tolerability and pharmacokinetics of subcutaneous BFKB8488A in patients with type 2 diabetes.

5P30DK11607402 (Seung Kim) 09/15/2017 - 06/30/2022
National Institutes of Health $988,011
EFFORT
"Stanford Diabetes Research Center"
Stanford Diabetes Research Center

1R01HL14669001 (Joseph Wu) 04/01/2019 - 03/31/2023
National Institutes of Health $484,501
EFFORT
"Genetic and Stem Cell Model of Cardiac Metabolic Disease"
To study genetic and stem cell models of cardiac metabolic disease

Other Support - Everett Meyer

Active:

K08 Career Award; 1K08HL119590-01A1 05/01/14-04/30/19 EFFORT
National Institutes of Health $155,600
T-cell monitoring and immunotherapy for treating graft-versus-host disease.
The major goal of this project is to (1) develop pre-clinical models of Tregulatory and T and iNKT cell therapy for the treatment of acute graft-versus-host disease and (2) to develop T immune monitoring of GVHD in patients.
NIH/National Heart, Lung and Blood Institute
Role: PI

The PO1HL075462, P30DK116074-01, UC4 RFA-DK-17-003 and CLIN2-09439 grants is scientifically related to K-Award and effort counted toward EFFORT

PO1 HL075462 (PI: Strober) 04/01/16-06/30/21 EFFORT
National Institutes of Health $16,330
Blood Stem Cell Transplantation as Immunotherapy
Goals: To apply high throughput immune repertoire sequencing to the study of transplantation tolerance in kidney/bone marrow transplant recipients.
Role: Co-PI

UC4 RFA-DK-17-003 (PI: Kim) 09/20/17-08/31/19 EFFORT
National Institutes of Health $ 209,422
Therapeutic Targeting of the Human Islet Environment
Goals: This application to join the Consortium on Targeting and Regeneration as part of the Human Islet Research Network (HIRN) to explore and develop targeting of T regulatory cells to human pancreatic islets.
Role: CO-PI

Private Source (PI: Strober) 02/01/17-01/31/21 EFFORT
Private Source $82,009
Induction of Tolerance to Combined Kidney and Hematopoietic Progenitor Cell Transplants from HLA Haplotype Matched Living Donors
Goals: To study T cell repertoire and phenotype in patients undergoing a clinical immune tolerance protocol in order to better understand how tolerance works and the biology of T cells in humans.
Role: Co-PI

P30 DK116074-01 (PI: Kim) 01/31/2019-12/31/2019 EFFORT
National Institutes of Health $50,000
"Stanford Diabetes Research Center"
Research Core-002 (Core Co-Director: Meyer), "Diabetes Immune Monitoring Core"
Goals: This application is for a shared program project grant core focused on the immune monitoring of patients with type 1 diabetes with a particular focus on monitoring around eventual islet cell transplantation.
Role: Co-PI

Private Source 07/01/15-06/30/19 EFFORT
$4,609
University of Texas MD Anderson Cancer Center Adoptive Immunotherapy for Leukemia Using Cord Blood Derived NK Cells
Goals: Application of high throughput immune sequencing to track CIK cells to evaluate persistence as a factor for the effective therapy.
Role: Co-PI

Private Source 04/01/17-12/31/21 EFFORT

Private Source

$136,363

Developing chimeric antigen receptor Tregulatory cells for islet allograft tolerance.
Goals: This project is a pre-clinical study in murine systems to build, understand and apply the transient genetic modification of Tregulatory cells to induce tolerance to islets.
Role: PI

Private Source

04/01/18-03/31/20
$113,129

EFFORT

Targeting CAR-expressing regulatory T cells to pancreatic islets
Goals: To develop CAR Tregs for islet targeting and tolerance.
Role: PI

Private Source

03/14/17-02/29/20
$40,480

EFFORT

A Single-Cohort, Phase 2 Study of Ruxolitinib in Combination With Corticosteroids for the Treatment of Steroid-Refractory Acute Graft-Versus-Host Disease
Goals: Assess the efficacy of ruxolitinib in combination with corticosteroids in subjects with Grade II to IV steroid-refractory acute graft-versus-host disease (GVHD).
Role: PI

Private Source

6/01/18-05/31/21
$13,666

EFFORT

A Randomized, Double-Blind, Placebo-Controlled Phase 3 Study of Itacitinib or Placebo in Combination With Corticosteroids for the Treatment of First-Line Acute Graft-Versus-Host Disease
Goals: Compare the efficacy of itacitinib in combination with corticosteroids versus placebo in combination with corticosteroids in terms of ORR at Day 28 in subjects with aGVHD.
Role: PI

Private Source

06/08/18-08/31/23
$300,000

EFFORT

Budget with future funding pending accrual milestones
Phase 1-2 Trial for Patients with Advanced Hematologic Malignancies undergoing Myeloablative Allogeneic HCT with a T-cell Depleted Graft with Simultaneous Infusion of Conventional T-cells and Regulatory T-cells
Goals: Support ongoing investigator-lead graft engineering trial to prevent GVHD and improve immune reconstitution.
Role: PI

Other Support – Walter Park

Active:

3U01DK10830004S1 (Park) 09/28/2015 - 08/31/2020
NIH $430,295
EFFORT
"A Clinical Center to Study Immunological and Hormonal Biomarkers for the Diagnosis, Prediction and Treatment of Chronic Pancreatitis and its associated development to Diabetes and Pancreas Cancer"
To create a clinical center to study immunological and hormonal biomarkers for the diagnosis, prediction and treatment of chronic pancreatitis and its associated development to diabetes and pancreas cancer

3U01DK108328-02S1 (Park) 09/01/2016 – 08/31/2020
NIH $290,754
EFFORT
"Consortium for the Study of Chronic Pancreatitis, Diabetes, and Pancreatic Cancer: Coordinating and Data Management Center"
To create and manage a coordinating and data management center for the Study of Chronic Pancreatitis, Diabetes, and Pancreatic Cancer.

5U01CA21002003 (Iagaru) 05/01/2017 – 04/30/2022
NIH $632,507
EFFORT
"Molecular Imaging Methods for the Detection of Pancreatic Ductal Adenocarcinoma"
To develop molecular imaging methods for detection of pancreatic ductal adenocarcinoma.

Private Source (Park) 11/06/2017 – 08/06/2020
Private Source $88,221
EFFORT
"A phase 1, single dose pk and safety study with NI-03 followed by a phase 2, randomized, double-blind, parallel-group dose-ranging study to evaluate the safety and efficacy of NI-03 compared to placebo in subjects with chronic pancreatitis"
To run a phase 1 safety study with single dose pk NI-03 followed by a phase 2, randomized, double-blind parallel group dose-ranging study to evaluate the safety and efficacy of NI-03 compared to placebo in subjects with chronic pancreatitis.

HHSN26120120035 (Park) 05/29/2018- 09/16/2019
NIH/Northwestern University $113,418
EFFORT
"Statin Therapy to Reduce the Risk of Recurrent Pancreatitis"
To assess statin therapy to reduce the risk of recurrent pancreatitis.

1P30DK11607402 (Seung Kim) 09/15/2017-06/30/2022
National Institute of Health
Stanford Diabetes Research Center
EFFORT
The goal of the project is to support basic and clinical research to discover, apply and translate science about diabetes and its complications, to improve health and wellness.

MICHAEL SNYDER

ACTIVE

1K12HL12000101 (PI: Rabinovitch) 09/01/13 – 05/31/19
NIH $0
EFFORT
Stanford Cancer Development Program in Omics of Lung Diseases
This is a Career Development Program (CDP) in 'Omics' of lung diseases with a major focus on pulmonary arterial hypertension (PAH). This is an extension of the current K12 CDP on the "Genetics and Genomics of Lung Diseases" that focuses on PAH. PAHYI (SPO#109815), 1 Yr No Cost Extension.

1R24HL11775601A1 (PI: Wu) 04/15/14 – 03/31/19
NIH $5,391
EFFORT
Biorepository of Human iPSCs for Studying Dilated and Hypertrophic Cardiomyopathy
To generate, characterize, sequence and distribute cardiac iPSC lines over 5 years to create a novel bio-repository valuable to broader scientific community. PADSA (SPO#110465)

Private Source (PI: Snyder) 6/1/14 – 5/31/19
$833,631
EFFORT
Northern California Genomics Center for Excellence
Multi-level genomics approaches to study stem cell derivation and differentiation in heart, tumors and the nervous system, with implications for understanding disease processes in cancer, diabetes, and cardiac and mental health; developing novel tools for computational systems and network analysis of stem cell genome function, as well as a start of the art data management program. UZAER (SPO# 109931)

1R01HL12288701A1 (PI: Rabinovitch, Co-PI: Snyder) 8/1/15 – 5/31/19
NIH $90,000
EFFORT
Integrative Omics as a Discovery Tool for Pulmonary Hypertension
To develop and apply innovative bioinformatics methods of analysis to integrate very large publicly available data sets with novel data sets derived from state-of-the-art 'omics' technologies that assess changes in gene expression and metabolism across the genome, and generate a powerful systems biology approach to characterize a disease for which there is no cure, pulmonary arterial hypertension (PAH). PAFOV (SPO#112108)

1P50HG007735-01 (PI: Chang) 9/1/14-6/30/19
NIH $371,329
EFFORT
Center for Personal Dynamic Regulomes
Develop technologies that greatly increase the sensitivity, speed, and comprehensiveness of understanding genome regulation. PADVM (SPO#112285)

1U41HG009293-01 (PI: Cherry, Co-PI: Snyder) 08/01/16 – 7/31/19
NIH/NHGRI $57,884
EFFORT
RegulomeDB: A Resource for the Human Regulome
Major Goals: Information generated from individual laboratories and consortia concerning potential regulatory regions such as that affecting gene expression, transcription factor binding, chromatin modification and DNA methylation will be collected from the literature, and integrated into a common database and displayed at nucleotide resolution. PAJTN (SPO#123432)

5UM1HG00944202 (PI: Snyder) 12/01/16 – 11/30/20
NIH $2,242,160
EFFORT
Production Center for Mapping Regulatory Regions of the Human Genome
To assemble scores of normal and diseased human tissues under open consent, perform aggregate and single cell ATAC-seq on these samples, and distribute samples for the rest of the consortium for other maps. Data will be made accessible to the public domain through the DCC. PAKAD (SPO 124217)

1U54MD010724-01 (PI: Cullen/Maldonado, Project 1 PI: Snyder) 4/11/16 – 3/31/21
EFFORT

NIH $200,000
Stanford Precision Health for Ethnic and Racial Equity (SPHERE)
To form a coordinated, sustainable, and far-reaching research to practice collaboration to address racial and ethnic health disparities. PAHWI (SPO 121927)

5U24DK11234802 (PI: Snyder) 12/13/16 – 11/30/22
NIH $1,200,000
EFFORT
MoTrPAC Center for Genomics, Transcriptomics and Epigenomics
To establish a collaborative MoTrPAC Genome, Epigenome and Transcriptome (GET) site which will combine high-throughput technologies with state-of-the-art algorithms and datasets to enable new breakthroughs in identifying the molecular characteristics of exercise and its benefits on human health. PAKME (SPO 124210)

5R01DK11018602 (PI: McLaughlin; Co-PI: Snyder) 4/01/17 – 3/31/22
NIH $130,000
EFFORT
Longitudinal multi-omic profiles to reveal mechanisms of obesity-mediated insulin resistance
To comprehensively profile the genomic and molecular changes that are associated with the development of obesity-induced insulin resistance in human subjects. These molecular portraits will provide a significant public health benefit in identifying at-risk subjects for targeted intervention and open up novel avenues for therapeutics. PAJZX (SPO 122117)

70NANB17H215 (PI: Snyder) 8/1/17 – 7/31/19
National Institute of Standards & Technology (NIST) $400,000
EFFORT
JIMB Shared Research Facility
To establish a facility shared with NIST to enable the collaborative pursuit of metrology in genomics and synthetic biology. SBAAQ (SPO 127660) (1 Year no cost extension)

1P30DK116074-01 (PI: Kim) 9/15/17 – 6/30/22
National Institute of Diabetes & Digestive & Kidney Diseases $134,975
EFFORT
Stanford Diabetes Research Center
To create a premier research program founded on a base of superb, collaborative investigators studying basic, clinical and translational problems, and focused on improving diabetes care. PAMMK (SPO 128573)

2P01HL08797-06 (PI: Rabinovitch, Co-PI: Snyder) 9/15/17 – 6/30/22
National Heart, Lung, and Blood Institute $30,000
EFFORT
Elafin Therapy for Pulmonary Arterial Hypertension
Investigate the functions of Elafin and use novel mass spectrometry techniques to inform us about the pathobiology of the disease at the single cell level in circulating immune/inflammatory cells and in the tissues. PAMYH (SPO 50959)

PI: Snyder 9/19/18 – 6/30/22
National Institutes of Health $840,000
EFFORT
Stanford Tissue Mapping Center.
To map the complexity of the small bowel and colon with cell-to-cell resolution in histologic sections, both along their lengths and across multiple individuals. PAPWJ (SPO 135898)

PI: Snyder 09/20/18 – 8/31/22
National Institutes of Health $250,000
EFFORT
Multiomic Signature of Microbial Metolites following Prebiotic Fiber Supplementation. (SPO 136205)
A comprehensive, multiomic study that will integrate longitudinal data associating changes in specific gut bacteria and host in response to prebiotic fiber supplementation.

PI: Snyder 9/30/18 – 6/30/23
National Institutes of Health $1,600,000
EFFORT
Precancer Atlas of Familial Adenomatous Polyposis.

To use an integrated and collaborative approach to develop a PreCancer Atlas for colorectal adenocarcinoma using FAP as the disease model. PAPPD (SPO 135043)

PI: Snyder — 7/1/16 – 6/30/19
UCSF — $200,000
EFFORT

Preterm Birth Initiative-CA (PTBi-CA)
Omic analyses (e.g. lipodomics, proteomics, metabolomics, genomics) and work on efforts at integrating these data with other clinical information. (SPO 126957)

OVERLAP: There is no duplication of financial support or overlap of effort between projects, although several of the above named projects are interrelated based on the use of the UCSC genome browser and associated tools. Notice several grants will end next year and effort will be adjusted on one or more existing awards as needed should the current proposal be funded.

E. OVERALL IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

The creation of the Stanford DRC created an opportunity for discussions on pancreas cancer research and ultimately the organization of the Frontiers in Pancreatic Cancer Research symposium supported by the Dean of Medicine and led by SDRC members such as Dr. Seung Kim and Dr. Aida Habtezion with Dr. Steven Artandi, Professor of Biochemistry. This interaction expanded focus in pancreas cancer research and led to the creation of the Stanford Pancreas Cancer Research Group which includes SDRC investigators (Drs. Seung Kim, Aida Habtezion, Monte Winslow, Edgar Engleman, Walter Park, Stephen Quake, Brendan Visser). Members of the Pancreas Cancer Research Group - Drs. Attardi, Engleman, Habtezion, Kim, Nolan, Park and Winslow - Pending Support

Pending Support

SDRC has helped with recruitment of new members from various departments at Stanford to diabetes related research. This is reflected in new members being added from departments of Bioengineering, Electrical Engineering and Material Sciences; and efforts to extend the membership of SDRC to the Graduate School of Business. SDRC has also been key in recruitment of faculty in the field of diabetes to Stanford University. Dr. Danny Chou from University of Utah and Dr. Anna Gloyn from University of Oxford are currently considering moving their research base to Stanford with the idea of being able to use the resources offered by the center and looking forward to potential collaborations with SDRC member laboratories.

SDRC has been working on programs to link research efforts of its member laboratories with local opportunities. Through multiple meetings and discussions over the last year with JDRF and through seminar series and meetings with UCSF DRC members, we are currently establishing a Northern California JDRF Center of Excellence Pending Support and convenes a superb team of highly innovative collaborative investigators with the goal of identifying and targeting interactions required for autoimmune assault of human islets by immune cells to address outstanding questions in type 1 diabetes pathogenesis.

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

Not Applicable

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?

NOTHING TO REPORT

F. OVERALL CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

File uploaded: Overall_Human_2019.pdf

F.3.b Vertebrate Animals

File uploaded: Overall_Animal_2019.pdf

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

Changes to Human Subjects:
Please see relevant updates for Human Subjects Sections in Core 5987 (Clinical and Translational Core) and Project 5989 (Pilot and Feasibility Program).

Changes to Vertebrate Animals:
Please see relevant updates for vertebrate animals in Core 5985 (Islet Procurement and Research Core) and Project 5989 (Pilot and Feasibility Program).

G. OVERALL SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

NOTHING TO REPORT

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

Yes

Is the research exempt from Federal regulations?

No

Does this project involve a clinical trial?

Yes

If yes, is this an NIH-defined Phase III Clinical Trial?

No

G.4.b Inclusion Enrollment Data

Report Attached: Elucidating the medchanisms of Diabeteic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative

Report Attached: Common Consent for Diabetes Clinical Research Registry

Report Attached: Elucidating the mechanisms of Diabeteic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative

Report Attached: SDRC Biobank Sample Collection

Report Attached: Continuous Glucose Monitoring to Aid Weight Loss in Prediabetes

Report Attached: The Immune Response to Pre-Proinsulin in Human Type 1 Diabetes (T1D) Pathology, Prevention and Therapy

Report Attached: The Use of Continuous Glucose Monitor Technology and Remote Monitoring to Change Clinical Outcomes Following New Diagnosis of Type 1 Diabetes in the Pediatric Population

Report Attached: Impact of Water Promotion and Sugar-Sweetened Beverage Policiies on Beverage Intake in Low-Income Communities

Report Attached: Diabetes Precision Phenotyping and Outcomes Prediction in Health Care

Report Attached: Diabetes Precision Phenotyping and Outcomes Prediction in Health Care

G.4.c ClinicalTrials.gov

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

Yes

If yes, provide the ClinicalTrials.gov identifier, NCT number (e.g., NCT00654321) for those trials:

NCT Number	COMPONENT
NCT03844646	Project-5989 (Pilot and Feasibility Program)

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Are there personnel on this project who are newly involved in the design or conduct of human subjects research?

No

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Does this project involve vertebrate animals?

Yes

G.8 PROJECT/PERFORMANCE SITES

Organization Name:	DUNS	Congressional District	Address
Primary: Board of Trustees of the Leland Stanford Junior University	009214214	CA-018	279 Campus Drive Beckman Center B303 Stanford CA 943055329

G.9 FOREIGN COMPONENT

No foreign component

G.10 ESTIMATED UNOBLIGATED BALANCE

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget?

No

G.11 PROGRAM INCOME

Is program income anticipated during the next budget period?

Yes

Anticipated Amount	Source(s)
500	Islet Core service charges

G.12 F&A COSTS

Not Applicable

Inclusion Enrollment Report

Inclusion Data Record (IDR) #: 248709

Using an Existing Dataset or Resource: Yes

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: Elucidating the medchanisms of Diabeteic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	0	0		0	0					0
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**0**	**0**		**0**	**0**					**0**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	4	20	0	0	0	0	1	3	0	28
Native Hawaiian or Other Pacific Islander	1	1	0	0	0	0	0	0	0	2
Black or African American	3	0	0	0	0	0	0	0	0	3
White	12	14	0	1	1	0	0	2	0	30
More than One Race	0	1	0	0	0	0	0	0	0	1
Unknown or Not Reported	0	0	0	2	0	0	0	0	0	2
Total	**20**	**36**	**0**	**3**	**1**	**0**	**1**	**5**	**0**	**66**

Inclusion Data Record (IDR) #: 283891

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: Common Consent for Diabetes Clinical Research Registry

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	0	0		1	1					2
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**0**	**0**		**1**	**1**					**2**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	3	2	0	1	1	0	0	1	0	8
Asian	61	30	1	0	0	0	3	2	0	97
Native Hawaiian or Other Pacific Islander	3	0	1	0	0	0	1	0	0	5
Black or African American	14	5	0	0	1	0	0	0	0	20
White	233	108	15	24	6	1	6	5	0	398
More than One Race	7	5	0	10	5	0	3	0	0	30
Unknown or Not Reported	6	2	0	14	7	0	0	2	1	32
Total	**327**	**152**	**17**	**49**	**20**	**1**	**13**	**10**	**1**	**590**

Inclusion Data Record (IDR) #: 283892

Using an Existing Dataset or Resource: Yes

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: Elucidating the mechanisms of Diabeteic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	0	0		0	0					0
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**0**	**0**		**0**	**0**					**0**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	1	2	0	0	0	0	0	0	0	3
Asian	32	58	0	0	0	0	6	3	0	99
Native Hawaiian or Other Pacific Islander	1	3	0	0	0	0	0	0	0	4
Black or African American	8	5	0	1	0	0	0	2	0	16
White	26	29	0	2	1	0	0	3	0	61
More than One Race	1	2	0	3	2	0	0	0	0	8
Unknown or Not Reported	2	1	0	3	2	0	0	1	0	9
Total	**71**	**100**	**0**	**9**	**5**	**0**	**6**	**9**	**0**	**200**

Inclusion Data Record (IDR) #: 283893

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: SDRC Biobank Sample Collection

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	0	0		1	1					2
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**0**	**0**		**1**	**1**					**2**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	0	0	0	0	0	0	0	0	0
White	1	0	0	0	0	0	0	0	0	1
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	0	0	1	0	0	0	0	1
Total	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**

Inclusion Data Record (IDR) #: 283894

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: Yes

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: Continuous Glucose Monitoring to Aid Weight Loss in Prediabetes

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		1	1					2
Asian	2	2		0	0					4
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	7	7		0	0					14
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**9**	**9**		**1**	**1**					**20**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	0	0	0	0	0	0	0	0	0
White	0	0	0	0	0	0	0	0	0	0
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Inclusion Data Record (IDR) #: 283895

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: The Immune Response to Pre-Proinsulin in Human Type 1 Diabetes (T1D) Pathology, Prevention and Therapy

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	0	0		1	1					2
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**0**	**0**		**1**	**1**					**2**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	1	1	0	0	0	0	0	0	0	2
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	1	0	0	0	0	0	0	0	1
White	7	8	0	0	0	0	0	0	0	15
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	0	2	2	0	0	0	0	4
Total	**8**	**10**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**22**

Inclusion Data Record (IDR) #: 283896

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: Yes

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: The Use of Continuous Glucose Monitor Technology and Remote Monitoring to Change Clinical Outcomes Following New Diagnosis of Type 1 Diabetes in the Pediatric Population

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0		0	0					0
Asian	0	0		0	0					0
Native Hawaiian or Other Pacific Islander	0	0		0	0					0
Black or African American	0	0		0	0					0
White	1	1		0	0					2
More than One Race	0	0		0	0					0
Unknown or Not Reported										
Total	**1**	**1**		**0**	**0**					**2**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	0	0	0	0	0	0	0	0	0
White	0	1	0	0	0	0	0	0	0	1
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	1	0	0	0	1	0	0	2
Total	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**3**

Inclusion Data Record (IDR) #: 283897

Using an Existing Dataset or Resource: No

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location: Domestic

NIH Defined Phase III Clinical Trial:

Study Title: Impact of Water Promotion and Sugar-Sweetened Beverage Policiies on Beverage Intake in Low-Income Communities

Planned Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	6	4		0	0					10
Asian	70	52		0	0					122
Native Hawaiian or Other Pacific Islander	12	10		0	0					22
Black or African American	28	20		0	0					48
White	158	120		0	0					278
More than One Race	0	0		50	40					90
Unknown or Not Reported										
Total	**274**	**206**		**50**	**40**					**570**

Cumulative Enrollment

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	0	0	0	0	0	0	0	0	0
White	0	0	0	0	0	0	0	0	0	0
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Inclusion Data Record (IDR) #:

Using an Existing Dataset or Resource:

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location:

NIH Defined Phase III Clinical Trial:

Study Title: Diabetes Precision Phenotyping and Outcomes Prediction in Health Care

Planned Enrollment

NOTE: No planned enrollment data exists in the system for this inclusion enrollment report. Updates to this data were not required.

Cumulative Enrollment

NOTE: No cumulative enrollment data exists. Although prompted to do so, the PD/PI did not enter information. No data can be displayed.

Inclusion Data Record (IDR) #:

Using an Existing Dataset or Resource:

Delayed Onset Study ?: No

Clinical Trial: No

Enrollment Location:

NIH Defined Phase III Clinical Trial:

Study Title: Diabetes Precision Phenotyping and Outcomes Prediction in Health Care

Planned Enrollment

NOTE: No planned enrollment data exists in the system for this inclusion enrollment report. Updates to this data were not required.

Cumulative Enrollment

NOTE: No cumulative enrollment data exists. Although prompted to do so, the PD/PI did not enter information. No data can be displayed.

Page 066 of 220 to Page 079 of 220

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A. COMPONENT COVER PAGE

Project Title: Administrative Core
Component Project Lead Information: Kim, Seung K

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The Administrative Core of the SDRC is responsible for: 1) oversight and allocation of center resources, 2) planning enrichment programs, 3) solicitation, review, selection and funding of proposals to the Pilot and Feasibility Award Program, 4) oversight and allocation of Research Core resources and 5) coordinating interactions with the scientific, clinical and lay community through the center website. The SDRC proposes the following Specific Aims:
1.Organize, coordinate, administer and promote SDRC activities, especially Research Core use, and assess their productivity and value.
2.Oversee the criteria and selection process for being a SDRC member.
3.Encourage and develop collaborations and scientific resources and opportunities for SDRC members, including leveraged use of SDRC Research Cores.
4.Provide a training and educational framework to enhance the education and career development of trainees, including graduate students, medical students, post-doctoral fellows, and junior faculty.
5.Foster an environment that attracts, sustains and nurtures young investigators in diabetes, obesity and metabolic research.
6.Create an environment to enrich research by all SDRC investigators.
7.Organize and oversee a successful Pilot and Feasibility Award Program.
8.Organize and oversee an effective SDRC Enrichment Program.
9.Organize effective mechanisms to enhance communications and collaborations by SDRC investigators.
10.Develop, maintain and continuously improve the SDRC website and its integration into the NIDDK Diabetes Research Center program website.
11.Allocate SDRC resources fairly.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: Admin-accomplishments-2019.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

NOTHING TO REPORT

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

Quarterly e-newsletter (More details in enrichment section) describing center activities and achievements including featured publication, investigator and trainee sections.
Participation as a medical partner in various diabetes-related community events in the Bay Area - SDRC Program Manager attended and handed out flyers for studies, clinical registry and diabetes care program at vendor tables. In addition, various SDRC investigators showcased the research activities of the center in presentations at these events.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

1.Meeting with External Advisory Board - The SDRC leadership will update the External Advisory Board on center activities and accomplishments on 6/7/19. Prior to meeting with them, the Administrative Core will provide them a written summary of center activities including accomplishments. This will guide the discussion and provide opportunity for the EAB to advise the leadership on better outcomes for SDRC.
3.Partnering with JDRF - SDRC leadership will meet regularly and discuss with JDRF leaders the potential to set up a Stanford 'center of excellence' focused on diabetes research
4.Partnering with Stanford centers such as Cardiovascular Institute (CVI), Maternal and Child Health Research Institute (MCHRI), Division of Gastroenterology and Hepatology, Center for Definitive and Curative Medicine (CDCM), Center for Digital Health, eWear Initiative, Stanford Cancer Institute (SCI) and Stanford Institute for Stem Cell and Regenerative Medicine to expand the scope of our center projects and promote collaborations with the members of these centers
5.The Administrative Core and in particular the Program Manager will partner with organizers of seminar series at Stanford such as Frontiers in Biology, ReMS, BioX, Medicine and Endocrine grand rounds, CSB lecture series to enhance the quality of diabetes related research seminars that SDRC members can participate in.
6.The Administrative Core will assist the Biomedical Research Cores in promoting usage by holding appropriate informational sessions and informal meeting venues
7.The Administrative Core willl establish more formal connections with UCSF DRC, UC Berkeley and UC Davis to create and promote new collaborative activities, including research-based meetings and research collaborations.
8.The Administrative Core will continue to foster development of new membership by including Graduate School of Business faculty. New members added this year have been listed elsewhere in this component. New members are always selected through standard procedures of the Administrative Core.

B.2 What was accomplished under these goals?

1. Met with **Internal Advisory Board** on 05/25/18 and provided them with an executive summary of the center activities. IAB provided valuable input on directions and partnerships with other centers at Stanford such as eWear and Center for Digital Health. The IAB also provided guidance for becoming a recognized center at Stanford to be able to independently organize and manage events. The leadership has an upcoming meeting on 06/07/19 with members of the **External Advisory Board** to also review the activities of the center and receive guidance and input based on their own experience in managing the operations of other diabetes research centers.

2. Solicited **quarterly reports** from core facilities and kept track of usage metrics and made suggestions for more engagement such as informal coffee sessions. Promoted user accrual by the SDRC research cores by organizing presentations outlining services as well as supporting training efforts. In addition, the Program Manager polled SDRC members to identify needs that the current cores can help support. In this survey, it was identified that **human tissue procurement** will be highly advantageous for 13 laboratories immediately in their research needs. Based on this identified need, a new section has been developed within the Clinical and Translational Core with the appointment of Dr. Walter Park to manage the tissue procurement aspect and a technician has been appointed to support his activities. With the technician's support, Dr. Park has already completed the appropriate material transfer agreements and is working on identifying common tissue needs to be able to place orders.

3. Organized **Pilot and Feasibility program** and awarded 8 awards from among the 21 proposals received (see details in P&F component). The core also raised interdepartmental support for the pilot and feasibility program by sending out 7 request letters and receiving pledges of support from the Departments of Pediatrics and Medicine.

4. Served as a central **coordinating entity** for all enrichment and outreach programs (details in enrichment component). Organized meetings with affinity group leaders and core facility leaders to plan appropriate activities for promoting participation and engagement. The affinity group leaders now receive salary support from the Administrative core to be able to dedicate EFFORT towards the center activities. The Metabolism and Signaling group leaders have now included faculty members from UC Berkeley in their seminar series to enable data sharing and enable cross-institutional collaborations. The administrative core supported and launched the semi-annual **Bay Area Islet Biology meeting** and is working on extending this concept to the Metabolism and Signaling affinity group. This core is also supporting the planning of the **West Coast Regional Islet Study Group** (WRISG) in October 2019.

5. Supported dissemination of information by partnering with bay area diabetes communities to spread information about SDRC programs (details in Enrichment component)

6. SDRC leadership made a decision in the past year to allow Instructors to apply for and become **SDRC members** at the level of associate members to encourage their career development and provide enrichment through seminar series and support through research cores. The center added the following new members to three of the four affinity groups.

Dr. Aijaz Ahmed – Professor of Medicine
Dr. James Priest – Assistant Professor of Pediatrics
Dr. Agnieszka Czechowicz – Assistant Professor of Pediatrics
Molly Tanenbaum – Instructor, Pediatrics
Dr. Jinnie Rhee – Instructor, Medicine
Dr. Laya Ekhlaspour – Instructor, Pediatrics

Dr. Quan Dong Nguyen – Professor of Ophthalmology

There are 3 membership applications pending review by the SDRC leadership for new members to be added to the Metabolism and Signaling, and Bioengineering and Behavioral Sciences affinity groups – Dr Drew Endy (Associate Professor of Bioengineering), Dr. Peter Jackson (Professor of Microbiology and Immunology) and Dr. David Scheinker (Clinical Associate Professor of Pediatrics). The Administrative Core has also engaged faculty members and the Dean of the Graduate **School of Business** to foster new relationships and collaborations.

The presence of SDRC has served as a critical recruitment tool to attract diabetes researchers to Stanford University. In the last year, the SDRC leadership has invited and supported recruitment of **Dr. Danny Chou and Dr. Anna Gloyn** to Stanford University. The recruitment negotiations are currently ongoing for each of these investigators and are in the final stages. Dr. Gloyn's research is focused on using naturally occurring mutations in humans as tools to identity critical regulatory pathways and insights into normal physiology. Due to her interests, there is great potential for collaborations within the Islet Biology and Metabolism affinity groups of SDRC. This potential has been instrumental in generating an interest in moving to Stanford University.

Dr. Danny Chou's research focuses on protein and peptide therapeutics for the treatment in Type 1 Diabetes and other human diseases. He was first invited by SDRC Director Dr. Seung Kim and Associate Director, Dr. David Maahs to present at the Endocrinology grand rounds at Stanford. This led to great interest in his research and the SDRC leadership helped establish collaborations with SDRC member laboratories such as with Dr. Eric Appel and identified an open position for Dr. Chou to be recruited at Stanford.

7. Hired a part-time Science writer for creating web content and publishing of e-newsletters quarterly. In addition, hired two Stanford students in Summer 2018 to help with cataloging the SDRC member achievements in terms of publications and grants which is the hallmark for tracking outcomes from the P30 support.

8. **SPIRIT initiative** – Support from the SDRC has been critical to advance the Stanford Pancreatic Islet Regeneration and Immune Tolerance (SPIRIT) clinical program. The SDRC leadership raised funds from institutional support for purchasing equipment that will support islet isolation at Stanford and renovating and retrofitting the Cell Therapy Facility suite under the directorship of Dr. Everett Meyer for the purpose of islet isolation for clinical purposes.

Due to this support, ten Stanford faculty worked together with the hospital business development to author a comprehensive financial proposal which was submitted to the Stanford Health Care leadership in April, 2019. The report benefited from visits from world experts in islet transplantation to see our facility and help our program including Dr. Rita Bottina (Cincinatti), Dr. Camillo Ricordi (Miami), Dr. Mark Kay (Melbourne), Dr. Andrew Posselt (UCSF) and Dr. Greg Szot (UCSF). Each gave a talk sponsored by the DRC. Dr. James Shapiro (Edmonton) has on numerous occasions provided guidance to the SPIRIT group. Each of these program leaders has pledged to support our program and would like to pursue collaboration.

In addition, members of the SPIRIT team visited the University of Miami, UCSF and Edmonton, Canada to see their islet transplant programs first-hand. Dr. Stephan Busque was able to fulfill training that will allow him to apply to the national transplantation accreditation organization as medical director of a nascent program at Stanford. Dr. Avnesh Thakor was further able to develop approaches for islet introduction in patients. Dr. Marina Basina was able to see and coordinate with experts in peri-transplant endocrine care. Dr. Walter Park was able to also see and coordinate with experts in islet autotransplantation. Dr. Everett Meyer was able to

gain insight into the requirements for our cellular therapy laboratory, as well as clinical care, clinical trial and correlative science efforts.

9. Previously, the administrative core had supported a Frontiers in Pancreas Cancer Research in October 2017 that over the last year has resulted in highly collaborative research projects and a **P01 submission** titled “Pancreatic Cancer Development: Genetic and Immune Regulation”. The administrative core helped extensively with the preparation of the grant and in fostering the necessary collaborations and sample/data exchange that helped with the evolution of the center grant.

10. Through various interactions with the diabetes researchers in the Bay Area, the SDRC administrative core has helped build relationships. These have resulted in the

Pending Support

Pending Support

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

No Change

F.3.b Vertebrate Animals

No Change

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 092 of 220 to Page 095 of 220

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A. COMPONENT COVER PAGE

Project Title: Islet Procurement and Research Core
Component Project Lead Information: Kim, Seung K

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

Pancreatic islet dysfunction and/or loss underlie or profoundly influence both type 1 and type 2 diabetes and are major research areas of the Stanford Diabetes Research Center (SDRC). The SDRC's large group of collaborative, celebrated investigators study a broad spectrum of islet biology in physiological or pathological settings, including islet development, functional maturation, maintenance of mature cell fate, proliferation, genetics, epigenetics, gene regulation, inter-organ signaling, intra-islet cell signal transduction, islet immunology, and aging, to name a few. A central aspect of the SDRC is our direct focus on parallel studies in rodent and human tissues. An essential component supporting the experimental pipeline of the majority of studies falling under this paradigm is our ability to isolate in house high-quality, well-characterized rodent pancreatic islets, and then to perform complex assays of islet cellular, molecular and physiological phenotypes – which can also be used on human islets procured from outside Stanford. Based on the success of the Islet Procurement and Research Core (IPR Core) and its contributions to published studies, the Specific Aims of the Islet Procurement and Research Core are:
1. Assist SDRC investigators by providing high-quality, well-characterized mouse islets.
2. Facilitate research of SDRC investigators by providing quality human islets
3. Assist SDRC investigators by providing islet transplantation services
4. Provide SDRC investigators with training in islet biology and analysis.
5. Ensure the evolution of core services to meet the ongoing needs of the SDRC research base.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: SIRC-Accomplishments-2019.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: SIRC_Training_2019.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

The research findings resulting from SIRC services are presented to the community of researchers within the SDRC on a weekly basis and are available on the SDRC website. Information about the SIRC and its accomplishments are also distributed via a quarterly newsletter and emails to the SDRC members. The SIRC manager presented a poster at the annual SDRC symposium in 2018 to inform SDRC members and collaborators of the services offered by the SIRC. The SIRC manager and staff frequently communicate to SDRC members about their research needs and coordinate with each other to ensure smooth running of the SIRC.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

We will continue to support the research efforts of the SDRC by making available our robust services and expertise to SDRC members. To this end, we have established a Program Income account to charge nominal fees for the services offered by the SIRC and help recover the costs of these procedures. The funds obtained from the Program Income will be used for expanding the core and the center. We will help advance research collaborations between SDRC members and researchers outside Stanford through our cost-effective and convenient islet procurement program and core services. We will also continue to offer training and professional development opportunities to young investigators and trainees within the SDRC. We will work towards disseminating information about the services offered by the SIRC to the SDRC and the wider community of diabetes researchers. These efforts are expected to rapidly advance research progress in the field of diabetes, pancreas biology and therapeutics for the large and collaborative group of SDRC members.

USE OF CORE FACILITIES

during last 12-month budget period

CORE: **Stanford Islet Research Core**

DETERMINATIONS/SERVICES RENDERED

A. Mouse islet isolation with Histopaque (each occurrence)
B. Mouse islet handpicking after Histopaque (each occurrence)
C. Human/mouse islet dissociation (each occurrence)
D. Human/mouse islet flow cytometry (each occurrence)
E. Human/mouse islet transplantation (each animal)
F. Human Islet Procurement (each occurrence)
G. Insulin/Glucagon ELISA (each sample)
H. Perifusion Assay (each sample)
I. Instruction and consultation (each occurrence)

Core User	Funded Project	Period of Core Use	A	B	C	D	E	F	G	H	I	Use & Comments
Bollyky, Paul	1R01DK11417401A1 5U01AI10198407	05/01/2018 – 04/30/2019	4	4			5				6	A) 27 mice over 4 occurrences B) 2700 islets over 4 occurrences E) 24 mice over 5 occurrences I) 6 hours over 6 occurrences
Czechowicz, Agnieszka	Unfunded	05/01/2018 – 04/30/2019									2	I) 2 hours over 2 occurrences
Fathman, Garrison	Private Source	05/01/2018 – 04/30/2019						4			2	F) 9,000 islet equivalents

												over 4 occurrences I) 2 hours over 2 occurrences
Gross, Eric	1R01HL14438801	08/01/2018-10/31/2018									1	I) 1 hours over 1 occurrence on 08/09/18
Habtezion, Aida	DOD W81XWH-17-1-0339 U01DK108300 R01DK105263 R01DK092421	05/01/2018 – 04/30/2019				1				1		D) 24 samples on 1 occurrence on 08/07/18 H) 24 samples on 1 occurrence on 05/23/18
Kim, Seung	NIH 1UC4DK11625201 NIH 5R01DK10750703	05/01/2018 – 04/30/2019	3				12	10				A) 15 mice over 3 occurrences E) 51 mice over 12 occurrences F) 111,000 islet equivalents over 10 occurrences
Meyer, Everett	NIH 1UC4DK11625201 JUDIAB 5-CDA-2017-381-A-N	05/01/2018 – 04/30/2019			3	6	20	13				C) 15,000 islet equivalents over 3 occurrences D) 18 samples over 6 occurrences E) 84 mice over 20 occurrences

												F) 76,000 islet equivalents over 13 occurrences
Nusse, Roeland	Private Source	05/01/2018 – 04/30/2019	1	2								A) 5 mice on 1 occurrence 03/18/19 B) 5 mice on 2 occurrences I) 1 hour on 1 occurrence on 08/20/18
Quake, Stephen	5U19AI05722915	05/01/2018 – 04/30/2019	1						2		1	A) 8 mice on 1 occurrence on 01/16/19 G) 4 samples over 2 occurrences I) 1 hour on occurrence on 01/16/19
Soh, Tom	R01GM129313 OT2OD025342	05/01/2018 – 04/30/2019						1		2	3	F) 400 islets on 1 occurrence on 11/08/18 H) 2 samples on 1 occurrence on 11/08/18 I) 3 hours over 3 occurrences
Thakor, Avnesh	Private Source	05/01/2018 – 04/30/2019	2	2			4	5			6	A) 4 mice over 2 occurrences B) 800 islet equivalents

												over 2 occurrences E) 12 mice over 4 occurrences F) 15,000 islet equivalents over 5 occurrences I) 6 hours over 6 occurrences
Non-members												
Attardi, Laura (Stanford)	5R35CA19759104	05/01/2018 – 04/30/2019				1					1	D) 3 samples on 1 occasion of 08/21/18 I) 1 hours on 1 occurrence on 08/08/18
Christian, Conrad (Univ of Heidelburg)	N/A	05/01/2018 – 04/30/2019	1					4				A) human islet isolation on 1 occurrence on 09/03/18 F) procurement of human islets over 4 occurrences
Ferrer, Jorge [Institut d'investigacions Biomèdiques August Pii Sunyer (IDIBAPS)]	N/A	05/01/2018 – 04/30/2019						6				F) procurement of human islets over 6 occurrences

Gaisano, Herb (U of Toronto)	N/A	05/01/2018 – 04/30/2019						3 Pig				F) procurement of pig islets over 3 occurrences
Patrick MacDonald – U of Alberta	N/A	05/01/2018 – 04/30/2019			2	2						C) 10,000 islets over 2 occurrences D) 4 samples over 2 occurrences
Weinacht, Katja	Private Source	05/01/2018 – 04/30/2019					8				6	E) 38 mice over 8 occurrences I) 6 hours over 6 occurrences

OUTCOMES OF CORE FACILITIES

during last 12-month budget period

CORE: **Stanford Islet Research Core**
Publications

Core User	PMID/PMCID	Title	Authors
Annes, Justin	PMC6386607	Zinc-Chelating Small Molecules Preferentially Accumulate and Function within Pancreatic β Cells.	Horton TM, Allegretti PA, Lee S, Moeller HP, Smith M, **Annes JP**

Kim, Seung	30378044	Spheroid Culture of Human Pancreatic Ductal Cells to Reconstitute Development of Pancreatic Intraepithelial Neoplasia.	Lee JJ, **Kim SK**
Kim, Seung	30283141	Single-cell transcriptomics of 20 mouse organs creates a *Tabula Muris*	The Tabula Muris Consortium
Kim, Seung	PMC6155000	Discovering human diabetes-risk gene function with genetics and physiological assays.	Peiris H, Park S, Louis S, Gu X, Lam JY, Asplund O, Ippolito GC, Bottino R, Groop L, Tucker H, **Kim SK**
Kim, Seung	PMC6347013	A Chromatin Basis for Cell Lineage and Disease Risk in the Human Pancreas.	Arda HE, Tsai J, Rosli YR, Giresi P, Bottino R, Greenleaf WJ, Chang HY, **Kim SK**.
Thakor, Avnesh	30707291	Adipose tissue-derived mesenchymal stem cells rescue the function of islets transplanted in sub-therapeutic numbers via their angiogenic properties.	Ren G, Rezaee M, Razavi M, Taysir A, Wang J, Thakor AS

Grants

Core User	Grant #	Title	Sponsor
Annes, Justin	1 R01 DK119955-01A1	Developing a Small Molecule Stimulator of Beta-Cell Survival and Regeneration	NIH
Annes, Justin	1 U01 DK123731-01	A Targeted Approach to Type 1 Diabetes: Integrated Use of Medicinal Chemistry and Cellular Engineering to Enable Islet-Restricted Suppression of Auto-Reactivity and Functional beta-cell expansion	NIH
Annes, Justin and Meyer, Everett	Pending Support		
Fathman, Garrison			
Kim, Seung	5R01DK10881702 (Grant)	Discovering genetic and hormonal mechanisms underlying diabetes risk from flies to humans	NIH
Kim, Seung	1U01DK120447-01	Linking human islet cell sub-population function and identity: From in vitro to in situ	NIH/University of Alberta
Kim, Seung and	Pending Support		

Powers, Alvin			
Kim, Seung	Pending Support		
Kim, Seung			
Kim, Seung			
Thakor, Avnesh	N/A	A novel strategy for regenerating the pancreas using mesenchymal stem cells and pulsed focused ultrasound	Private Source
Thakor, Avnesh	Pending Support		

B.4 What opportunities for training and professional development has the project provided? The SIRC routinely provides training and consultation opportunities to graduate students, postdoctoral scholars and research assistants within SDRC who are interested in learning or mastering specialized
skills and procedures related to islet biology. These techniques include islet isolation and culture, mouse transplantation, immunohistology, blood collection, hormone secretion assays, Insulin and Glucagon ELISAs.

During the 2018-2019 academic year, training, instruction and consultations in have been provided to individuals from the following SDRC member laboratories:

1. Dr Paul Bollyky
2. Dr Garrison Fathman
3. Dr Stephen Quake
4. Dr Avnesh Thakor
5. Dr Katja Weinacht (not an SDRC member)

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

No Change

F.3.b Vertebrate Animals

File uploaded: SIRC-pig model.pdf

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

Changes to Vertebrate Animals: Core 5985

The Research Core Component called Islet Procurement and Research Core or the Stanford Islet Research Core has added pigs as a model system to procure and supply islets to laboratories interested in using the islets for research purposes when they do not have the resources to establish and maintain a pig colony of their own. The pig protocol is approved by Stanford **APLAC (# 33001)**. This system is added since rodent islets have a number of differences to human islets and the studies based on rodent models may not always be translated to human biology. The pig has an additional advantage as an islet donor for islet xenotransplantation, including availability of source tissue and compatibility with human xenotransplant.

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 114 of 220 to Page 117 of 220

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of the Freedom of Information and Privacy Act

A. COMPONENT COVER PAGE

Project Title: Diabetes Immune Monitoring Core
Component Project Lead Information: Maecker, Holden T.

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The Diabetes Immune Monitoring Core (DIMC) is a specialized unit of the Stanford Human Immune Monitoring Center (HIMC). The DIMC currently provides immune monitoring for human immune tolerance studies of organ transplantation at Stanford relevant to diabetes. This includes renal transplants, and transplantation of hematopoietic cells, or of genetically-modified immune cell subsets (like T-cells expressing chimeric antigen receptors: CAR T-cells). Thus, while the HIMC provides core services to the broader Stanford community studying human Immunology, the DIMC will focus its efforts on diabetes-related studies of SDRC members.
Given the central role of the immune system in diabetes, and the goals of treating and ultimately curing diabetes, it is critical to advance the monitoring of immune cell subsets, including their phenotype (frequency, differentiation and/or activation state) and function (suppression, target cell killing or cytokine/chemokine secretion). Inflammatory immune responses underlie islet β cell loss and dysfunction in type 1 (T1D) and type 2 diabetes (T2D). Immune inflammation also contributes to pancreas dysfunction in type 3c diabetes (T3cD) from exocrine pancreas trauma, including cystic fibrosis and pancreatitis, as well as to rejection of organs transplanted into diabetic subjects, like the kidney. Inflammation is caused by dysregulated immune responses by B, NK and T cells as well as by myeloid (blood monocytes, tissue macrophages, dendritic cells [DCs] and monocytic myeloid-derived suppressor cells [mMDSC]) and granulocytic (neutrophils, basophils , eosinophils and polymorphonuclear myeloid-derived suppressor cells [pmn-MDSC]) cell subsets following infection, tissue damage or atypical (non-immunologically silent) cell death (e.g. necrosis). An essential component of the DIMC is the availability of standardized assays and advanced, multi-dimensional technologies for monitoring each of the above immune cell subsets and their functions in blood and tissue samples (e.g. bone marrow, spleen, lymph nodes and pancreatic islets). These assays will be used to monitor patients and to assist SDRC investigators in their research efforts, in close collaboration with our other SDRC cores. This robust research support pipeline will contribute to the success of SDRC researchers to conduct modern basic, translational, and clinical research studies that will help to improve clinical outcomes for patients.
The Specific Aims of the Diabetes Immune Monitoring Core are:
1. Provide support of SDRC members studying transplantation biology in diabetes by providing high dimensional assays to track alloimmune and autoimmune responses to transplanted bone marrow, solid organ and islet allografts.
2. Facilitate research of SDRC investigators by providing standardized, high dimensional assays to monitor immune cell subsets that contribute to diabetes etiology and pathology.
3. Provide SDRC investigators with training in human immune monitoring and analysis.
4. Ensure the evolution and integration of the DIMC with other SDRC core services to meet the ongoing needs of the SDRC research base.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: DIMC-Accomplishments-2019.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: DIMC_Training_2019.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

DIMC clients present their findings at numerous internal and external seminars, conferences and symposia. DIMC leadership and clients present at the Stanford Annual Frontiers in Diabetes Research Symposium (every April) and the Stanford Annual Diabetes Research Forum (every November), Endocrinology Grand Rounds, the Islet Biology Affinity as well as the Immunology & Transplantation Affinity groups at Stanford. DIMC leadership organize and run the Immunology & Transplantation Affinity group's Research In Progress seminars every 4th Friday of the month. To disseminate information throughout the School of Medicine community regarding DIMC services, the Core Leader, Dr. Holden Maecker presented at a service center event organized by the Director of Service Center Operations at Stanford.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

The DIMC is expanding its portfolio of Immune Assays relevant to inflammation, metabolism and type 2 diabetes (T2D). We are comparing Luminex kits from different vendors, demonstrating a new instrument by MesoScale Discovery in order to test their assays and acquiring the equipment necessary to run assays from Olink Proteomics (via the Stanford Human Immune Monitoring Center [HIMC]). We are consulting with SDRC Faculty Members to ensure that the expanded Immune Assay portfolio measure the appropriate analytes with sufficient sensitivity to meet their research needs. The DIMC is fostering its interactions with Pediatric and Adult Endocrinology Clinicians by shipping type 1 diabetes (T1D) patient serum and DNA to the Auto-Antibody and HLA Service Center at the University of Colorado (Denver) for CLIA certified measurement of auto-antibodies and HLA typing. The tests for 50 T1D patients will be paid for by the DIMC. The results of these assays will be provided to Pediatric and Adult Endocrinology Faculty to be placed into their

patient's files to contribute to patient care. DIMC will benefit from this arrangement because it will allow SDRC researchers to stratify patients to better understand the Immunology of T1D. In addition, we have purchased peptides to human and mouse beta cell antigens and tetramers to enable DIMC and SDRC members to identify, clone and measure B and T cells that contribute to T1D pathology and prevention and to measure their function. The DIMC will continue support the research efforts of SDRC members by offering expertise and robust Immune Assays and training specific to Immunology of diabetes and islet transplantation tolerance.

USE OF CORE FACILITIES

during last 12-month budget period

CORE: **Diabetes Immune Monitoring Core (DIMC)**

DETERMINATIONS/SERVICES RENDERED
A. Luminex/Protein Immunoassays (number of samples)
B. Flow Cytometry (number of samples)
C. Mass Cytometry/CyTOF (number of samples)
D. B, T & APC Functional Studies(number of samples)
E. RNA Sequencing & TcR Repertoire Analysis (number of samples)
F. Beta Cell Antigens (number of samples)
G. Identification of Leukocyte Subsets in Human Islets (number of samples)
H. Instruction and consultation (hours)

Core User	Funded Project	Period of Core Use	A	B	C	D	E	F	G	H	Use & Comments
Bertozzi, Carolyn	5R37GM05886721 Stanford Neuroscience Inst. 130501	05/01/2018-04/30/2019	50								A) 50 samples over 3 occurrences
Bollyky, Paul	Private Source 5R21AI13743202	05/01/2018-04/30/2019	21							2	A) 21 samples over 2 occurrences H) 2 hours over 2 occurrences
Czechowicz, Agnieska	None, unfunded, not billed	05/01/2018-04/30/2019		2						2	B) 2 samples over 2 occurrences H) 2 hours over 2 occurrences
Fathman, Garrison	R01DK115874 Private Source	05/01/2018-04/30/2019								10	H) 10 hours over 10 occurrences
Gurtner, Geoffrey	5R01DK07409514	05/01/2018-04/30/2019	30								A) 30 samples on 1 occurrence on 09/26/18

Habtezion, Aida	5R01DK10526303 3U01DK10830004S1 R01DK092421	05/01/2018-04/30/2019	434		100						A) 434 samples over 7 occurrences C) 100 samples on 1 occurrence on 10/10/18
Maecker, Holden	5U19AI11049104 1U24CA22430901 5R21CA20543002 5U24AI118648-04	05/01/2018-04/30/2019	94								A) 94 samples over 4 occurrences
McLaughlin, Tracey	5R01DK11018602	05/01/2018-04/30/2019	165								A) 165 samples over 3 occurrences
Meyer, Everett	UC4DK116252 Private Source	05/01/2018-04/30/2019		6					16		B) 6 samples over 6 occurrences G) 16 samples over 8 occurrences
Sebastiano, Vittorio	Private Source 5R21AR07036102	05/01/2018-04/30/2019	27								A) 27 samples over 3 occurrences
Shizuru, Judith	Private Source	05/01/2018-04/30/2019	53								A) 53 samples over 3 occurrences
Snyder, Michael	5UM1HG009442-03	05/01/2018-04/30/2019	264								A) 264 samples over 5 occurrences
Strober, Samuel	Private Source	05/01/2018-04/30/2019					31		4		E) 31 samples on 1 occurrence on 07/13/18 G) 4 samples over 2 occurrences
Thakor, Avnesh	Private Source 5P30DK11607402	05/01/2018-04/30/2019	106								A) 106 samples over 10 occurrences
Wu, Joseph	5R01HL13002004	05/01/2018-07/31/2018	9								A) 9 samples over 2 occurrences
Non-members											
Weinacht, Katja	5K08AI12357104									3	H) 3 hours over 3 occurrences

OUTCOME OF CORE FACILITIES

during last 12-month budget period

CORE: **Diabetes Immune Monitoring Core (DIMC)**

Publications

Core User	PMID	Title	Authors
Bollyky, Paul	PMC6286219	Extracellular matrix and the maintenance and loss of peripheral immune tolerance in autoimmune insulitis.	Medina CO, Nagy N, **Bollyky PL**
Bollyky, Paul	PMC6401354	Hyaluronan levels are increased systemically in human type 2 but not type 1 diabetes independently of glycemic control.	Nagy N, Sunkari VG, Kaber G, Hasbun S, Lam DN, Speake C, Sanda S, McLaughlin TL, Wight TN, Long SR, **Bollyky PL**
Bollyky, Paul	PMC5767862	Hyaluronan content governs tissue stiffness in pancreatic islet inflammation.	Nagy N, de la Zerda A, Kaber G, Johnson PY, Hu KH, Kratochvil MJ, Yadava K, Zhao W, Cui Y, Navarro G, Annes JP, Wight TN, Heilshorn SC, **Bollyky PL**, Butte MJ
Thakor, Avnesh	30707291	Adipose tissue-derived mesenchymal stem cells rescue the function of islets transplanted in sub-therapeutic numbers via their angiogenic properties.	Ren G, Rezaee M, Razavi M, Taysir A, Wang J, **Thakor AS**

Grants

Core User	Grant #	Title	Sponsor
Bollyky, Paul	5R21AI13324002	Heparanase and regulatory T cell stability and function	NIH (NIAID)
Bollyky, Paul	5R01DK11417402	The development of 4-methylumbelliferone pro-drugs to prevent autoimmune diabetes	NIH (NIDDK)
Meyer, Everett and Annes, Justin	Pending Support		
Meyer, Everett	U01 DK12373101	A targeted approach to type 1 diabetes: Integrated use of medicinal chemistry and cellular engineering to enable islet restricted suppression of auto-reactivity and functional beta cell expansion	NIH (NIDDK)

Meyer, Everett	Pending Support		
Meyer, Everett	1UC4DK11625201	CAR T cell targeting of human islets	NIH
Meyer, Everett	Pending Support		
Thakor, Avnesh	N/A	A novel strategy for regenerating the pancreas using mesenchymal stem cells and pulsed focused ultrasound	Private Source
Thakor, Avnesh	Pending Support		
Thakor, Avnesh			
Thakor, Avnesh			

B.4 What opportunities for training and professional development has the project provided?

DIMC supports collaborative arrangements between SDRC members and training of Doctoral Students, Postdoctoral Fellows, Research Scientists and Research Staff in assays relevant to Diabetes and Transplantation. DIMC leadership consults with clients, demonstrates the relevant assays, assist initially with data analysis and provides ongoing support for researchers interested in diabetes research. Training includes antibody panel design and execution of flow cytometry and CyTOF assays, Luminex and B, T and APC functional studies, including cell sorting of immune cells from blood (provided by the Diabetes Clinical Research Core [DCTC]) or human/mouse islets (provided by the Stanford Islet Research Core [SIRC]).

In the past year, we provided consultation and training to members of the following member laboratories:

1. Paul Bollyky
2. Agnieska Czechowicz
3. Gary Fathman
4. Everett Meyer
5. Katja Weinacht (non-member)

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

No Change

F.3.b Vertebrate Animals

No Change

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 132 of 220 to Page 135 of 220

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A. COMPONENT COVER PAGE

Project Title: Clinical and Translational Core
Component Project Lead Information: GARDNER, CHRISTOPHER D

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The Clinical and Translational Core (CTC) supports the mission of the SDRC to foster innovation, new knowledge, and training in clinical and translational diabetes-related research, leading to improved diagnosis, treatment and prevention of diabetes and its complications. The CTC will facilitate diabetes-related research at Stanford University by increasing interdisciplinary collaborations, facilitating execution of clinical research, and improving quality of sample collection, integrity of data, and efficiency of processes necessary for human trial conduct. At our institution, pioneers in cutting-edge technologies are often in search of clinical collaborators with human subjects in which to test their in vitro or animal results. Likewise, clinical investigators often fail to use emerging and novel methodologies due to lack of awareness of and/or accessibility by SDRC researchers in basic science. In addition, clinical investigators can encounter hurdles with recruitment/retention, sample management, and thoughtful data collection, leading to inefficient use of time, sample loss, failure to complete studies, and disincentive to provide banked samples for collaborators. The CTC will address these specific needs by leveraging existing Stanford resources to focus on diabetes-specific research, thus enhancing our institution's ability to perform innovative high-impact interdisciplinary studies that surpass the capabilities of a single investigator/laboratory. Recent advances in programmatic design and data management, and strategic planning to centralize clinical and translational research infrastructure at Stanford provide platforms that the CTC is poised to exploit. The CTC will facilitate the tailoring and usage of these systems by SDRC investigators through the following Specific Aims:
1. Establish a Biorepository (iBiobank) of existing and prospectively collected samples with standardized collection, sample tracking, links to clinical data, and access via a centralized hub.
2. Provide Advanced Analytic Support including study design, database design with data capture in REDCap and linkage to the electronic medical record and virtual biorepository, data management, and data analysis.
3. Create a Clinical Trial Support hub that creates a clinical registry for recruitment, advises in the logistics and conduct of trials, and enhances human subjects retention and compliance.
4. Provide SDRC investigators with training in biospecimen preservation for the iBiobank, clinical study design, data analysis and management, and human clinical trial logistics and strategies.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: DCTC-Accomplishments.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: DCTC_Training_2019.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

CTC leaders Drs. Christopher Gardner and Tracey McLaughlin have advertised sample repository to the SDRC members using the regular SDRC communication channels. To help kickstart and build the SDRC Clinical Registry, Clinical coordinator, Christina Petlura has worked with the SDRC Program Manager, Kiran Kocherlakota to advertise the url to sign up for registry at all major Bay Area diabetes events and on social media. The CTC staff have presented posters at the SDRC symposia and continue to make periodic presentations to the SDRC members to make them aware of steps being taken to build the sample repository and registry.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

The Clinical and Translatoinal Core will continue to build the SDRC communal biobank by consenting study participants and arranging for sample collection. These samples will be advertised as available for collaborative/pilot studies through the SDRC communication channels and usage will be recorded. In addition to the prospective samples, CTC will promote and encourage sharing of previously collected clinical specimens between SDRC investigators.
CTC will continue to advertise and recruite participants for the Clinical Registry & advertise the registry to investigators to recruit for their individual studies from. Our goal is to reduce the recruitment burden for investigators by providing a list of willing participants to select from based on study requirements.
Dr. Manisha Desai, Director of Quantitative Sciences Unit, that provides data analysis and study design services will present to SDRC Members and potential diabetes-related collaborators on the topic of "Collaborating with Data Scientists from the Quantitative Sciences Unit". Following this seminar, the QSU will organize a 1:1 biostatistics consulting session which will be in addition to the regular 1:1 biostatistics consulting sessions full-day events to assist individuals with grant proposal preparation and data analysis targeting the P&F deadline in August.
In the coming year, CTC will include services for tissue procurement with consent for genomics studies included to facilitate research in multiple laboratories that require primary human tissues.

USE OF CORE FACILITIES

during last budget period

CORE: **Diabetes Clinical and Translational Core (DCTC)**

DETERMINATIONS/SERVICES RENDERED
A1. Study Design and Analytics
A2. Manuscript preparation with data analysis
A3. Grant preparation with data analysis
B. Recruitment from SDRC registry
C1. Bodily fluids (serum/plasma, urine, stool or other)
C2. Buffycoat/PBMCs/WBCs (each)
C3. Human tissue samples (Pancreas, adipose etc)

Core User	Funded Project	Period of Core Use	A1	A2	A3	B	C1	C2	C3	Comments
Desai, Manisha	Non-Funded; U19 NIH grant proposal prep	11/01/18-01/31/19	X		X					Approximately 7-10 hours per week during the usage time period
Desai, Manisha	Non-Funded; R01 NIH grant proposal prep	02/01/2019-04/30/19	X		X					Approximately 15 hours thus far; additional 25 hours expected through grant submission
Gardner, Christopher		4/20/18		X						Approximately 35 hours manuscript preparation
GenePool/ Snyder, Bhalla, Palaniappan	Various	11/1/18-01/31/19						300		300 WBC samples
Hood, Korey		6/6/18			X					Grant application

Kim, Engleman, Habtezion, Nolan, Winslow and Park	Pending Support	01/20/2019	X		X					Approximately 5 hours
Kim, Sun		4/25/18	X							Approximately 4 hours data analysis
Knowles, Joshua/Long, Jonathan	Private Source	11/1/17-04/30/19					100			50 plasma and 50 serum samples
Knowles, Joshua/ Snyder, Michael		11/1/17-04/30/19					100			100 buffycoat samples
Knowles, Joshua/Tsao, Phillip		11/1/17-04/30/19					10			10 plasma samples
Lal, Rayhan	Pending Support	8/14/18-10/12/18			X					6 hours over the course of 2 months (Manisha Desai on Advisory Board)
Maahs, David		09/01/18-10/31/18			X					10 hours of grant proposal support
Maahs, David	Private Source	01/10/19-01/31/19		X						25 hours of manuscript preparation
McLaughlin, Tracey		01/30/2019				30				Registry participants for recruitment
McLaughlin, Tracey	NIH 5R01DK11018602	01/10/19-04/20/19	X		X	60				Approximately 7 hours in total
McLaughlin, Tracey	Non-funded	9/5/18-9/26/18		X						3 hours (manuscript-review consultation)

McLaughlin, Tracey/Bollyky, Paul	Private Source	10/01/2018							26	26 adipose tissue samples
McLaughlin, Tracey/Davis, Mark	Private Source	12/01/2018					72			72 plasma sampels
McLaughlin, Tracey/Engleman, Edgar	Unfunded	07/012018-01/31/2019					100		100	100 WBCs and 100 adipose tissue samples
McLaughlin, Tracey/Gardner, Christopher	Private Source	2018							100	100 adipose tissue samples
McLaughlin, Tracey /Knowles, Joshua	Unfunded; Preliminary data generation for manuscript	11/01/18-01/31/19							4	4 adipose tissue samples
McLaughlin, Tracey/Kraemer, Rick & Gardner, Christopher	Unfunded	09/01/2018							48	48 adipose tissue samples
McLaughlin, Tracey/Snyder, Mike	Unfunded	12/01/2018							72	72 adipose tissue samples
McLaughlin, Tracey/Svensson, Katrin	Private Source	10/01/2018							10	10 adipose tissue samples
Palaniappan, Latha		4/18/18		X						Approximately 35 hours of manuscript preparation
Palaniappan, Latha	Non-Funded; NIH/NIDDK R01 grant preparation	02/01/19-03/31/19	X		X					Approximately 10 hours in total
Roncarolo, Maria Grazia	NIH grant proposal preparation	5/9/18			X					

Strober, Samuel/DIMC	NIH P30DK116074	02/01/2019						2		2 PBMC samples
Teruel, Mary	Non-Funded (Stanford Internal Grant Proposal Submission)	9/4/18			X					1 hour (consultation office hour provided by QSU) for Stanford Internal Grant Proposal Submission
Wu, Joseph	NIH R01 grant proposal	5/31/18			X					10 hours grant proposal preparation
Non-members										
Boden, Matthew	N/A	05/01/2018		X						Approximately 10 hours manuscript preparation
Goodwin, Marianne	Non-Funded; Preliminary stages of study design and analytics	02/01/2019	X							Ongoing project
Gabiola, Julieta	Non-Funded	02/01/19-04/30/19	X							Approximately 2 hours consultation and project ongoing
Gupta, Tanya	Non-Funded	02/01/19-04/30/19		X						Approximately 5 hours consultation for grant submission
Halpern, Casey	UH3 NIH grant proposal prep	01/01/2019	X		X					Approximately 15-20 hours in total for analytics and grant submission
Ragson, Natalie	5R01AG05034503	09/01/2018				59				59 registry participants for recruitment

Raygor, Viraj	Non-funded	6/12/18-04/30/19	X							2 hours data analysis
Sampson, Jacinda	Non-Funded	9/28/18-04/30/19	X							2 hours thus far (expected up to 15 hours over next six months)
Sarin, Kavita	N/A	5/9/18		X						Approximately 8-10 hours manuscript preparation
Sonnenburg, Justin	Gift funding support	11/01/2018-01/31/2019				88				88 registry participants for recruitment
Srivastava, Ashini	Non-Funded (Stanford Internal Grant Proposal Submission)	9/4/18		X	X					1 hour consultation for Stanford Internal Grant Proposal
Tabatabai, Ideen	Private Source	10/01/2018				32				32 registry participants for recruitment
Tierney, Seda		6/26/18	X							4 hours data analysis
Wang, Jason	Manuscript pending Journal review	2/11/19		X						Approximately 15-20 hours in total
Weinacht, Katja	Non-funded	03/012019-04/30/19	X							Approximately 2 hours (ongoing)
Wong, Jessie	Non-Funded (Stanford Internal Grant Proposal Submission)	9/4/18		X	X					1 hour (consultation provided by QSU) for Stanford Internal Grant Proposal Submission

OUTCOME OF CORE FACILITIES

during last 12-month budget period

CORE: **Diabetes Clinical and Translational Core (DCTC)**

Publications

Core User	PMID	Title	Authors
Bollyky, Paul	30196101	Hyaluronan Levels Are Increased Systemically in Human Type 2 but not Type 1 Diabetes Independently of Glycemic Control.	Nagy N, Sunkari VG, Kaber G, Hasbun S, Lam DN, Speake C, Sanda S, McLaughlin TL, Wight TN, Long SR, Bollyky PL.
McLaughlin, Tracey	30040822	Glucotypes reveal new patterns of glucose dysregulation.	Hall H, Perelman D, Breschi A, Limcaoco P, Kellogg R, McLaughlin T, Snyder M.
Snyder, Mike	30487145	High Frequency Actionable Pathogenic Exome Variants in an Average-Risk Cohort.	Rego S, Dagan-Rosenfeld O, Zhou W, Sailani MR, Limcaoco P, Colbert E, Avina M, Wheeler J, Craig C, Salins D, Röst HL, Dunn J, McLaughlin T, Steinmetz LM, Bernstein JA, Snyder MP.

Grants

Core User	Grant #	Title	Sponsor
Maahs, David	R18DK122422-01	Teamwork, Targets, Technology, and Tight Control in Newly Diagnosed Pediatric T1D: 4T Study	NIH
McLaughlin,Tracey	Private Source	Role of altered nutrient transit and incretin hormones in glucose lowering after Roux-en-Y gastric bypass surgery	Private Source
Wu, Joe	R01HL14669001	Genetic and Stem Cell Model of Cardiac Metabolic Disease	NIH

B.5 How have results been disseminated to communities of interest?

CTC leaders Drs. Christopher Gardner and Tracey McLaughlin have advertised sample repository to the SDRC members using the regular SDRC communication channels. To help kickstart and build the SDRC Clinical Registry, Clinical coordinator, Christina Petlura has worked with the SDRC Program Manager, Kiran Kocherlakota to advertise the url to sign up for registry at all major Bay Area diabetes events and on social media. The CTC staff have presented posters at the SDRC symposia and continue to make periodic presentations to the SDRC members to make them aware of steps being taken to build the sample repository and registry.

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

File uploaded: CTC Human Subjects Update.pdf

F.3.b Vertebrate Animals

No Change

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

Human Subjects Update: Core 5987

The Clinical and Translational Core (CTC) of the Stanford Diabetes Research Center serves the diabetes research community by providing access to patient samples (Biobanking) and clinical recruitment services (Clinical Registry).

Registry: The CTC is creating a clinical research registry of patients who are willing to participate in clinical studies and trials and wish to be contacted with details. From this registry, SDRC investigators can recruit participants when they have a study that requires patient recruitment. Potential participants fill out an online questionnaire consisting of a consent form and personal information including diabetic status. The goal is to use this registry to enhance recruitment for clinical studies conducted by SDRC members and to help new investigators seek out potential participants. This service is enabled by IRB approved protocol (IRB44294). Inclusion enrollment data and protection of human subjects information have been entered in the Human Subjects form.

Biobanking: The purpose of this service is to facilitate collaborative efforts within SDRC by creating a Biobank of blood samples from diabetic and healthy volunteers. Consenting participants will have an extra tube of blood drawn that is stored and available for use by SDRC investigators for pilot or collaborative studies with the goal of having these studies lead to the development of publications or grant proposals. There are two IRB approved protocols that are used for this purpose – IRB35453 and IRB49453. Further details are in the Human Subjects form.

Investigator	Title	Status
McLaughlin, Tracey	Common Consent for Stanford Diabetes Clinical Research Registry	IRB44294
Gardner, Christopher	SDRC Biobank Sample Collection	IRB49453
Meyer, Everett	The Immune Response to Pre-Proinsulin in Human Type 1 Diabetes Pathology, Prevention and Therapy	IRB35453

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

Yes

Is the research exempt from Federal regulations?

No

Does this project involve a clinical trial?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 152 of 220 to Page 155 of 220

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A. COMPONENT COVER PAGE

Project Title: Diabetes Genomics and Analysis Core
Component Project Lead Information: CHAIB, HASSAN

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

Stanford Diabetes Research Center (SDRC) investigators through access to next-generation sequencing and modern bioinformatics analysis. Nucleotide sequencing has become essential for formulating and resolving crucial biological questions in many contexts, like diabetes. This includes determining the underlying causes of human diseases to monitoring gene expression, elucidating regulatory networks and exploring organismal diversity that may impact human health, like human microbiomes. Thus, high-throughput sequencers have become a transformative tool for a wide variety of studies in both pure and applied biomedical science. Researchers use this technology increasingly for an ever-broadening range of applications to detect and characterize nucleic acid molecules (RNA and DNA). The overall goal of the Stanford DGA Core is to provide SDRC investigators with a next-generation sequencing facility composed of state-of-the-art laboratory, computational facilities and informatics support.
The DGA Core is committed to providing SDRC laboratories with the expertise and technical support necessary to realize the potential of next-generation sequencing in a cost effective matter regardless of their existing expertise in genomics. The Stanford DGA Core will offer a complete package of services ranging from study design consultation, library preparation services, access to sequencing technologies, and analysis and interpretation of sequencing data. SDRC laboratories can leverage the technologies and expertise of the Stanford DGA Core to overcome cost-prohibitive barriers of entry into genomics which include technologically advanced facilities and equipment, and computational infrastructure that can only be achieved in a center setting like the Stanford DGA Core. Based on the strengths of the Stanford DGA Core and its contributions, the specific aims of the DGA Core are to:
1. Provide SDRC core users guidance with design of their next-generation sequencing projects
2. Provide SDRC core users access to a broad range of nucleotide library preparation services
3. Provide SDRC core users access to sequencing services with modern sequencing technologies
4. Support SDRC core users with data analysis and interpretation of their sequencing projects

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: DGAC-Accomplishments.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: DGAC_Training.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

The office hours have helped to produce a central location where SDRC members and Stanford community as a whole can meet and discuss sequencing topics and challenges to advance research in diabetes field. DGAC members have given talks and presented posters at Stanford organized events including SDRC symposium in May 2018 and a Stanford Service Center informational session in April 2019. The DGAC website is maintained with up to date information for the convenience of SDRC member laboratories to have access to general FAQs and policies.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

The DGAC core will continue to conduct the office hours for SDRC members for consulting on the various projects and help answer any questions regarding data analysis. The DGAC core will proactively reach out to SDRC members to inform them of their availability for bioinformatics analysis and sequencing services.

USE OF CORE FACILITIES

during last 12-month budget period

CORE: **Diabetes Genomics and Analysis Core**

DETERMINATIONS/SERVICES RENDERED

A. Library Preparation
B. Sequencing
C. Analysis
D. Bioinformatics Consultation
E. Sequencing service Office hours

Core User	Funded Project	Period of Service Performed	Service type and usage					Actual Use And
			A	B	C	D	E	
Annes, Justin	NIH R01DK10153004	08/03/2018-08/31/2018	32		13			2 x 16 RNA libraries and 13 hours requests for Bioinformatics analysis
Bollyky, Paul	NIH R21AI13324002	11/02/2018 - 01/31/2019			32.5			32.5 hours requests for bioinformatics analysis
Chang, Howard	N/A	10/25/2018 - 01/31/2019					1	2 office hours visits
Davis, Mark	Private Source	08/6/2018-08/31/2018			93			93 hours Bioinformatics Analysis

	Private Source							
Fathman, Garrison	Private Source	11/01/2018 - 01/31/2019			85.5	2.5		85.5 hours requests for Bioinformatics Analysis and 2.5 hours one-on-one advising
Gurtner, Geoffrey	NIH U01DK11909401	11/01/2018 - 03/31/2019			34.25			34.25 hours requests for Bioinformatics Analysis
Habtezion, Aida	N/A	08/02/2018 - 03/31/2019					3.5	3.5 office hours visits
Huang, Ngan	N/A	11/01/2018 - 01/31/2019					1	1 office hours visit
Ingelsson, Erik	N/A	10/25/18					1	1 office hours visit
Stanford Islet Research Core	NIH P30DK116074	08/31/2018- 10/25/2018					3	3 office hours visits
Kay, Mark	N/A	10/11/2018 - 01/31/2019					1.5	1.5 office hours visits
Kim, Seung	NIH UC4DK11625201	08/31/2018 - 03/31/2019			47		1	47 hours requests for Bioinformatics Analysis and 1 office hours visit

Knowles, Josh	Private Source	02/01/2019 - 03/31/2019			7			7 hours requests for Bioinformatics Analysis
Longaker, Michael	Transplant and Tissue Engineering Gift	09/12/2018 - 01/31/2019			58			58 hours requests for Bioinformatics Analysis
Meyer, Everett	N/A	02/01/2019 - 03/31/2019				2	1	2 one-on-one advising and 1 office hours visit
Nusse, Roelan d	Private Source	08/15/2018 - 11/30/2019	5		1			5 requests each for single cell libraries preparation and 1 Bioinformatics Analysis
Snyder, Michael	Stanford GDM 11- NOV- 09/EALDU	08/02/2018 - 03/31/2019			37		7	37 hours requests for Bioinformatics Analysis
Tsao, Phillip	Stanford - VA account	05/01/2018- 08/31/2018			42.5			42.5 hours requests for Bioinformatics Analysis
Weissman, Irv	N/A	05/01/2018- 08/31/2018					1.5	1.5 office hours visits

Wu, Joseph	NIH P01GM09913005	11/01/2018 - 03/31/2019			155			155 hours requests for Bioinformatics Analysis
Wu, Joy	DOD W81XWH-17-1- 0027	11/01/2018 - 11/30/2019	3	9	13		1.5	3 libraries preparation, 9 lanes sequencing, 13 requests for Bioinformatics Analysis and 1.5 office hours visits

OUTCOME OF CORE FACILITIES

during last 12-month budget period

CORE: **Diabetes Genomics and Analysis Core**

Publications

Core User	PMID	Title	Authors
Longaker, Michael	30374308	*Twist1*-Haploinsufficiency Selectively Enhances the Osteoskeletal Capacity of Mesoderm-Derived Parietal Bone Through Downregulation of *Fgf23*	Quarto, N., Shailendra, S., Meyer, N. P., Menon, S., Renda, A., and **Longaker, M. T**

Unpublished

Unpublished

Unpublished

B.4 What opportunities for training and professional development has the project provided?

DGAC was established one year and seven months ago. It has quickly become the principal platform for SDRC members to connect with experts in Next-Generation Sequencing (NGS) and allowed for rapid improvements in study design, optimization of sequencer use, and analysis of data. In addition to one-on-one consultation with the SDRC member users, the creation of sequencing advising drop-in has helped to streamline the experiment-to-sequencer process and has produced a central location where SDRC members and Stanford as a whole can meet and discuss sequencing topics and challenges. Over 600 hours were spent by the DGAC for bioinformatics consulting, analysis, and office hours help on various projects involving 11 SDRC labs. Data analysis was performed on studies involving RNA-Seq, single-cell RNA-Seq, T-cell immunoprofiling, whole genome variant calling, and ChIP-Seq, among others.

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

No Change

F.3.b Vertebrate Animals

No Change

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 170 of 220 to Page 173 of 220

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A. COMPONENT COVER PAGE

Project Title: Pilot and Feasibility Program
Component Project Lead Information: KRAEMER, FREDRIC B.

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The mission of the Stanford Diabetes Research Center (SDRC) Pilot and Feasibility (P&F) Program is to foster the development of a community of productive, well-connected investigators whose work leads to advances in the prevention, cure and treatment of diabetes and its complications. The Program focuses on funding research proposals by early career investigators, investigators who are new to the diabetes research field, and established diabetes researchers with ideas for novel and exciting research directions that have outstanding potential to open areas of diabetes-related research in diverse scientific disciplines at Stanford. Specifically, the aims of the Pilot and Feasibility Program are:
Aim 1: To solicit, review, and fund SDRC Pilot and Feasibility awards. These grants will be provided to outstanding beginning and established investigators at Stanford whose expertise is complementary to areas of strength within the SDRC membership, whose research has a high probability of benefiting from use of SDRC core facilities, and could generate data necessary to transition to additional extramural peer-reviewed funding mechanisms.
Aim 2: To provide mentorship and career development for recipients of Pilot and Feasibility grants. The P&F program leadership seeks to form and enhance relationships among P&F funded researchers and other Stanford faculty to provide intellectual support, constructive commentary and career development during the project period. This activity aims to foster the P&F grantee's scientific expertise and integrate scientific and professional outcomes into the larger sphere of SDRC and national or international diabetes research. This includes relationships that enhance further collaboration between P&F award applicants or awardees and other members of the SDRC. Success in the SDRC P&F Program will result in new independent investigators focused on solving problems related to diabetes and complications of diabetes, increased SDRC Research Core use, a stronger local diabetes research community, and scientific discoveries that may lead to new treatment strategies for people with diabetes.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File uploaded: PF-accomplishments-2019.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File uploaded: P_F-Training-2019.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

SDRC organized the annual Diabetes Research Forum on November 28th 2018 to mark National Diabetes Awareness Month. The event brought together 100+ attendees who had an opportunity to hear presentations by 2017 and 2018 P&F awardees. 2017 awardees presented an update of their projects that started in January 2018, while the 2018 awardees presented their proposed ideas that resulted in their awards.
Dr. Palaniappan's project was accepted for presentation at the ADA June 2019 Scientific sessions. Thakor group presented their pilot project at the Stanford Bio-X Interdisciplinary Initiatives Seed Grants Symposium 2019 at Stanford University. Dr. Diana Naranjo's work was presented at the Advanced Technologies and Treatments for Diabetes (ATTD) in February 2019 and the 3rd Annual Innovations in Psychiatry and Behavioral Health Conference in October 2017. Dr. Jennifer Lee's work was presented at 2018 American Society of Bone Mineral Research (ASBMR) and will be presented at the 2019 American Diabetes Association (ADA). The results from Dr. Yaping (Joyce) Liao's pilot project were presented at the 2018 North American Neuro-Ophthalmology Society (NANOS) meeting and the 2018 Association for Research in Vision and Ophthalmology (ARVO) meeting.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

A fresh round of applications will be solicited during the month of July 2019 with a deadline of Aug 30, 2019. Ample prior notifications of upcoming RFA will be provided as early as on April 24th at the Frontiers in Diabetes Research Symposium as well as at the weekly seminar meetings. Email notifications will also be sent out to SDRC member laboratories and the broader Stanford community through our partnering centers at Stanford. In addition to current Schools at Stanford included in the SDRC membership (Medicine, Engineering, Humanities and Sciences) we will make members of other Stanford schools (Education, Law, Business, Earth/Energy/Environmental Sciences) aware of these P&F opportunities and coordinate with building membership in the SDRC.

B.2 What was accomplished under these goals?

Solicitation - details

- The RFA was posted on SDRC website in July, 2018. Email notifications were sent out to SDRC mailing list as well as several relevant Stanford University mailing lists.
- **25 LOIs** were received. **21 full P&F applications** were received by the deadline date and reviewed.
- Types of applications reviewed
    - 10 applications came from new investigators, 3 applications were from established investigators new to diabetes research, 1proposal was an innovative partnership
    - 10 proposed basic research, 5 were clinical, 3 have translational potential and 5 addressed prevention & control strategies
    - 11 of the proposals focused on diabetes, 3 on endocrinology in general, 8 on obesity, 2 on autoimmunity, 3 on transplantation ideas and 3 on diabetes related conditions
    - 2 proposals were inter-disciplinary and 4 others were trans-disciplinary in nature
- All reviewers were external reviewers chosen from the NIDDK P&F reviewer list available to DRCs. Based on the scores and reviewers' comments, the final decision was made by the SDRC leadership to extend 8 pilot awards to begin in January 2019.

New P&F Awards

- **8 new Pilot and Feasibility awards** were granted with the award period of 1 year and award start date being 1/1/2019
- Types of awards
    - 2 awardees are new investigators, 2 are established investigators new to diabetes research and 1 pilot was granted for an innovative partnership
    - 5 of the basic research proposals, 3 of the clinical research proposals and 1 of the prevention & control proposal received pilot grants
    - 5 awarded pilots focused on diabetes, 1 focused on endocrinology, 3 on obesity and 1 on transplantation
    - 1 inter-disciplinary and 2 trans-disciplinary projects received funding
    - 3 of the pilot grants were supported with additional funding from Departments of Pediatrics and Medicine at Stanford in addition to the NIH P30 granted funds.

7 publications have resulted from pilot funding support and **9 grants** including fellowships have been awarded for proposals submitted based on data from the pilot projects. See the table of outcomes of pilot awards from 2017-present. Note that 2017 awards did not utilize NIH P30 funds and were made with support from the Stanford School of Medicine since SDRC did not have the NIH designation then. We have included the results here since these awards were mentioned in the proposal and the progress is relevant to show the outcomes of our P&F progress. For 2018, SDRC received interdepartmental funding support for our pilot program from Department of Pediatrics and for 2019, SDRC received interdepartmental funding support for our pilot program from Departments of Pediatrics and Medicine.

PILOT PROJECT OUTCOME TABLE

P& F #	PI (Dept)	Dates/Amt of P&F project	Title of Pilot project	Brief project description	A	P	Applications Funded/ Pending	Still in Diabetes field?
1	Bhalla, Vivek (Nephrology)	1/1/17-12/31/17 ($25,000)	Validation of cell-free RNA associated with human diabetic kidney disease	We identified similar and different biomarkers in plasma and serum samples from diabetic kidney disease among patients with diabetes and are preparing digital droplet PCR protocols to demonstrate repeatable measurements of select RNA transcripts.	1	MIP		Yes
2	Gross, Eric (Anesthesiology)	1/1/17-12/31/17 ($12,500)	Generation of endothelial cells resistant to hyperglycemia-induced endothelial cell dysfunction	We have generated a mutant mouse model to test TRPV1 function in hyperglycemia induced endothelial dysfunction and are performing mitochondrial assays.	3			Yes
3	Liao, Joyce (Ophthalmology)	1/1/17-12/31/17	Treatment of vision loss due to optic nerve ischemia in diabetes	In collaboration with members of the Stanford Diabetes Research Center, we are currently studying the expression of key endoplasmic reticulum markers in 5 different animal models of type 1 and type 2 diabetes, with and without optic nerve ischemia.	2	2 MIP	Pending Support	Yes
4	Naranjo, Diana (Psychiatry)	1/1/17-04/30/18 ($33,000)	Optimizing uptake and use of closed loop automated insulin delivery systems through virtual reality	We tested a Virtual Reality based exposure therapy for known barriers to utilizing diabetes technologies with a pilot of 20 adult patients both with technology experience and without. This initial pilot has shown that the study is feasible and acceptable.	2			Yes

5	Teruel, Mary (Chemical and Systems Biology)	1/1/17-12/31/17 ($38,000)	Understanding the role of FABP4 in regulating adipogenesis and adipocyte function	We used CRISPR-mediated genome editing to tag endogeneous PPARG and FABP4 with fluorescent proteins in order to understand the dynamics and timing of FABP4 and PPARG during adipogenesis.	8	1, MII P		Yes
6	Cochran, Jennifer (Bioengineering)	1/1/17-12/31/17 ($38000)	Engineering agonists of the glucagon-like peptide-1 receptor with novel pharmacological properties for the study and therapeutic control of diabetes	We have found several new agonists whose sequence differs from that GLP-1, despite all being competent at activating GLP-1R signaling. We are using these hits to design more rounds of combinatorial and rational screening to elucidate the sequence determinants of peptide agonism.	1			Yes
7	Lee, Won Hee (Cardiovascular Institute)	1/1/17-12/31/17 ($12,500)	Assessing the potential health risk of e-cigarettes in diabetes using patient-specific induced pluripotent stem cells-derived endothelial cells	Our findings in the iPSC-ECs support a novel model for the study of dia-betic angiopathy (micro- or macroangiopathy), which may have significant implications in diabetic cardiac complica-tions. The findings also shed further light on the mecha-nisms underlying the benefits of calpain inhibition as a therapeutic target in tackling cardiac disorders.		1		Left Stanford
8	Matsa, Elena	1/1/17-12/31/17	Identification of genetic variation determining patient-specific responses to anti-diabetic drugs	Project discontinued and funds returned				Left Stanford

9	Nagy, Nadine (Medicine)	1/1/17-12/31/17 ($ 33,000)	The development of 4-methylumbelliferone analogs to prevent autoimmune diabetes	We generated 16 candidate esters of 4-MU or 4-MUG and examined the conversion of these compounds into 4-MU in human serum, and seleted 2 that were readily converted into 4-MU and best inhibited HA synthesis in vitro.	2	4	R01DK114174-01A1	Yes
10	McLaughlin, Tracey (Endocrinology)	1/1/17-12/31/17	Predicting Cardiovascular Benefits of Anti-diabetic Drugs	Treatment of iPSC-ECs derived from patients with type 2 diabetes with canagliflozin, a sodium-glucose cotransporter-2 (SGLT2) inhibitor, significantly dampened proinflammatory response and improved endothelial tube formation and nitric oxide production under stimulated diabetic conditions	1	MIP	Stanford Bio-X Undergraduate Summer Research Fellowship, 2019	Yes
11	Annes, Justin (Endocrinology)	1/1/18-12/31/18 ($50,000)	Mitochondrial Dysfunction Promotes ß-Cell Failure and diabetes via a Previously Unrecognized Mechanism: Protein Hyper-Succinylation	SDH-deficient β-cells have reduced replicative capacity in response to nutrient treatment. RNA-Seq data indicates that SDH-deficient and Aged mice have altered cholesterol metabolism. Current work is focused on better understanding this phenotype.	3	MIP		Yes
12	Appel, Eric (Materials Science and Engineering)	1/1/18-12/31/18 ($25,000)	Novel ultra-fast insulin formulations for diabetes treatment	We have used CB[7]-PEG as a stabilizing excipient to create a stable insulin-pramlintide co-formulation to enable a single administration treatment that can more closely mimic endogenous hormone secretion and conducted a pilot study in a fully autonomous closed-loop system in a diabetic swine model.	1	MIIP	R01-DK119254	Yes

13	Lee, Jennifer (Medicine)	1/1/18-12/31/18 ($25,000)	Diabetes Precision Phenotyping & Outcomes Prediction in Health Care	We are mapping disease progression, from normoglycemia to pre-diabetes to type 2 diabetes, for 10+ million Veterans during the last 10 years. We are also overlaying a map of cardiometabolic-related drug prescribing, to evaluate whether or which treatments may alter the progression path, for subpopulations of patients.		2S, 1MIP	VA Research Initiative Cooperative Studies Program	Yes
14	Meyer, Everett (Medicine)	1/1/18-12/31/18 ($50,000)	Therapeutic targeting of islet-infiltrating invariant NKT cells in diabetes to promote islet tolerance	We use a data-driven approach using high-dimensional data to reveal a scheme for defining human iNKT cell effector phenotypes with distinct functions. We found pro-inflammatory iNKT cells that expands and correlates closely to acute graft-versus-host disease (aGVHD) after hematopoietic cell transplantation (HCT) and in patients with new onset type 1 diabetes (T1D).		1S		Yes
15	Palaniappan, Latha (Primary Care and Population Health)	1/1/18-12/31/18 ($25,000)	Elucidating the mechanisms of Diabetic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative	We are planning exosome analysis from blood collected at three time points during the devleopment of metabolic myopathy.	5	MIP	Pending Support	Yes
16	Soh, Tom (Electrical Engineering)	1/1/18-12/31/18 ($25,000)	Real-time biosensor for continuous in vivo detection of glucose	We are developing an aptamer based glucose sensor well suited for minimally invasive operation and to enable long-term continuous tracking concentrations in vivo, in real-time.	1	2MIP	NSERC Postdoctoral Fellowship & NIH	Yes

							1OT2OD025342-01	
17	Thakor, Avnesh (Radiology	1/1/18-12/31/18 ($50,000)	A novel collagen based cryogel bioscaffold that generates oxygen and promotes angiogenesis for islet transplantation	We developed a clinically transplantable bioscaffold which can release oxygen in a controlled manner to provide a “bridge” for islet survival before they establish their own blood supply for long-term oxygen delivery.	1	1, 1MIP		Yes
18	Zheng, Xiaolin (Mechanical Engineering)	1/1/18-12/31/18 ($25,000)	Breath Acetone Sensor towards Non-invasive Diabetic Monitoring	The project is aimed at developing a portable sensor to measure breath acetone concentration for non-invasive diabetic monitoring. We have developed a sub-ppm level miniaturized acetone sensor that can operate at 200 °C with a good sensitivity and selectivity.				Yes
19	Annes, Justin (Endocrinology)	1/1/19-12/31/19 ($50,000)	Development of β-Cell-Targeted Regenerative Therapeutics using a Novel Prodrug Strategy	We will take advantage of Peptidylglycine α-Amidating Monooxygenase (PAM) to convert latent prodrugs to target biologically active daughter compounds selectively within β-cells		1	NIDDK R01DK119955	Yes
20	Demirci, Utkan (Radiology)	1/1/19-12/31/19 ($50,000)	An Automated, Centrifuge-Free Platform for Isolating Pancreatic Islets using Magnetic Levitation	We propose to develop a novel, automated, high-throughput, centrifuge-free platform technology that can sort and purify pancreatic islets based on the principles of magnetic levitation.				Yes
21	Ingelsson, Erik (Cardiovascular Medicine)	1/1/19-12/31/19 ($50,000)	Pooled CRISPR Screens to Established Causal Genes for	We are working on a strategy for following up genetics of complex phenotypes at large scale with				Yes

			Insulin Resistance	pooled single guide RNA (sgRNA) libraries.				
22	Kim, Sun (Endocrinology)	1/1/19-12/31/19 ($50,000)	Real-time Continuous Glucose Monitoring to Aid Weight Loss in Prediabetes: Building on expertise within SDRC	The goal of this proposal is to test the hypothesis that real-time continuous glucose monitoring (RT-CGM) will facilitate weight loss in overweight/obese individuals with prediabetes.				Yes
23	Patel, Anisha (Pediatrics)	1/1/19-12/31/19 ($50,000)	Evaluating the Impact of Safe Drinking Water Access and Promotion in Parks alongside Soda Taxes	This study builds upon a cross-sector partnership (Stanford and UCSF researchers, policymakers, community-based organizations, and San Francisco [SF] city agencies including the SF Department of Public Health [SFDPH], SF Public Utilities Commission [SFPUC], Parks and Recreation) focused on promoting intake of water instead of sugar-sweetened beverages as an obesity prevention strategy.				Yes
24	Pham, Tho (Pathology)	1/1/19-12/31/19 ($50,000)	Exploring how Interactions Between the Microbiota and Humoral Immune System Contribute to Insulin Resistance	We will use mouse models to study systemic changes to the immunoglobulin repertoire associated with gut microbiota perturbation by high-fat diet (HFD) consumption.				Yes
25	Prahalad, Priya (Pediatrics)	1/1/19-12/31/19 ($50,000)	The Use of Diabetes Technology to Change Clinical	The goal of this SDRC pilot and feasibility proposal is to develop a remote monitoring program by integrating CGM glucose values into				Yes

			Outcomes Following New Diagnosis of Type 1 Diabetes in the Pediatric Population	EMR using the GluVue system developed at Stanford.				
26	Tanenbaum, Molly (Pediatrics)	1/1/19-12/31/19 ($50,000)	A pilot of ONBOARD: OvercomiNg Barriers & Obstacles to Adopting Diabetes Devices for adults with T1D	ONBOARD will provide adults with T1D (18-50) with the skills to maximize benefit and minimize daily interference from barriers associated with CGM and increase closed loop readiness.			K23DK1194700 1	Yes

A = Abstracts
P = Publications (MIP – manuscript in preparation, S - submitted)
* Under “Applications Funded/Pending”, list the grant received most proximate in time to the P/F award, i.e. for investigators who received funding 5-10 years ago, this may not be current funding.

B.4 What opportunities for training and professional development has the project provided?

The Pilot and Feasibility awards have supported and enabled training of post-doctoral fellows, Sooyeon Lee, Amani Harini, Caitlin Maikawa, Mehdi Razavi; graduate students, Sangwook Park, Chelsea Longwell, Tim Horton; and undergraduate student Emma Tsai. Trainee Sooyeon Lee was awarded the 2019 Rachmiel Levine-Arthur Riggs Symposium Young Investigator Achievement Award that "encourages and recognizes outstanding research effort by a young investigator in the field of diabetes and metabolism". She also won the best poster award among 30 posters presented at the Frontiers in Diabetes Research Symposium organized by Stanford Diabetes Research Center on May 2, 2018. Trainee Mehdi Razavi received best poster award at Stanford Bio-X Interdisciplinary Initiatives Seed Grants Symposium 2019 among 100+ posters presented. Emma Tsai received a Stanford Bio-X undergraduate Summer Research Fellowship to continue the project in the McLaughlin group. Chelsea Longwell has trained rotation and undergraduate students for her project in the Cochran group. 3 Clinical Coordinators on the Palaniappan project received the CITI Human Subject Research Training program, designed to cover the topics of human subject's protection and to provide current information on regulatory and ethical issues involving human subjects research. Investigator Eric Appel received the Junior Faculty Development award from ADA. Dr. Jennifer Lee's trainee received ASBMR 2018 Annual Meeting Young Investigator Travel Grant for presenting their work.

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

Category	Explanation
Research Material	Research Material: Virtual Reality (VR) module to increase uptake and sustained use of closed loop systems and their components by users. This pilot was awarded during the 2016 RFA has partnered with the medical visualization company, Photon Biomedical (Philadelphia), to build 4 simulated VR modules. The VR modules are designed to address the most prevalent patient-reported barriers to diabetes device use, which were identified from recently published qualitative research. The content has been refined based on surveys, focus group responses, time to complete metrics, and observations from the research team. Overall, the VR exposure has been established as a technique for patients to better manage stressful diabetes-specific situations that can occur in daily life while using a closed loop system. It can further available for use in future studies.
Instruments or equipment	Miniaturized acetone sensor: Sub-ppm level miniaturized acetone sensor that can operate at 200C with good sensitivity and selectivity using mesoporous structured silicon doped WO3 has been developed by Dr. Xiaolin Zheng in an attempt to create a non-invasive glucose monitoring device.

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Category	Explanation
Research Material	Set of novel active GLP1R agonist peptides One of the P&Fs awarded following the 2018 RFA has identified a set of novel active GLP1R agonist peptides that are have sequence differences from wild-type GLP1 that can be indicators of functional impacts. These sequence variations are being tested for impact on peptide agonist function to inform future peptide drug development.
Research Material	New formulations of monomeric insulin: Dr. Eric Appel's pilot project has developed a series of formulations of monomeric insulin that are stable under stressed conditions. These formulations have been tested in diabetic rats and they indeed appear to have a faster onset of action than standard “fast-acting” insulins.

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

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F.3.b Vertebrate Animals

File uploaded: Vertebrate Animals update.pdf

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

Human Subjects Update: Project 5989

The Stanford Diabetes Research Center only supports Human Subjects studies/projects that are IRB-approved. The Stanford IRB determines whether each protocol meets the institutional standards for conducting research involving human subjects, including the protection of human subjects, inclusion of women and minorities.

4 new clinical studies/projects have been awarded pilot funding with the year 2 P30 grant support. This is in addition to two clinical studies from last year that we are providing updates for in this report. The table below lists basic details and more information can be obtained from the human subjects form that has also been filled out for this RPPR submission.

One of these studies has not yet begun enrollment and the IRB approval is pending at this point. Hence, the human subjects form is left empty and only the title has been provided. One is a clinical trial listed on clinicaltrials.gov (NCT03844646). Planned enrollment table and other details have been included in the human subjects form. The IRB approval was granted on 03/19/19 and the protocol # is 49402. The remaining two have received IRB approval and #s are listed below in the table, but only one study has started enrollment and the data has been uploaded in the human subjects form.

For the studies from the previous year of reporting, updates have been included in the human subjects form as appropriate. Note that one of them is infact exempt for human subject research as indicated below and on the human subjects form associated with this RPPR.

Investigator	Title	Project Dates	Status
Kim, Sun H	Real-time Continuous Glucose Monitoring to Aid Weight Loss in Prediabetes: Building on expertise within SDRC	1/1/19-12/31/19	NCT 03844646; IRB49402
Patel, Anisha	Evaluating the Impact of Safe Drinking Water Access and Promotion in Parks alongside Soda Taxes	1/1/19-12/31/19	IRB43173
Prahalad, Priya	The Use of Diabetes Technology to Change Clinical Outcomes Following New Diagnosis of Type 1 Diabetes in the Pediatric Population	1/1/19-12/31/19	IRB48935
Tanenbaum, Molly	A pilot of ONBOARD: OvercomiNg Barriers & Obstacles to Adopting Diabetes Devices for adults with T1D	1/1/19-12/31/19	IRB pending approval
Palaniappan, Latha	Elucidating the mechanisms of Diabetic Cardiomyopathy through Exosome Profiling, A Diabetes Research Center Collaborative Initiative	1/1/18-12/31/18	IRB40291
Lee, Jennifer	Diabetes Precision Phenotyping & Outcomes Prediction in Health Care	1/1/18-12/31/18	Exempt

Vertebrate Animals Update: Project 5989

2 new studies/projects involving animal subjects have been granted pilot funding with year 2 support from P30 grant under the Pilot and Feasibility Program. Both studies use *Mus musculus* as model systems and have received the necessary approvals from the Stanford IACUC.

Investigator	Title	Project Dates	Status
Annes, Justin	Development of β-Cell-Targeted Regenerative Therapeutics using a Novel Prodrug Strategy	1/1/19-12/31/19	Protocol 27273
Pham, Tho	Exploring how Interactions Between the Microbiota and Humoral Immune System Contribute to Insulin Resistance	1/1/19-12/31/19	Protocol 22340

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

Yes

Is the research exempt from Federal regulations?

No

Does this project involve a clinical trial?

Yes

If yes, is this an NIH-defined Phase III Clinical Trial?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 193 of 220 to Page 196 of 220

Withheld pursuant to exemption

Budget ; Redacted by agreement

of the Freedom of Information and Privacy Act

A. COMPONENT COVER PAGE

Project Title: Enrichment Program
Component Project Lead Information: Annes, Justin Pierce

B. COMPONENT ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The SDRC Enrichment, Training and Outreach Program (ETOP) drives innovation in diabetes research and diabetes care by enhancing research and training. The leadership of ETOP has organized numerous diverse activities that focus on (1) Creating forums to facilitate interaction, communication and knowledge sharing among SDRC-affiliated investigators at the faculty, post-doctoral and student levels that promote the emergence of new ideas, collaborations and discoveries; (2) Attracting and training the next generation of diabetes researchers in an environment that is intellectually fertile, diverse and supportive by providing resources, mentorship and career development opportunities; (3) Educating health professional and lay communities about research advances in diabetes and state-of-the-art diabetes treatment. Research-Focused ETOP efforts are led by Drs. Justin Annes, and Clinically-Focused ETOP are led by Dr. Marina Basina to fulfill the following aims:
1. ENRICHMENT: To foster an environment that stimulates advances in diabetes research and patient care by organizing interactive and interdisciplinary research forums
2. TRAINING: To provide support and leadership for training activities that enhance diabetes research both locally and in the broader scientific community
3. OUTREACH: To promote diabetes awareness and research support through community outreach programs

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

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B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

Not Applicable

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

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B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

1. Newsletter - The Stanford Diabetes Research Center Education and Outreach Program distributed the first periodic e-newsletter (Quarterly going forward) containing news and highlights related to SDRC members and their achievements. The distribution list contained members within and outside the Stanford Community and included Diabetes stakeholders from the broader Bay Area diabetes community that have engaged over the years with Stanford. Total of 287 e-newsletters were delivered and we have added 16 subscribers since Feb 2019, both from within and outside Stanford.
2. Public forum for dissemination of research projects of SDRC – 4th annual Frontiers in Diabetes Research Symposium on April 24, 2019 where selected abstracts from SDRC members and their laboratories had an opportunity to present their latest diabetes-related research projects as short talks or posters.
3. T1DM walks – JDRF One Walk events are fun, family friendly events where dedicated walkers, volunteers and sponsors raise money to make living with T1D safer and healthier, until it is no longer a threat. Within the Bay Area, each year, 4 walks are organized. Stanford Diabetes Research Center attended each of the 4 events and provided informational materials and promoted recruitment to the Clinical Registry to facilitate future SDRC clinical studies and trials. SDRC members also volunteered at the emergency medical station to provide supplies and care for participants.
4. Bay Area Diabetes Summit – SDRC was a medical partner with CarbDM in the organization and execution of the Annual Bay Area Diabetes Summit on 04/14/19. We distributed flyers promoting the Clinical Registry and Diabetes Care Programs funded by SDRC to patients and their families. Several SDRC members and their teams participated in various ways by giving presentations or running panel discussions – Drs. Marina Basina, Diana Naranjo, Jessie Wong, Rayhan Lal, Ideen Tabatabai, Tandy Aye, Priya Prahalad, Bruce Buckingham and David Maahs.
5. VLAB Breakthroughs in Diabetes panel discussion at Stanford – VLAB is a non-profit, volunteer-run organization that connects entrepreneurs, founders, investors and industry experts around ideas and technologies with the potential to disrupt industries. They organized a panel discussion regarding the advances in diabetes technologies and the potential for a cure in the future. SDRC helped support this event and several SDRC members participated. We distributed flyers promoting the Clinical Registry and SDRC funded Diabetes Care Programs.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

There are no major changes to our plan for the next reporting period. We have established and executed nearly all of the aspects of our plan for environment enrichment, training and outreach (ETOP). We will however continue and increase our efforts in the ETOP sphere. We continue to identify laboratories (engineering, chemistry, material sciences, business, health policy, etc) at Stanford that are identifying new and novel solutions to impact the field of diabetes and reduce the related health burden. These labs are engaged in our seminars and included in brain-storming sessions to identify new areas of need in diabetes. For example, new efforts are being developed in the Department of Bioengineering towards a live bacterial sensor for type 1 diabetes in Dr. Drew Endy's lab. He is being considered as a potential new member of the SDRC. Laboratories of Drs. Erik Ingelsson, Joshua Knowles and Katrin Svensson have

built on discussions during the seminar series interactions and submitted a grant proposal to NIH titled “Characterization of novel insulin resistance genes by gene editing, high-throughput phenotyping and in vivo studies”. Laboratories of Drs. Seung Kim, Everett Meyer, Judy Shizuru and Kyle Loh are working together to understand and overcome the immune component of type 1 diabetes and will be submitting a center of excellence proposal to JDRF. Dr. Katrin Svensson and Dr. Jon Long have established joint monthly lab meetings with the laboratories of Drs. Keith van Haren, Katja Weinacht and Peter Jackson, who are not currently SDRC members to expand the scope and reach of the Metabolism and Signaling affinity group. This monthly lab meeting is titled Metabolism supergroup meeting and has helped identify Dr. Peter Jackson to join in future as SDRC member.
In the coming year, we will make an effort to engage the University of California San Francisco Diabetes Research Center, University of California, Berkeley and University of California, Davis in shared educational and research activities. We believe that interaction between these Bay Area scientific communities will be an asset for all programs: increasing the interaction among investigators and cross-pollination of trainees and research endeavors. Joint publications and grants will be the outcome measures.
We will continue to engage with organizations such as JDRF, CarbDM, beyond type1, etc to allow trainees to better understand the real-world burden of diabetes and the areas of therapeutic needs. The JDRF Medical Providers’ Council (Drs. Maahs, Hood, Buckingham and Basina) is envisioned as a way to provide guidance to strengthen JDRF Greater Bay Area Chapter’s connections with, and outreach to, our T1D community. The Medical Providers’ Council will serve as a sounding board on how effectively JDRF is communicating research progress and addressing the needs of our community. In turn, council members can leverage JDRF messages regarding clinical trial opportunities, patient resources, advancements in treatment, and mission progress to the patient community. We would also look to the Medical Providers’ Council as an important source of speakers for various Chapter events, research updates and programs. We are also working with JDRF to develop a proposal for a Northern California – JDRF Center of Excellence focusing on the immune component of type1 diabetes by combining expertise at Stanford and UCSF. This is further described in other sections of this RPPR. Through the ECHO project, we will continue to connect physicians in remote areas to experts in Endocrinology for advice on management of diabetes within their local communities. We plan to extend this support beyond the current two participating states (California and Florida).

Enrichment Programs:

1. **Friday research-in-progress seminar** series – Each Friday, members from one of the four affinity groups present half or 1 hr presentations of their work in progress. This platform is mostly geared for trainees to present though we also encourage PI participation in the form of presentations and critical feedback. The leadership of the Metabolism and Signaling in Diabetes affinity group has started including colleagues at the Nutrition Department from University of California, Berkeley (January 18, 2019) in these meetings to enhance collaborations among institutions.

2. **Bay Area Young Diabetes Investigators Retreat** took place on December 11th at UC Davis from 12-4pm and was attended by Mark Huising's group at UC Davis, Dr. Justin Annes' group from Stanford and Drs. Julie Sneddon and Gregory Ku's groups at UCSF.

3. **Bay Area Islet Biology symposium** – Participating labs from UCSF, UC Davis and Stanford (agenda below) – was organized by the leaders of the Pancreas and Islet Biology affinity group, Drs. Seung Kim and Justin Annes, on 02/13/19, to promote exchange of ideas, protocols and data among laboratories from these institutions.

4. **Co-sponsoring speakers** for Endocrinology grand rounds –
    a. Dr. Danny Chou – Assistant Professor, Department of Biochemistry, University of Utah
    b. Dr. Gerald Shulman – George R Cowgill Professor of Physiological Chemistry; Professor of Medicine (Endocrinology) and Cellular & Molecular Physiology; Co-Director, Yale Diabetes Research Center, Yale University School of Medicine
    c. Dr. Melena Bellin – Associate Professor, Department of Pediatrics and Surgery (Endocrinology), University of Minnesota Medical School
    d. Dr. Randi Epstein – Writer in Residence; Yale Medical School; Lecturer, Yale University; Adjunct, Columbia University
    e. Dr. Richard Bergman – Alfred Jay Firestein Chair in Diabetes Research; Professor, Department of Biomedical Sciences, Cedars-Sinai; Professor-in-Residence, Deparment of Medicine, UCLA; Director, Sports Spectacular Diabetes and Obesity Wellness and Research Center
5. **Co-sponsoring speakers** with Chemical and Systems Biology department
    a. Dr. Philip Scherer – Professor and Distinguished Chair in Diabetes Research; Director, Touchstone Diabetes Center; University of Texas Southwestern Medical Center
    b. Dr. Paolo Sassone Corsi – Donald Bren Professor of Biological Chemistry; Director, Center for Epigenetics and Metabolism, University Irvine School of Medicine
6. **Invited speakers** for SDRC Special Guest Seminars –
    a. Dr. Andrew Posselt - Professor of Surgery and Director of Pancreatic Islet Program at UCSF
    b. Dr. Greg Szot – Core Manager, Islet Production Core at UCSF
    c. Dr. Jon Piganelli – Associate Professor, Children's Hospital of Pittsburgh
    d. Dr. Alice Long – Research Associate Member, Translational Immunology; Program Manager, Human Immunophenotyping Core Lab; Benaroya Research Institute, Seattle
    e. Dr. Peter Robinson – Chief Scientific Officer, Enable Biosciences
    f. Dr. Rafael Scharfman – Research Director, INSERM, Cochin Institute, France

g. Dr. Tony Lam – Senior Scientist, Toronto General Hospital Research Institute; University Health Network
h. Dr. Anna Gloyn – Professor, Molecular Genetics and Metabolims; Wellcome Trust Senior Fellow in Basic Biomedical Science; University of Oxford

7. **Annual Diabetes Research Forum** -11/28/18 (agenda below)
8. **Frontiers in Diabetes Research Symposium** 04/24/19 (agenda below)

Community Outreach Programs:

1. **Celebrity Chef 'Feel Good Food'** series – Stanford Diabetes Research Center has co-hosted two of these events with Stanford Healthcare (SHC) at the SHC library in the months of September, 2018 and January, 2019. At these events, Chef Curtis Aikens engages the audience to think creatively in the kitchen and apply ways of tailoring recipes to lifestyle needs. He discusses specific recipes to present ways in which dietary restrictions and caloric intake can be managed while retaining flavor and excitement of cooking and enjoying the food you prepare. Approximately 70 attendees benefit from these events with recipes to try out and enjoy at home.
2. **Author Series Community event** on May 24, 2018. Sponsored by the Stanford Diabetes Care Program, Author Adam Brown discussed some of the subjects he covers in his diabetes handbook. *Bright Spots and Landmines* focuses on food, mindset, exercise and sleep strategies. It includes: what to eat to minimize blood sugar swings; helpful strategies to feel less stressed, guilty, and not burned out; and simple ways to improve exercise and well-being. Copies of *Bright Spots and Landmines* were provided free to the attendees of the event.
3. **Stanford Diabetes Prevention and Wellness Health Fair** was organized by the Stanford Diabetes Care Program team to mark 11/14/18 as **World Diabetes Day**. On this day, over 500 attendees received diabetes prevention tips, free diabetes risk assessments, living healthy with diabetes guidelines, nutrition education with chef aided food demonstrations, diabetes advocacy group tables with experts answering questions and up-to-date informational materials on diabetes technologies and state of the art wellness tools. Stanford Diabetes Research Center provided flyers to attendees to promote recruitment for the SDRC Clinical Registry.
4. **Community Blood Glucose Screening and Diabetes risk assessment event:**These events were held at employee based clinics at Yahoo (OATH) and Qualcomm and at local community events to promote Diabetes awareness education and risk reduction. A total of 4 events have been organized in the past year each with an average of 150 - 200 Blood glucose screening per event.
5. **Health Matters** (June 2018) is an annual event which takes place at Stanford University School of Medicine campus. There are typically health talks throughout the day and a collection of exhibits featuring interactive, hand-on attractions and activities for the whole family. The Stanford Diabetes Care Program offered cooking demonstrations, presentations, and Q&A with Stanford experts who provided tips for living healthy and well that attendees were able to enjoy throughout the day. They also learnt personalized approaches to managing diabetes if someone had it or preventing it if someone was at risk.
6. **Project ECHO** (Extension for Community Healthcare Outcomes) is a model for moving knowledge when patients cannot be moved. It utilizes the hub-and-spoke model to target

and partner with community primary care providers who manage patients with type1 diabetes at non-specialty diabetes practices across the states of Florida and California. In California, 11 spoke sites were enrolled with 37 clinics serving roughly 900 adult and pediatric patients with type1 diabetes. In Florida, 12 spoke sites were enrolled with 67 clinics serving roughly 1300 patients. 6 peer type1diabetes health coaches were trained locally in California and 4 in Florida. Thus, SDRC members have helped develop an innovative healthcare delivery model which appears capable of building capacity for type1 diabetes management in the medically underserved.

7. SDRC members volunteered at **DYF Camps** in July 2018. DYF programs are available in various locations around California throughout the year for children, teens, and families affected by type I diabetes. These camps create a community and provides a safe environment for kids to feel supported. Drs. Marina Basina, David Maahs, Darrell Wilson and Bruce Buckingham provided expert care, guidance with encouragement and education to live with type1 diabetes during camp stay to kids and families.

Stanford | Diabetes Research Center

Stanford Diabetes Research Forum (Register at https://sdrc.stanford.edu)

Berg Hall, Li Ka Shing Center, Nov 28th, 2018

9:30–9:45am Introduction and Updates on Stanford Diabetes Research Center - **Seung Kim**

9:45–10:45 am SESSION I: 2017 P&F Progress updates (10 min talks + 5 min Q&A)

- 9:45-10:00 am **Justin Annes**: "The role of Succinate Dehydrogenase Subunit B (sdhb) in β-cell function and diabetes"
- 10:00-10:15 am **Everett Meyer**: "Defining inflammatory iNKT subset in Type 1 diabetes"
- 10:15-10:30 am **Sangwook Park [Zheng lab]**: "Development of Breath Acetone Sensor towards Non-invasive Diabetic Monitoring"
- 10:30-10:45 am **Tom Soh**: "Continuous, Real-time measurement of biomolecules in vivo"

10:45-11:00 am COFFEE BREAK

11:00-12:00 pm SESSION 2: 2017 P&F Progress updates (10 min talks for P&F + 5 min Q&A)

- 11:00-11:15 am **Mehdi Razavi [Thakor lab]**: "A novel collagen based cryogel bioscaffold which can release oxygen for islet transplantation"
- 11:15-11:30 am **Jennifer Lee**: "Glycemic phenotyping using EHR for real-world evidence"
- 11:30-11:45 am **Caitlin Maikawa [Appel lab]**: "Supramolecular PEGylation as an approach to improved insulin formulations"
- 11:45-12:00 pm **Latha Palaniappan**: "Exosomes in Diabetic Cardiomypathy"

12:00–1:00 pm KEYNOTE Speaker: **Dr. Qizhi Tang**, Professor of Surgery and Director of Transplantation Research Laboratory, University of California San Francisco - **"Primary graft failure in islet transplantation: an elephant in the room"**

1:00-2:00 pm LUNCH

2:00–3:15 pm SESSION 3: 2018 P&F talks – Introduction by Rick Kraemer (10 min talks + 5 min Q&A)

- 2:00 – 2:15 pm **Rick Kraemer**
- 2:15-2:30 pm **Tim Horton [Annes lab]**: "Developing a Strategy for Beta-Cell-Targeted Therapeutics"
- 2:30-2:45 pm **Priya Prahalad**: "The Use of Diabetes Technology to Change Clinical Outcomes Following New Diagnosis of Type 1 Diabetes in the Pediatric Population"
- 2:45-3:00 pm **Molly Tannenbaum**: "A pilot of ONBOARD: OvercomiNg Barriers & Obstacles to Adopting Diabetes Devices for adults with T1D"
- 3:00-3:15 pm **Anisha Patel**: "Evaluating the Impact of Safe Drinking Water Access and Promotion in Parks alongside Soda Taxes"

3:15-3:30 pm COFFEE & SNACK BREAK

3:30-4:30 pm SESSION 4: 2018 P&F talks (10 min talks + 5min Q&A)

- 3:30-3:45 pm **Tho Pham**: "Exploring how Interactions Between the Microbiota and Humoral Immune System Contribute to Insulin Resistance"
- 3:45-4:00 pm **Utkan Demirci**: "An Automated, Centrifuge-Free Platform for Isolating Pancreatic Islets Using Magnetic Levitation"
- 4:00-4:15 pm **Erik Ingelsson**: "Pooled CRISPR screens to established causal genes for insulin resistance"
- 4:15-4:30 pm **Sun H Kim**: "Real-time Continuous Glucose Monitoring to Aid Weight Loss in Prediabetes: Building on expertise within SDRC"

4:30–4:45 pm Closing Remarks - **Seung Kim**

We gratefully acknowledge the generous grant for this conference provided by:
National Institutes of Health/National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Grant No. P30DK116074

Stanford | Diabetes Research Center

BAY AREA ISLET BIOLOGY MEETING
Wednesday, Feb 13th, 2019
Beckman Center, B302 (IIIrd Floor)
279 Campus Drive
Stanford University, Stanford CA 94305

11:00 – 11:30am	Welcome, introductions and informal discussion
11:30 – 12:00pm	Jenny Lee (Annes lab): "The role of Succinate Dehydrogenase Subunit b (sdhb) in β-cell biology and diabetes"
12:00 – 12:30pm	Ronan Russell (Hebrok lab): MAFB plays a central role in human pancreatic beta cell formation
12:30 – 1:00 pm	Robert Whitener (Kim lab): Molecular Characterization of porcine islet cell development
1:00 – 2:00pm	Lunch
2:00 – 2:30 pm	Alex Mawla (Huising lab): "Navigating the depths and avoiding the shallows of pancreatic islet cell transcriptomes"
2:30 - 3:00pm	Gopika Nair (Hebrok lab): "Generation of functional beta cells from human pluripotent stem cells"
3:00 – 3:30 pm	Haixia Xu (Annes lab): Novel approaches to rescuing life-threatening insulin-induced hypoglycemia: overcoming the limitations of glucagon
3:30 - 4:00 pm	Krissie Tellez (Kim lab): Gluca-gone: Creation of a glucagon null mouse model to study regulated glucagon secretion in vivo

Stanford | Diabetes Research Center

4th Annual Frontiers in Diabetes Research Symposium

Berg Hall, Li Ka Shing Center, 291 Campus Drive, April 24th, 2019

8:00–9:00am **Seung Kim,** Director of Stanford Diabetes Research Center, Professor of Developmental Biology and Medicine (by courtesy): **Medicine Grand Rounds** – "Stanford Diabetes Research Center"

9:00–10:00 am **Breakfast, Registration and Poster Session**

10:00–11:00 am **SESSION I: Metabolism and Signaling in Diabetes**

10:00-10:30 **Suneil Koliwad,** Associate Professor, Diabetes Center, UCSF: "Translating Fat Fibrosis to Control Insulin Resistance"

10:30-10:45 **Joshua Knowles,** Assistant Professor of Medicine: "Statin Associated Diabetes: Physiologic Insights"

10:45-11:00 **Joon Tae Kim,** Department of Pathology: "Apolipoprotein Regulation of Endogenous PM20D1 Activity and Potential Implications for Metabolic Disease and Atherosclerosis"

11:00–12:00 pm **SESSION 2: Bioengineering and Behavioral Sciences**

11:00-11:30 **Drew Endy,** Professor of Bioengineering: "Can We Engineer a Skin Microbe to Diagnose and Treat Diabetes?"

11:30-11:45 **Bruce Buckingham**, Professor of Pediatrics: "Moving to a Full Closed-Loop, Removing the Daytime as Well as the Nighttime Burden of Diabetes"

11:45-12:00 **Diana Naranjo,** Clinical Associate Professor of Psychiatry and Behavioral Sciences: "Novel Interventions for Children with Special Healthcare Needs. Helping Those Who Need It Most"

12:00–1:00 pm **KEYNOTE Speaker: Dr. Michael German,** Justine K. Schreyer Endowed Chair in Diabetes Research; Professor, Clinical Director and Associate Director, Diabetes Center, UCSF: **"Beta-Cell Generation and Regeneration"**

1:00–2:30 pm **Lunch and Poster Session**

2:30–3:30 pm **SESSION 3: Immunology and Islet Transplantation**

2:30-3:00 **Jon Piganelli,** Associate Professor, University of Pittsburgh: "The Role of Oxidative Stress Induced Inflammation in Type 1 Diabetes"

3:00-3:15 **Nadine Nagy,** Department of Medicine: "Sustained Release of Il-2 Using an Injectable Hydrogel Prevents Autoimmune Diabetes"

3:15-3:30 **Garry Fathman,** Professor of Medicine (Emeritus): "A Novel Therapy to Restore Function of Endogenous Tregs to Prevent/Treat Type 1 Diabetes"

3:30–4:30 pm **SESSION 4: Pancreas and Islet Biology**

3:30-4:00 **Julie Sneddon,** Assistant Professor, Diabetes Center, UCSF: "Lineage Dynamics of Pancreatic Endocrine Development at Single-Cell Resolution"

4:00-4:15 **Linda Yip,** Department of Medicine: "High Iron Exposure and Loss of Pancreatic Iron Homeostasis May Contribute to the Pathogenesis of Type 1 Diabetes"

4:15-4:30 **Haixia Xu,** Department of Medicine: "Novel Approaches to Rescuing Insulin-Induced Hypoglycemia: Overcoming the Limitations of Glucagon"

4:30–4:45 pm **Prizes/Awards announcements and closing remarks**

We gratefully acknowledge the generous grant for this conference provided by:
National Institutes of Health/National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
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Poster Session

1A: Latha Palaniappan – "Strength Training Regimen fOr Normal weiGht Diabetics (STRONG-D) Study"

1B: Latha Palaniappan – "Initiate and Maintain Physical Activity in Clinics (IMPACT) Study"

2A: Nicolas Cuttriss – "Democratizing Type 1 Diabetes (T1D) Knowledge in Rural and Underserved Communities: Project ECHO T1D"

2B: Juri Park – "Predictors of Incident Type 2 Diabetes in Normal Weight Individuals with Normoglycemia: The Korean Genome and Epidemiology Study (KoGES)"

3A: Si Wu – "Systematic Investigation of Overweight and Normal Weight Type I Diabetes by Applying Metabolomics"

3B: Caitlin Maikawa – "Supramolecular CB[7]-PEG Designer Excipients for Improved Insulin Formulations"

4A: Keren Hilgendorf – "The ω-3 Fatty Acid Receptor Ffar4/Gpr120 Triggers Camp-Dependent Adipogenesis via Primary Cilia"

4B: Kyle Kovary – "An Integrated Screening Approach to Identify Drug Repurposing Targets for Treating Insulin Resistance"

5A: Seokho Kim – "Discovering Mechanisms Regulating Islet Development and Maturation in Pigs"

5B: Atefeh Rabiee – "Dynamic Reversal of Insulin Sensitivity during Adipogenesis by the Timing and Order of CEBPB and CEBPA Levels"

6A: Graham Barlow – "Deep Profiling of Autoimmunity in the Pancreas of Type 1 Diabetes Patients Using Highly Multiplexed Microscopy"

6B: Kaisha Benjamin – "Engineering a Live Bacterial Therapeutic for Type 1 Diabetes"

7A: Ivan Carcamo-Oribe – "Co-Expression and Predictive Network Based Key Driver Analysis of Insulin Resistance in Human iPSC Lines"

7B: Meng Zhao – "Identification of c16orf89 as a New Metabolic Hormone Produced by Thyroid Gland"

8A: Romina Bevacqua – "Molecular and Functional Studies of SIX2 and SIX3 Transcription Factors in Human Pseudoislets"

8B: Owen Jiang & Yunshin Jung – "Isthmin-1 Is an Endocrine Activator of the pi3k Pathway That Improves Glucose Homeostasis"

9A: Krissie Tellez – "Gluca-Gone: Exploring in Vivo Mechanisms Regulating Glucagon Secretion in a Glucagon Null Mouse"

9B: Mohsen Fathzadeh – "FAM13A Affects Body Fat Distribution and Function"

10A: Laya Ekhlaspour – "Impact of Fat Content on Postprandial Glucose Excursions While in a Hybrid Closed-Loop System"

10B: Stefan Tholen – "Circadian Glucocorticoid Oscillations Are Required to Maintain Functional Brown Adipose Tissue"

11A: Mehdi Razavi & Rosita Primavera – "Dexamethasone-Loaded Microplates Improve the Outcome of Islets Transplanted in PDMS Bioscaffolds"

11B: Christopher Gardner – "The DIETFITS (Diet Intervention Examining The Factors Interacting with Treatment Success) Study"

12A: Eric Jay Daza, Katarzyna Wac and Marily Oppezzo – "Effects of Sleep Deprivation on Blood Glucose, Food Cravings, and Mood in Non-Diabetics: An N-of-1 Randomized Trial Pilot Study"

12B: Robert Whitener – "Leveraging the Flexibility of the mAbCAR System to Target Tregs to Human Islets"

13A: Carl Johnson – "Preadipocyte Cell Cycle Control: Hypertrophy or Hyperplasia"

13B: Monica Lanning – "Exposure to Closed Loop Barriers Using Virtual Reality"

B.4 What opportunities for training and professional development has the project provided?

1. **Training grants**: Training grant T, F & K awards. Consistent with the exceptional Diabetes Research-focused training environment at Stanford, **7 trainees** received full time salary support (2018-2019), through existing T32 grants, to work in the laboratories of Stanford Diabetes Research Center Members. These trainees are working towards building a career in Diabetes Research and are included in our numerous and varied training and educational opportunities. The ETOP program works to bring these trainees together to support their career and connections to the larger diabetes research community. The trainees are encouraged to present at the Work-in-progress style Friday seminar series to hone their presentation skills and get valuable feedback on their projects. Current SDRC-affiliated trainees are listed below:

Grant	Mentor	Trainee	Title	Description
T32DK00721743: Diabetes, Endocrinology and Metabolism Training Grant	Justin Annes	Sooyeon Lee	The role of SDHB in b-cell biology and diabetes pathogenesis	To understand the molecular mechanisms that link mitochondrial dysfunction to b-cell failure, we generated and characterized a conditional b-cell specific knockout of a key mitochondrial protein, Succinate Dehydrogenase subunit B (SDHB). The loss of SDHB leads to progressive diabetes development. Our results demonstrate a surprisingly necessary role of SDHB in mitochondrial function, insulin secretion and b-cell replication.
T32DK00721743: Diabetes, Endocrinology and Metabolism Training Grant	Justin Annes	Timothy Horton	Confronting the central challenge of developing a regenerative therapy: Cell type-specific drug targeting.	Beta-cell regeneration is a promising new strategy for treating diabetes, a growing health crisis. However, current small molecules for regeneration all suffer from a lack of selectivity. In order to safely advance these molecules further, we are working on a variety of chemical and biological strategies to selectively deliver these molecules to pancreatic beta-cells.
T32DK00721743: Diabetes, Endocrinology and Metabolism Training Grant	Joshua Knowles	Hadi Harati	Determining the causal association between type 2 diabetes and atrial fibrillation	Using Mendelian randomization analysis, we did not find a causal role of clinical significance between genetically programmed type 2 diabetes, fasting glucose, or hemoglobin A1c and development of atrial fibrillation suggesting that drug treatment to reduce dysglycaemia is unlikely to be an effective strategy for atrial fibrillation prevention.

T32GM00841223: Graduate Training Program in Biotechnology	Howard Chang	Robert Chen	N6-methyladenosine modification controls circular RNA immunity	Circular RNAs are produced naturally through RNA splicing events. We are studying the basis for cellular recognition of synthetically-produced circular RNAs. We hope to dissect the basis by which the cell's own circular RNAs are "marked" as self by the N6-methyladenosine (m6A) RNA modification.
T32GM11385404: Molecular Pharmacology Training Grant	Mary Teruel	Joydeb Sinha	Investigating the role of circadian rhythms in adipocyte differentiation	I am using live, single cell fluorescence microscopy and synthetic biology approaches to study role of cell intrinsic circadian rhythms in adipogenesis (fat cell differentiation). More specifically, I am investigating how perturbations to circadian dynamics and pulsatility of naturally circadian hormones such as corticosterone affects the propensity of adipose precursor cells to differentiate into mature fat cells.
T32GM11385404: Molecular Pharmacology Training Grant	Justin Annes	Hannah Moeller	Identifying Modulators of Beta-Cell Zinc: Opportunities for targeted drug delivery, insulin secretion manipulation, and diabetes treatment	My thesis project seeks to identify regulators and modulators of beta-cell zinc by utilizing chemical and CRISPR knockout screening. The uniquely high concentration of zinc in beta-cells has been implicated as protective against type 2 diabetes in GWAS studies (ZnT8 gene) and in mouse models, and can be targeted with regenerative compounds for tissue-selective drug delivery.
T32GM00727642: Cellular and Molecular Biology Training Program	Jennifer Cochran	Chelsea Longwell	Engineering agonists of the glucagon-like peptide-1 receptor with novel pharmacological properties for the study and therapeutic control of diabetes	By leveraging the principles of protein engineering and directed evolution, we are able to design and screen libraries of GLP1 peptide derivatives in which we discovered novel active sequences that differ substantially from the wild type peptide. These peptides are to be further studied to characterize their pharmacological and therapeutic properties.
T32DK00735734: Adult and Pediatric Nephrology and	Glenn Chertow/ Tara Chang	Ian McCoy	Diuretic Use in the Intensive Care Unit	Our research investigates the safety and efficacy of diuretic therapy in the intensive care unit, estimating the risks of acute kidney injury, prolonged mechanical ventilation, and mortality, in varied clinical settings.

Urology Research Training Program				This research will help clinicians in the ICU to select patients most likely to benefit from diuretics and to better understand the risks and benefits of diuretic
T32DK007217-43S1	Justin Annes, Tracey McLaughlin, Korey Hood, Bruce Buckingham	Keyuree Satam (Yale University), Jessica Shen (Boston University), Annika Lenz (USC), Gabrielle Cintron (City University)	Medical Student Research Program in Diabetes and Obesity	This program has completed selection of trainees and the research projects will begin in Summer 2019.
K23DK11947001	Korey Hood	Molly Tanenbaum	ONBOARD: OvercomiNg Barriers & Obstacles to Adopting Diabetes Devices	The goals of this project are to iteratively refine and evaluate a comprehensive behavioral intervention package that aims to reduce barriers to using CGM so that adults with T1D can experience increased

Pending Support

3. Marina's **MED218SI**: 9x 1hr classes from 1/17/19 – 3/14/19: Diabetes 101 for healthcare providers organized by Dr. Marina Basina. This course is designed to teach practical skills about diabetes care, treatment and the latest research in the field for 1st and 2nd year medical students to raise awareness about living with diabetes and resulting medical complications of diabetes. Survey results from students?

4. **Grant writing course** 4/11/18: This was a 4 week mini-course offered by Dr. Seung Kim to junior faculty members of the SDRC to help improve their grant writing skills. Each session was 90 minutes and there was a practical portion of this course where the students have to write their specific aims and receive group feedback. 7 junior investigators took this course of which one was not an SDRC member. A total of 35 grant proposals were submitted by these 7 investigators since completion of this course last spring. Of these 35 applications, 15 grants have been awarded, including 3 R01, 1 R03, 1R35, 1U01 and 1 prestigious Pew Scholar Award.

Pending Support

Pending Support

5. **Core facility trainings/workshops** – Recruitment and retention training (06/22/18), Islet isolation one-on-one trainings, Immune monitoring core one-on-one trainings, Genomics and Analysis core biweekly consultation and drop-in sessions.

6. **Diabetes care program** classes/support groups - Monthly classes held in three locations (East Bay location added in 2018) to help patients live well and keep informed. An extension is the Wellness group that meets once a month and is also available via telephone for those who are unable to attend in person on a regular basis. This group discusses broader wellness issues related to diet and exercise.

7. **Diabetes Technology Update** evening hosted at the Arrillaga alumni Center – October 2018 – a evening featuring the closed loop technology of insulin pumps. A patient panel discussed their experiences with various closed loop systems, advantages and adaptations for their lifestyle and needs. Local nonprofits attended and had tables to educate the Diabetes community about their services. The evening ended with a Q&A sessions with experts in the field.

8. **Comet Program** at Stanford School of medicine – A Scribing Model: The Clinical Observation Medical education training (COMET) Fellowship for College Graduates program – SDRC care program members work with this team to help teach the program participants about the issues facing diabetes and prevention of diabetes and its impact on public health. The students often participate by coming to classes and do independent studies on our patient populations outcomes.

9. **Clinical Summer internship** (CSI) Program at Stanford School of medicine - Teaching diabetes to interested Undergraduates and High school students who are aspiring to work in medicine June/July 2018: http://med.stanford.edu/medcsi.html

C. COMPONENT PRODUCTS

C.1 PUBLICATIONS

Not Applicable

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

Not Applicable

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Not Applicable

C.5 OTHER PRODUCTS AND RESOURCE SHARING

Nothing to report

D. COMPONENT PARTICIPANTS

Not Applicable

E. COMPONENT IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

NOTHING TO REPORT

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?
Not Applicable

F. COMPONENT CHANGES

F.1 CHANGES IN APPROACH AND REASONS FOR CHANGE

Not Applicable

F.2 ACTUAL OR ANTICIPATED CHALLENGES OR DELAYS AND ACTIONS OR PLANS TO RESOLVE THEM

NOTHING TO REPORT

F.3 SIGNIFICANT CHANGES TO HUMAN SUBJECTS, VERTEBRATE ANIMALS, BIOHAZARDS, AND/OR SELECT AGENTS

F.3.a Human Subjects

No Change

F.3.b Vertebrate Animals

No Change

F.3.c Biohazards

No Change

F.3.d Select Agents

No Change

G. COMPONENT SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

Not Applicable

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

No

G.4.b Inclusion Enrollment Data

Not Applicable

G.4.c ClinicalTrials.gov

Not Applicable

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Not Applicable

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

Not Applicable

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Page 217 of 220 to Page 220 of 220

Withheld pursuant to exemption

Budget ; Redacted by agreement

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