Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain
Principal Investigator: [redacted]
Date of Action: 9/10/2021

The animal protocol review was considered by the Committee and the following decisions were made:

The protocol was approved.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contac[redacted]o schedule.
☒ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT[redacted] prior to starting surgeries.
☒ **Other requirements: IBC approval is required before work with biohazardous agents may begin**

Total # of Animals: 24
Species: NHP **Pain Category: D**

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 9/14/2021
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

IACUC Use Only	**IACUC Protocol #:** 22-1873R
Date: 8/10/2021	☒ IBC ☐ RSC ☐ Chem

ANIMAL USE PROTOCOL
ARIZONA STATE UNIVERSITY INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE
(Revised February 2021)

Read "Instructions for Submitting the ASU Animal Use Protocol" before completing. **Upon approval, this protocol will become a public record so follow instructions carefully.**

PROJECT/PROGRAM TITLE: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

SPECIES REQUESTED: Cynomolgus macaque (*Macaca fascicularis)*

I. PERSONNEL INFORMATION

A. A single member of the university faculty and/or Principal Investigator (PI) is considered the responsible individual.

NAME: [redacted] TITLE: Director

AFFILIATION: [redacted] Office Phone # [redacted]

Cell Phone #: [redacted] E-Mail: [redacted]

B. Additional contact, if any, for IACUC business

NAME: [redacted] TITLE: Primate Lab Supervisor

AFFILIATION: [redacted] Office Phone # [redacted]

Cell Phone #: [redacted] E-Mail: [redacted]

C. Protocol Type

☐ Non-funded research

☐ Internal Funding

Account Number:

☒ External Funding (Grant/Contract)

Granting Agency: Michal J. Fox Foundation Deadline:

Co-Investigator(s): [redacted]

Proposal Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

ASU Proposal or Award #: [redacted]

If, ASU proposal or award number is not provided, attach a copy of the complete proposal or grant document.

☐ Teaching - Course Number and Title:

D. Protocol Status:

☒ New

☐ Renewal—Previous Protocol #:

☐ Revision—Previous Protocol #:

E. Do you plan to use Department of Animal Care & Technologies (DACT) personnel and resources? If yes, describe the support needed? (If this use is new or an expansion of previous use, contact the DACT well in advance of need). Yes, surgical anesthesia and post-op monitoring, as well as standard husbandry and clinical care.

II. PROJECT DESCRIPTION AND PROGRAM REQUIREMENTS

The Institutional Animal Care and Use Committee (IACUC) is composed of both active animal users and lay persons. Regardless of background, each member has a vote, so it is particularly important that the language of the application be understood by all. This applies to all sections of the application, but it is especially important that the goals and justifications of the proposed research be spelled out in the clearest possible terms. NOTE: Upon approval, this protocol will become a public record, so do not disclose proprietary information.

A. Provide a brief (300 words or less) synopsis in **NON-SCIENTIFIC TERMS** of proposed research.

The typical symptoms of Parkinson's disease (PD) are a result of the loss of dopamine producing neurons in the brain. Our goal is to develop a method to reprogram other support cells known as astrocytes into new dopamine producing neurons in order to replace the cells that have been lost. We plan to test this method using a non-human primate (NHP) model of PD that mimics many of the same symptoms shown by patients with PD.

B. PLANNED USE OF ANIMALS. Begin with a clear **statement of purpose** and briefly provide **background** information and **references** to previous work (especially if this is a renewal protocol). Include a clear description of the **experimental design** for all animal experiments planned and explain **why** the experiments must be performed. It is critical that for each procedure you provide a detailed sequence of events that effectively describes what happens to the animals from acquisition to euthanasia (if applicable). As the focus of the IACUC protocol is on animal use, do not simply cut and paste research objective statements from grant proposals. Flow charts, diagrams or tables are strongly recommended for complicated experimental designs. State how the research is expected to benefit the human community, the animal community, and/or society as a whole. **Details regarding surgical procedures, drug treatments, and field techniques are not necessary, as they will be addressed later in the form.**

Background: Parkinson's disease (PD) is the second most common neurodegenerative disease after Alzheimer's disease (AD) and a major cause of disability in individuals over 65 years of age. Current treatment options for PD patients are designed either for symptom management or for damping disease progression, but none for disease reversal. Cell replacement holds the promise to accomplish the ultimate goal of disease reversal. The recent advance in converting endogenous non-neuronal cells, such as astrocytes, into functional neurons, suggests an attractive cell replacement strategy, which would avoid immune rejection confronted by transplanting exogenous cells into the brain. Most efforts on in situ astrocyte-to-neuron conversion are made via overexpressing lineage-specific transcription factors (TFs), but none of the published work has demonstrated the ability to reconstitute a lost neural circuitry to degeneration. Contrary to this common approach, we have pioneered a new strategy to induce astrocyte-to-neuron conversion by depleting PTB, a master negative regulator of neurogenesis, (1-4) through the administration of a viral vector coding for small hairpin RNA (shRNA) that silences PTB expression and has demonstrated the feasibility to rebuild the nigrostriatal pathway in a mouse PD model to achieve potent disease reversal (3). We feel the results of this treatment in the mouse model justify testing it in the gold standard MPTP NHP model of PD. Similar results in the NHP model could pave the way for clinical trials of this treatment.

References:

1. [redacted]

2.

3. [redacted]

4. [redacted]

Experimental Design: 24 cynomolgus macaques (M/F, 3-15 years old) will be acquired from commercial vendors. All animals will first have baseline serum & cerebrospinal fluid (CSF) collected. Eight animals will be trained on the hand reach task (HRT) and baseline data will be recorded. A baseline clinical rating scale (CRS) assessment will be performed on these eight and another eight animals, for a total of 16 animals. The remaining eight animals will be excluded from behavioral measures due to the short endpoint of groups 1-2. Following baseline behavior analysis, all animals will receive a single intracarotid injection of MPTP (3 mg) resulting in a unilateral PD model. At least one month following MPTP administration, all animals will undergo a PE2I dopamine transporter (DAT) PET scan and be divided into the following groups.

Group #	Targeting Vector	Endpoint (months)	Behavior analysis	N=
1	AAV-shGFP	1	None	4
2	AAV-shPTB	1	None	4
3	AAV-shGFP	6	CRS	4
4	AAV-shPTB	6	CRS	4
5	AAV-shGFP	12	CRS/HRT	4
6	AAV-shPTB	12	CRS/HRT	4

All animals will receive a pre-op MRI for neurosurgical targeting. The targeting novel and control vectors (AAV-shPTB or AAV-shGFP), both co-injected with AAV-Cre, will be delivered to each animal via unilateral intracranial injections into the MPTP-lesioned substantia nigra ($1E10^{13}$vg/mL, 2 sites total, 20μL medial SN, 20μL lateral SN). Serum and CSF samples will be collected once per month post-op. Behavior data will be collected from groups 3-6. Clinical rating scores will be obtained for Groups 3-6 (once per month), groups 5 & 6 will include a hand reach task (3-times/weekly). Before euthanasia, a second PE2I (DAT) PET scan will be obtained from all animals to determine timing of potential neuronal regeneration. At each group's respective study-endpoint, we will euthanize the animals and collect their brains for histological analysis.

Procedures:

MRI Scanning (one or two times): Stereotaxic intracranial injections are performed under intraoperative MRI guidance. Preop MRIs will be performed on a [redacted] MRI scanner at the [redacted] After transportation to [redacted] animals will be anesthetized with ketamine (3-10 mg/kg, IM) and either dexmedetomidine (0.03 mg/kg, IM) or midazolam (0.05-0.5 mg/kg) and maintained with gas anesthesia (e.g., isoflurane, sevoflurane) or booster injections of ketamine (1.5 mg/kg, IM) and dexmedetomidine (0.015 mg/kg, IM). Animals will be intubated to maintain a stable airway. Cetacaine spray (200 mg, topical) may be applied to the throat to assist with intubation. Animals will be placed in an MRI compatible stereotaxic frame and MRI-opaque fiducial markers will be placed around the skull for neuronavigation registration. T1 and/or T2-weighted images will be obtained. Following scanning, the locations of the fiducial markers will be permanently marked with a tattoo dot on the skin using a commercial tattoo marker [redacted] with sterile needle and ink. The MRI scan time is approximately 20 minutes, sedation is expected to last ≤1 hour. Following the procedure, dexmedetomidine/midazolam may be reversed with atipamezole (0.15-0.3 mg/kg, IM) or flumazenil (0.025 mg/kg, IV), respectively. As MRI registration is essential for accurate surgical guidance, if in the opinion of the surgeon the MR images prove inadequate (due to animal movement, fiducial placement, or other confounding factors), up to one repeat MRI may be performed.

PE2I (DAT) PET Scanning (two times): Status of nigrostriatal lesioning and potential neuronal regeneration will be monitored by PE2I (DAT) PET scanning. PET scans will be performed on a [redacted] MRI scanner at the [redacted] After transportation to [redacted] animals will be anesthetized with ketamine (3-10 mg/kg, IM) and either dexmedetomidine (0.03 mg/kg, IM) or midazolam (0.05-0.5 mg/kg) and maintained with gas anesthesia (e.g., isoflurane, sevoflurane) or booster injections of ketamine (1.5 mg/kg, IM) and dexmedetomidine (0.015 mg/kg, IM). Animals will be intubated to maintain a stable airway. A 24-gauge catheter will be inserted into a limb vein for isotope injection. Cetacaine spray (200 mg, topical) may be applied to the throat to assist with intubation. Animals will be placed in a sphinx position for imaging. Sedation is expected to

last ≤2.5 hours. A transmission PET scan is made for individual attenuation measurements and to confirm proper positioning of the animal in the scanner. Radiotracers (PE2I, <20 mCi) will be infused over 20-30 secs followed by sequential PET scans for up to 2 hrs. Following the procedure, dexmedetomidine/midazolam may be reversed with atipamezole (0.15-0.3 mg/kg, IM) or flumazenil (0.025 mg/kg, IV), respectively. The IV catheter and endotracheal tube will be removed; and the animal permitted to recover and brought back to the animal facility. The animal will be observed until it is able to care for itself.

Fine Motor Skills Test (Hand Reach Task) (three times per week): Animals will be tested for fine motor performance in both upper limbs using a hand reach task (HRT). Animals will be transported to a modified testing cage from their home cage and presented with a 3x3 well matrix plexiglass testing board. Six pieces of food will be placed within the wells for each trial, and time will be recorded for how long it takes the animal to retrieve them. The board is configured so that only one limb will be tested at a time. Animals will undergo 10 trials per limb, with each trial being alternated between the left and right limbs. Each animal will be tested by the same investigator 3 times/week. Investigators will be blinded to the animal's treatment groups. If necessary, food restriction will be used to encourage animal participation in this activity.

Clinical Ratings Scale (at least once per month): Animals will be evaluated with the Clinical Ratings Scale (CRS), a collection of clinical observations, scored and graded in order to determine the severity of an animal's overall impairments (see below). The Ratings scale contains scoring in the categories of posture (0-3), gait (0-5), bradykinesia (0-5), balance (0-3), tremor in left and right arms (0-3 for each), gross motor skills in left and right arms (0-4 for each), defense reaction (0-2) and freezing (0-2). The combined scores will determine the impairment level of the animal, a score of 0 indicates a normal animal, and a max score of 34 indicates severely impaired. A single intracarotid injection of MPTP may not always result in observable impairments, even though cell loss has occurred, therefore there is no target level for CRS. Individual scores in each category can be assessed separately as well in order to determine the overall health and well-being of an animal.. Occurrence of dyskinesia, psychological disturbances and vomiting will also be noted. In the past, animals that received only a single intracarotid injection of MPTP have had aggregate CRS scores of 0-14, indicating none to moderate impairment. This level of impairment typically manifests as reduced activity, slower locomotion, mild tremors, and/or mild clumsiness of the left arm and hand. This level of impairment is not expected to affect the animal's ability to feed themselves or move around their cage. The level of impairment is not expected to increase after symptoms have stabilized (approximately one month post-injection). If any animals begin to display neurological deficits or other clinical signs that may impact their health and well-being, including a posture score of 3, gait score of 3 or more, bradykinesia score of 3 or more, or gross motor skills score of 3 or more in both arms, they will be referred to the veterinarian for evaluation and treatment, if necessary.

Posture (0-3)	Gait (0-5)	Bradykinesia (0-5)	Balance (0-3)	Tremor (0-3)	Gross Motor Skills (0-4)	Defense Reaction (0-2)	Freezing (0-2)
0-Normal, upright posture 1-Mildly stooped, neck and shoulders slightly curved 2-Notably stooped 3-Face down, unable to sit	0-Normal, smooth movements 1-Mildly impaired 2-Moderately impaired, some stumbling, abnormal footing (crossover) 3-Severely impaired, stumbling, bradykinetic 4-Severely impaired, loss of balance, freezing 5-Incapable of movement	0-Normal, prompt, brisk, plentiful movements 1-Mild slowness, lesser overall movements than normal 2-Moderate slowness, increasing poverty of movement 3-Moderate slowness with freezing, few and labored movements 4 Severe slowness with freezing, few and labored movements 5-Unable to ambulate	0-Normal 1-Difficulty standing, holding onto cage bars; holds cage bars intermittently but can stand alone 2-Unable to stand without holding onto cage bars 3-Unable to sit without leaning; completely unable to stand	0-Absent 1-Small amplitude and/or infrequent 2-Large amplitude and/or frequent 3-Occurs constantly; interferes with normal behavior	0-Normal 1-Mild impairment, slight clumsiness 2-Moderately impaired, difficulty manipulating small objects, often drops food reward 3-Does not readily use arm to reach for food; can use to ambulate 4-Cannot use arm/hand for feeding or ambulating	0-Normal, aggressive, comes to front of cage, shakes bars, threatens 1-Strong facial threat but does not move 2-Minimal or no response	0-No freezing 1-Notable freezing; freezing readily broken with outside stimulation 2-Large periods of time frozen; interferes with ambulation

Euthanasia (once): The animal will be anesthetized with ketamine (10 mg/kg, IM), xylazine (2 mg/kg, IM) or midazolam (0.05-0.5 mg/kg), and either hydromorphone (0.2 mg/kg, IM) or morphine (1 mg/kg, IM), followed by gas anesthesia (e.g., isoflurane, sevoflurane) or additional drug delivered IV [ketamine (≤20 mg/kg, IV), xylazine (≤4 mg/kg, IV), and either hydromorphone (≤0.4 mg/kg, IV) or morphine (≤2 mg/kg, IV)], if needed to achieve a surgical plane of anesthesia. Once a surgical plane of anesthesia is achieved as verified by lack of response to toe/finger pinch, palpebral reflex, and corneal reflex, the thoracic cavity will be opened, heparin (5,000 IU, IC) will be injected into the left ventricle of the heart and the animal will be euthanized via transcardial perfusion of 0.9% saline (1-2 L) followed by 4% buffered formaldehyde (1-2 L). If perfusion cannot be performed for any reason,

animals will be anesthetized with ketamine (10 mg/kg, IM) followed by a pentobarbital-containing euthanasia solution (86-120 mg/kg, IV).

C. RATIONALE FOR INVOLVING ANIMALS AND THE APPROPRIATENESS OF THE **SPECIES AND NUMBER** USED. Keeping in mind the principles of the "3 R's" (Refinement, Reduction, and Replacement), answer the following:

1. Why must live vertebrates be used in this study?
Our laboratory's experiments are aimed to help human patients with neurodegenerative diseases. Preclinical research requires a model that can inform about the applicability of diagnostic tools as well as the potential complications of its utilization. To the best of our knowledge, in vitro and computer models are still not able to give us enough information for clinical projection in complex neurodegenerative diseases such as PD.

2. Why are you using the requested species rather than other species?
Cynomolgus macaques were chosen because this model of PD is well established within the species. While the anticipated results of this study have been previously demonstrated in cell culture and in rodent species, these models often lack efficacious translational therapies to human patients. The brain of NHPs are similar in many respects to humans, enhancing the applicability of the data obtained to human diseases. Proving efficiency of this novel neuronal reprogramming strategy in the NHP brain will be foundational to future neuronal cell replacement therapy studies.

3. What is the rationale supporting the numbers of animals proposed? Typically, a power analysis should be performed to support the proposed sample sizes. A table depicting the number of animals to be used is required.
The protocol will include an N of 24, which includes 6 groups of 4 animals. Statistical significance is not an objective of this protocol but has been formulated as a "proof-of-concept" experiment. To this end, the effect size of data is unable to be measured and the total number of animals proposed has been chosen based on the investigator's prior experience with similar study designs and the expected presentation of data which will guide future research.

Group #	Targeting Vector	Endpoint (months)	Behavior analysis	N=
1	AAV-shGFP	1	None	4
2	AAV-shPTB	1	None	4
3	AAV-shGFP	6	CRS	4
4	AAV-shPTB	6	CRS	4
5	AAV-shGFP	12	CRS/HRT	4
6	AAV-shPTB	12	CRS/HRT	4

4. What refinements, if any, have been made to reduce the number of animals used and the potential detrimental effects on the study animals?
We feel the number of animals requested is the minimum necessary to achieve the aims of this study. Furthermore, we have taken every precaution to avoid pain and discomfort in our animals. The intracarotid and intracranial injections proposed will be conducted under general anesthesia with proper perioperative pain management and postoperative monitoring and care.

III. EMERGENCY CONTACT

A. Who should be contacted in case of an animal emergency? **Note: This information will be redacted if this protocol is requested as a public document.**

Name:
Office Phone #
Home Phone #
Cell Phone #: [redacted]

IV. DUPLICATION AND ALTERNATIVES PLEASE READ ALL INSTRUCTIONS.

The Animal Welfare Act requires that you document your justifications with data from **two** or more sources. **One source** must **be a set of searches of a relevant database: name the database searched, the keyword and keyword combinations searched, the date the search was performed and the date range searched. The second source can be a set of searches of a second relevant database, or consultation with a laboratory animal science veterinarian, or courses/meetings/consultations with qualified personnel.** Sufficient documentation, such as the consultant's name and qualifications and the date and content of the consult, should be provided to the IACUC to demonstrate the expert's knowledge of the availability of alternatives in the specific field of study. Examples of appropriate databases to search include PUBMED, Web of Science, or Animal Welfare Information Center (AWIC – recommended for USDA-covered species https://www.nal.usda.gov/awic/databases).

A. Provide the following details for the most recent literature search used to explore for duplicative research. (The literature search documents that the research will not unnecessarily duplicate previous research). **Teaching protocols do not need to conduct this search.**

Date that search was conducted (*Must be within 60 days of the IACUC review date*): 07/30/2021
Database(s) used: ALTBIB, PUBMED
Publication years covered by the search: 1980 - present
Keyword combinations used: Neurogenesis, dopamine, nonhuman primate
Neurogenesis, dopamine, Parkinson's disease
Neurogenesis, dopamine, adeno-associated viruses

B. Provide the following details for the most recent literature search used to explore for **alternatives to animal use** and **alternatives to painful procedures.** Alternatives should be considered for any aspect of the protocol that may cause more than momentary or slight pain or distress to the animal. Alternatives to be considered include those that would: 1) refine the procedure to minimize discomfort that the animal(s) may experience; 2) reduce the number of animals used overall; or 3) replace animals with non-animal alternatives (e.g., computer models or tissue culture). **All protocols (research and teaching) MUST conduct this search.**

Date that search was conducted (*Must be within 60 days of the IACUC review date*): 07/28/2021
Database(s) used: ALTBIB, PUBMED
Publication years covered by the search: 2000 - present
Keyword combinations used: Parkinson's disease, animal model
Parkinson's disease, animal model, nonhuman primate
Nonhuman primate, intracranial injection alternative

C. **Results of literature search for alternatives**: Comment on the application(s) of any identified alternatives (found with your search terms, including how these alternatives may be or may not be incorporated to modify a procedure to either lessen or eliminate potential pain and distress. **All protocols must complete this section and must describe how the literature search results relate to painful procedures and alternatives to animal use.** You must include sufficient information for the IACUC to determine that a reasonable, good faith effort was made to determine the availability of alternatives. If the search identified any alternative methods (ones that could be used to accomplish the goals of the animal use proposal), you must clearly explain and justify why this alternative cannot be used.

For instance, if your search terms retrieved eight publications, summarize how many of those described alternatives to painful procedures and the use of animals.
No studies have been published demonstrating the ability to effectively target and reconstitute a lesioned nigrostriatal pathway in nonhuman primates. While similar rodent models of PD have been established, the NHP models better mimic what is seen in the human brain. Additionally, the brains of rodents are less complex than that of NHPs and humans. No alternatives to intracranial injection were found for delivering vector to the SN.

D. Describe any other procedures (e.g., participation in meetings, review of journals) that are used to explore and evaluate alternatives: The PI, lab manager, post-docs, and graduate students regularly attend national meetings and discuss recent updates in technology and methodology for these experiments with colleagues. Additionally, they remain up to date with the scientific literature on new and alternative procedures.

E. Does this research replicate previous work? **(Your answer will be based in part on the literature search above.)**

☒ No. Proceed to section **VI.**

☐ Yes. Explain why the replication is necessary:

☐ Not applicable. This is a teaching protocol.

V. CATEGORY OF PAIN OR DISTRESS

For non-USDA covered species, answer question A only. For USDA covered species, answer question B only. USDA covered species are all mammals EXCEPT laboratory mice and rats bred for research. All other rodents, including wild mice and rats, are covered.

A. Do the procedures in this protocol have the potential to involve more than slight or momentary pain or distress that will **NOT** be relieved with anesthetics, analgesics, tranquilizer drugs, or other method for relieving pain or distress (e.g., negative conditioning, unrelieved post-surgical pain, death without euthanasia)? ☐ No ☐ Yes

If yes, describe and justify:

B. Using the table below, list all USDA covered species to be used in the proposed study and indicate the number of animals to be used under each USDA pain category. For an animal undergoing multiple procedures, include the animal under the highest level of pain/distress expected for that animal.

USDA Covered Species	Number per USDA Category*				Total number of animals requested
	B	C	D	E	
Cynomolgus macaque			24		24

*USDA PAIN CATEGORIES: (see http://researchintegrity.asu.edu/animals/forms for a more complete description of the below categories)

Classification B: Includes animals that are used solely for breeding or are being acclimatized or held for use in teaching, testing, experiments, research, or surgery but have not yet been used for such purposes.

Classification C: Includes the use of animals in procedures involving no, momentary, or slight pain or distress (e.g., non-invasive parenteral drug delivery, peripheral blood collection, euthanasia, short-term manual or chemical restraint, toe clipping).

Classification D: Includes the use of animals used in procedures that could cause pain or distress but appropriate anesthetics, analgesics, and/or tranquilizing drugs or other methods for relieving pain or distress are used (e.g., surgery, perfusion, administration of irritating chemicals, humane endpoint euthanasia).

Classification E: Includes the use of animals in procedures that have the potential to involve pain or distress that will **not** be relieved with anesthetics, analgesics, tranquilizer drugs, or other method for relieving pain or distress (e.g., negative conditioning, unrelieved post-surgical pain, death without euthanasia).

VI. ASSURANCE:

The information contained herein is accurate to the best of my knowledge. I have carefully compared the proposed work with the current state of knowledge in this field by reviewing the literature and it is my professional opinion that the proposed work meets high standards of scientific merit. If the study involves pain and distress to the animal, whether or not it is relieved by anesthetics or analgesics, I have (1) reviewed the literature related to this work and have found no significant studies which could make this protocol unnecessarily duplicative, and (2) considered alternatives to animal use and found none available, as described above. Procedures involving animals will be carried out humanely and all procedures will be performed by or under the direction of trained or experienced persons. Any revisions to animal care and use in this project will be promptly forwarded to the Institutional Animal Care and Use Committee for review. Revised protocols will not be used until Committee clearance is received. The use of alternatives to animal models has been considered and found to be unacceptable at this time.

The principal investigator, by signing below, and the IACUC recognize that other medications may be given to the animals for veterinary care purposes. This includes the humane euthanasia of animals in uncontrollable pain or distress as determined by the Attending Veterinarian or the Clinical Veterinarian acting for the Attending Veterinarian. However, the veterinarians will make all efforts to contact and discuss the case with the Principal Investigator or designee prior to making a unilateral decision.

[redacted] 08/10/21

Principal Investigator –Print Date

[redacted] 08/10/21

Principal Investigator Signature Date

NOTE: Principal investigators must submit a current curriculum vitae or biosketch that reflects their most recent pertinent experience.

PERSONNEL CHART

ASU requires that all personnel engaged in animal research or teaching be qualified through training or experience in order to conduct the work humanely. The IACUC requires the following training:

- **Level I Basic** – Required of ALL participants (must be renewed every 4 years)
- **Level II Species-Specific** – Required for each participant that will have direct contact with that species (must be renewed every 4 years)
- **Level III Hands-on Training** – Required to perform specific procedures independently. Training can be received from DACT staff or PIs can have a member of their lab approved by DACT to be a Certified Trainer who can then train others. Simply being Level III certified does not allow the training of others. A Level III Certification form must be submitted to the IACUC office by the person providing the training within 5 days of the training.

You can access the training modules at https://asu.co1.qualtrics.com/jfe/form/SV_b2b2XRXRRs1309f. See the IACUC web site (https://researchintegrity.asu.edu/animals/training) for more information on training and Level III forms.

*** Procedures other than husbandry, handling, or behavioral testing MUST be performed under supervision unless the person is Level III certified to conduct the procedure independently. Personnel are not Level III certified until the IACUC has reviewed and approved the Level III training documentation. The PI is responsible for ensuring that personnel who are not Level III certified are supervised at all times.**

Name	Title	ASURITE name	Role in Protocol: What activities will each person perform on live animals ONLY while under direct supervision?	Role in Protocol: What activities will each person be allowed to perform independently (including appropriate Level 3 certification*) at the time of protocol submission?	Species with which individual will have direct contact ("none," "all", or list species)	FOR IACUC USE ONLY: Training Confirmation
[redacted]	PI	[redacted]	none	Intracranial surgery, intracarotid surgery, blood/CSF collection, MRI, PET scan, administration of any medications, and necropsy.	All	7/2021 OHSP

For each individual, describe the individual's years of experience with all listed species and procedures they will be conducting under this protocol. For procedures for which they are not yet trained, but will likely be trained to do during the activity period of this protocol, provide a description of who will provide such training:

[redacted] Dr. [redacted] has 37 years' experience conducting research with nonhuman primates and is experienced with all procedures in this protocol.

DETAILED USE OF ANIMALS

This section must be completed for each species used.

(additional Detailed Use of Animals forms can be found at https://researchintegrity.asu.edu/animals/forms)

Common Name: Cynomolgus macaque

Scientific Name: *Macaca fascicularis*

I. ANIMAL INFORMATION

A. Is this a threatened or endangered species?

☒ No. Proceed to section I. B.

☐ Yes. Describe why this work must be done on this species and why the project will not have a significant negative impact on the species:

B. Maximum # of animals to be used over the 3-year life of the protocol: 24

C. Sex: M/F Age or Weight Range: 3-15 years

D. Source (e.g., commercial, in-house breeding, captured from wild): Commercial

E. List all labs and/or rooms **outside of the ASU centralized vivaria** where you intend to keep or use live animals in connection with the animal use covered under this protocol. This list is for IACUC information to assure each location is inspected semi-annually. **Listing rooms here does not assure approval of this space for use.**

Building	Room #	Max Length of Stay	Method of Transport	Purpose
[redacted]		4 hours	NHP cage inside DACT truck	MR & PET imaging

F. If you use DEA-controlled substances, list the location where they are stored (building and room number). If you acquire controlled substances from DACT for same day use, state this. The IACUC is required to inspect all controlled substance storage locations semi-annually. Controlled substances will be stored in Dr. [redacted] office, [redacted]

II. MAJOR CATEGORIES OF USE

A. Will animals be immunized solely for the production and harvesting of antibodies to be used in vitro rather than as a vaccine study?

☒ No. Proceed to section II. B.

☐ Yes. Complete the following table.

Injection:

Volume of injectate	Adjuvant	Route	Min. Frequency	Max. # of injections

Collection: If terminal, check here ☐ otherwise complete the following.

Route	Max. Volume	Min. Frequency	Max. # of collections

B. Will tissues, blood, or other body fluids be harvested (other than for antibody production)?

☐ No. Proceed to section II. C.

☒ Yes. Will tissues, blood, or other body fluids be collected post-mortem only?

☐ Yes. Proceed to section II.C.

☒ No. Complete Appendix 1: Antemortem Specimen Collection.

C. Will animals be food restricted (calorically or specific constituents) other than for surgical procedures?

☐ No. Proceed to section II. D.

☒ Yes. [note: restriction paradigms exceeding a single 24-hr period must follow the ASU IACUC Standard Institutional Guideline for Food and Water Restriction available at https://researchintegrity.asu.edu/index.php/animals/procedures-library-and-guidelines

1. What are the restriction parameters? Provide scientific justification and include the length of restriction.
Some animals are initially resistant to performing the hand reach task (HRT). In order to provide increased incentive for these animals, we will offer different food treats (cereal, marshmallows, raisins, peanuts, etc.) to discover the animals' preferences (stage 1). If that is unsuccessful after one week, we will postpone daily feeding of the normal food allotment until after the animal has been tested (stage 2). If that is unsuccessful after one week, we would like to temporarily restrict the number of food biscuits fed to the animals (stage 3). Adult cynomolgus monkeys normally receive 6-12 biscuits per day and a half a fruit or vegetable, food restricted animals will receive a minimum of half their normal allotment of biscuits based on veterinarian recommendation, along with a half a fruit or vegetable. Food restriction during the initial HRT training period will last a maximum of one month. Previous animals that have been placed on similar food restriction have not become combative in our experience, but food restricted animals will be monitored and will be temporarily separated from their partners during feeding if necessary. This incentive program will apply to all animals participating in the HRT initial training and baseline. If an animal becomes reluctant to participate in the HRT at any time following surgery, they may be food restricted up to a maximum of one week (7 days) out of every four weeks during which time HRT performance will be recorded. A log of the HRT incentive program will be maintained.

2. How will you monitor for negative effects of food restriction (include information on how you will account for animal growth)?
Prior to the initiation of food restriction, the veterinarian will be consulted on the animal's ideal body weight and current body condition score (BCS) on a 9-point scale (see below). Animals with a BCS of 3.5/9 or less will not be placed on food restriction. During food restriction, the animal's body weight will be monitored every week or twice per week if body mass loss exceeds 8% of starting mass. An animals that loses 10% or more of its body weight from the start of food restriction or whose BCS drops to 3.5/9 or below will be removed from food restriction and will return to stage 2 (postponement of feeding full daily ration until after testing). Food restriction will last up to a maximum of one month during the initial HRT training period and up to a maximum of one week (7 days) out of every four weeks during the post-surgery assessment period. The same body weight and BCS restrictions will apply during this time.

D. Will animals be water restricted?
☒ No. Proceed to section II. E.
☐ Yes. [note: restriction paradigms exceeding a single 24-hr period must follow the ASU IACUC Standard Institutional Guideline for Food and Water Restriction available at https://researchintegrity.asu.edu/index.php/animals/procedures-library-and-guidelines

1. What are the restriction parameters? Provide scientific justification and include the length of restriction.

2. How will you monitor for negative effects of water restriction (include information on how you will account for animal growth)?

E. Will animals be exposed to trauma, injury, burning, freezing, electric shock, UV radiation, magnetic fields, lasers, loud noise, or other physical agents that might cause distress?
☐ No. Proceed to section II. F.
☒ Yes. List and justify each exposure.
Provide scientific justification: **Magnetic Resonance Imaging (MRI):** Due to the variability in NHP neuroanatomy, MR imaging is the best way to accurately target surgical injections within the brain. MRI scans involve strong magnetic fields, and precautions are made to ensure that no incompatible metals are present in the room during the scan. Noise levels inside an MRI machine typically vary from 65 to 95 dB, and intermittent spikes of ~110 dB may be produced. MRI scans are performed under anesthesia, and ear protection using ear plugs or gauze/cotton will be placed in the animal's ears to prevent damage and mitigate distress.
PE2I (DAT) PET scans: In order to track any in-vivo changes to the dopaminergic nigrostriatal pathway we plan to utilize PET imaging with the radioligand PE2I (DAT). PET scans are performed under

anesthesia. The dose of radiation utilized (<20 mCi) is not expected to have any clinical effects on the animal.

F. Will animals be exposed to environmental stress (e.g., non-natural temperature exposure, prolonged physical restraint, forced exercise)?
☒ No. Proceed to section II. G.
☐ Yes. List and scientifically justify each exposure.

G. Will animals undergo surgery?
☐ No. Proceed to section II. H.
☒ Yes. Complete Appendix 2: Surgical Procedures.

H. Will any animals have a device (e.g., thermocouple, cannula, electrode) that extends chronically through the skin?
☒ No. Proceed to section II. I.
☐ Yes. Describe wound management measures to minimize chances of infection around the device where it penetrates the skin:

I. Will individuals of a social species (e.g., most rodents) need to be housed singly at any time?
☐ No. Proceed to section II. J.
☒ Yes.

1. What would be the maximum duration that an individual would be singly housed? Provide scientific justification for singly housing for this duration:
Animals will be pair housed when possible. However, because of the relatively small number of animals involved, suitable pairing partners may not be available. If necessary, single housing will be determined in conjunction with the veterinary staff and will continue until a suitable pairing partner becomes available or the experiment concludes. Animals selected for groups 5-6 that will undergo HRT will be permanently exempt from the establishment of new social housing pairs (contact or mesh) beginning with baseline behavioral data collection. An injury to the arm, hand, or fingers can severely affect the HRT results and the establishment of new social housing pairs is a common cause of injuries. Animals in established pairs will be allowed to remain partnered. However, if injurious fights occur between established pairs, the animals may be permanently separated based on consultation with the veterinary staff.

2. Singly housed animals should receive additional enrichment. Describe what enrichment will be provided or scientifically justify why additional enrichment cannot be provided:
Animals will be housed in a room with other conspecifics and have access to visual, olfactory, and vocal/auditory contact. All animals are also provided a variety of enrichment items including manipulanda and destructibles; these may be increased in number or variety for singly housed animals as determined by the veterinary staff on a case-by-case basis.

J. Will animals need any special husbandry considerations, including but not limited to altering standard cage type, cage change frequencies, housing temperature, or lack of enrichment?
☒ No. Proceed to section II. J.
☐ Yes. Describe special procedures and provide scientific justification:

K. Will animals be transported off campus (e.g., to/from the field, or between institutions) in a vehicle other than one owned by the DACT?
☒ No. Proceed to section II. L.
☐ Yes. Describe details (e.g., vehicle to be used, destinations, and driven by whom), read the IACUC SIG - *Off-campus Transport of Animals by Laboratory Personnel*, and complete and submit with this protocol the *Assurance to Abide by the Requirements for Transporting Live Animals*:

L. Will any work be conducted in the field (this includes field experiments or the capture of animals to be used in laboratory experiments)?
☒ No. Proceed to section II. K.

☐ Yes. Complete Appendix 3: Field Research.

M. Will any animals need to be individually identified?
☐ No. Proceed to section III.
☒ Yes. Describe the marking technique to be used, why that technique was chosen, how it will be performed, and on what age range of animals?
Animals will be tattooed with an identification number on their chest or inner thigh. Animals either have the tattoo upon arrival or are tattooed while under sedation by DACT staff during quarantine. Touch ups may be done while sedated/anesthetized (e.g., for TB testing), and the hair in the region is shaved as needed to maintain visibility of the tattoo. This identification method is the most widely used means of permanently marking macaques.

III. CHEMICALS AND OTHER POTENTIAL HAZARDS

(If you answer yes to any of the following questions, this information may be forwarded to another oversight unit to aid you in assuring safe practices. Approval by these units or additional training may be required prior to using any of these materials)

A. Will drugs or chemicals be used with animals?
☐ No. Proceed to section III. B.
☒ Yes. For each drug or chemical, list the agent, dose, route, purpose, and grade in the table below:

Agent	Dose	Route	Purpose	Frequency	Pharmaceutical grade (Y/N)?	Is this a DEA controlled substance (Y/N)?
Atipamezole	0.15-0.3 mg/kg	IM	Dexmedetomidine reversal	As needed	Y	N
Atropine	0.02-0.05 mg/kg	IM	Reduce respiratory secretions and prevent bradycardia	As needed	Y	N
Betadine	N/A	Topical	Topical disinfectant	As needed	Y	N
Bupivacaine	1-2 mg/kg	SC	Analgesia	Once during closure	Y	N
Buprenorphine Sustained release	0.2 mg/kg	SC	Analgesia	Once post-op	Y	Y
Cefazolin	20-25 mg/kg	IV or IM	Antibiotic	Every 2-4 hours intra-op, as needed	Y	N
Cephalexin	20-30 mg/kg	PO	Antibiotic	Twice daily, as needed	Y	N
Cetacaine Spray (Benzocaine 14%, Butamben 2%, Tetracaine 2%)	200 mg	Topical	Anesthesia	As needed for intubation	Y	N
Chlorhexidine	N/A	Topical	Topical disinfectant	As needed	Y	N
Dexmedetomidine	0.015-0.05 mg/kg	IM	Anesthesia	As needed	Y	N
4% Formaldehyde	1-2 L	IC	Perfusion	Once	N	N
Flumazenil	0.025 mg/kg	IV	Benzodiazepine reversal	As needed	Y	N
Gelfoam	Cut to size	Topical	Hemostasis/Seal surgical holes	As needed	Y	N

Heparin	5,000 IU	IC	Anticoagulant for perfusion	Once	Y	N
Hydromorphone	0.05-0.4 mg/kg	SC, IM, IV	Analgesia	As needed	Y	Y
Isoflurane	0.5-5%	Inhalation	Anesthesia	As needed	Y	N
Isopropyl alcohol	70%	Topical	Topical disinfectant	As needed	Y	N
Ketamine	1.5-20 mg/kg	IM, IV	Anesthesia	As needed	Y	Y
Meloxicam	0.1-0.2 mg/kg	PO, SC	Analgesia	Once daily, as needed	Y	N
Meloxicam Sustained release (10 mg/mL)	0.6 mg/kg	SC	Analgesia	Once post-op	Y	N
Midazolam	0.05-0.5 mg/kg	IM, IV	Sedative, anticonvulsant	As needed	Y	Y
Morphine	1-2 mg/kg	IM, IV	Analgesia	As needed	Y	Y
MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)	3 mg/kg	Intracarotid	PD modeling	Once	N	N
Ophthalmic ointment	Dab	Topical	Prevent corneal desiccation	As needed	Y	N
Pentobarbital-containing euthanasia solution	86-120 mg/kg	IV	Euthanasia	Once	Y	Y
Propofol	2-5 mg/kg Bolus 0.2-0.6 mg/kg/min CRI	IV	Anesthesia	As needed Continuous, as needed	Y	N
Saline or Lactated Ringer's Solution	5-15 mL/kg/hr	IV	Fluid replacement	Constant-rate infusion	Y	N
Saline	3-20 mL	IV	Suspension for MPTP; post injection flush	Twice during intracarotid injections	Y	N
Saline	1-2 L	IC	Perfusion	Once	Y	N
Sevoflurane	1-8%	Inhalation	Anesthesia	As needed	Y	N
Sufentanil	0.25-2 µg/kg/hr	IV	Analgesia	Constant-rate infusion	Y	Y
Xylazine	2-4 mg/kg	IM, IV	Anesthesia	As needed	Y	N

1. For each drug or chemical that is not pharmaceutical grade, indicate whether no pharmaceutical grade equivalent exists or provide scientific justification for using the non-pharmaceutical grade product.
   MPTP is not available in a pharmaceutical grade due to its neurotoxic nature and having no clinical uses. Formaldehyde is not available in a pharmaceutical grade, and is only used once in a terminal procedure.

B. Does this project involve transgenic, knockout, or knock-in animals?
☒ No. Proceed to section III. C.
☐ Yes. List the strains, any special care needs, and any expected clinical signs that are associated with the strain. Transgenic animals need to be covered by an IBC disclosure.

C. Does this project involve the use of biohazardous agents in animals (microorganisms, microbial toxins, recombinant DNA)?
☐ No. Proceed to section III. D.
☒ Yes. List the agent, as well as concentration, dose, and route if applicable.

Agent	Concentration	Dose	Route	ADMIN. USE ONLY	
				ABSL	IBC # if Req'd
AAV-shPTB + AAV-Cre	1E10^{13}vg/mL	40μL	Intracranial unilateral injection into SN	PENDING	SPROTO2021-70 (PENDING)
AAV-shGFP + AAV-Cre	1E10^{13}vg/mL	40μL	Intracranial unilateral injection into SN	PENDING	SPROTO2021-70 (PENDING)

D. Does this project involve irradiation or the use of radiological material in animals?
☐ No. Proceed to section III. E.
☒ Yes. List the agent, dose, route, and purpose in the table below:

Agent	Dose	Route	Purpose
PE2I DAT radiotracer	<740 mBq (<20 mCi) ($T^1/_2$ = 110 min)	IV	Track the loss/gain of dopamine transporter

1. Provide the date of **Radiation Safety Committee** approval: Not required since imaging is occurring offsite at [redacted]

E. Describe any health hazards to **researchers** and include a description on how the risk is mitigated or managed:
Risk of bites, scratches, MPTP exposure, or Herpes B (Herpes B virus is not being used in animals but can be transmitted to personnel if there is an NHP bite/exposure). Risks are mitigated with the use of additional PPE as required by University policies (such as, but not limited to, Tyvek sleeves and double gloves), NHP primate certification, annual B Virus training (including Bite/Scratch policy), proof of 2 MMR vaccines or a measles titer, annual TB screening, and ear protection during MRI scans. Frequent revision of MPTP protocols, guidelines, and risk-management are conducted to ensure all research personnel are adequately trained in the safe handling and use of MPTP.

F. Describe any health hazards to **animals** and include a description on how the risk is mitigated or managed:
Zoonosis such as TB, measles, and flu are agents of concern that may spread from humans to monkeys. Before working with an NHP, all researchers are required to show proof of 2 MMR vaccines or a measles titer and annual TB screening. All people interacting with the monkeys are also required to wear a surgical mask to prevent the spread of these infections.

IV. DETRIMENTAL SEQUELAE

A. Will animals possibly experience clinical signs intentionally or as a possible side effect of the study?
☐ No. Proceed to section V.
☒ Yes. Complete the following.

Possible Clinical Effect	Probability of Occurrence	Treatment
MPTP is a neurotoxin known for its rapid and irreversible degradation of dopaminergic neurons in the substantia nigra. Clinical presentation appears as parkinsonism with all the hallmark movement abnormalities of PD including	100% of MPTP-injected animals. Deliberate lesioning of the SN in NHPs via MPTP injection provides a stable/reliable model of PD. Accurate physiological modeling is critical to	Animals will be unilaterally lesioned which will not significantly affect their ability to locomote and eat. However, if unforeseen clinical complications develop, we will consult with veterinary staff.

tremor, slow movement, and muscle stiffness.	examining PD therapies pre-clinically.	
Intracranial injections of AAVs may exhibit temporary post-op clinical symptoms related to the procedure.	Post-op clinical symptoms occur infrequently following AAV injection and typically resolve after a few days. We expect any clinical symptoms to be mild and not affect the animals' ability to locomote or eat.	Consult with veterinary staff if clinical signs develop

V. END POINT CRITERIA

A. What clinical signs will be used as a basis for removal of an animal from the study?
If any animals begin to display neurological deficits or other clinical signs that may impact their health and well-being, including a Clinical Ratings Scale posture score of 3, gait score of 3 or more, bradykinesia score of 3 or more, or gross motor skills score of 3 or more in both arms, they will be referred to the veterinarian for evaluation.
Weight loss in excess of 20% of ideal weight (as determined by veterinary staff based on body weight and body condition score) that does not resolve after two weeks of supportive treatment (as determined and provided in conjunction with the DACT veterinary team).
An animal that becomes laterally recumbent, or has difficulty locomoting or feeding themselves which does not resolve after one week of supportive treatment (as determined and provided in conjunction with the DACT veterinary team), or when determined by the DACT Veterinary Team to have reached an endpoint (veterinary discretion).

VI. EUTHANASIA

A. List the primary method of euthanasia:
Transcardial perfusion under anesthesia. If not perfusing, pentobarbital-containing euthanasia solution.

B. If using a chemical or gas, complete the chart below:
Various combinations of the following drugs may be used in coordination with euthanasia via injection of a euthanasia solution or perfusion.

Agent	Dose	Route	Is this a DEA controlled substance (Y/N)?	Secondary method used to confirm euthanasia
Pentobarbital-containing euthanasia solution	86-120 mg/kg	IV	Y	Removal of brain
Ketamine	10-20 mg/kg	IM, IV	Y	Used in conjunction with perfusion
Xylazine	2-4 mg/kg	IM, IV	N	Used in conjunction with perfusion
Midazolam	0.05-0.5 mg/kg	IM	Y	Used in conjunction with perfusion
Atropine	0.02-0.05 mg/kg	IM	N	Used in conjunction with perfusion
Morphine	1-2 mg/kg	IM, IV	Y	Used in conjunction with perfusion

Hydromorphone	0.2-0.4 mg/kg	IM, IV	Y	Used in conjunction with perfusion
Heparin	5,000 IU	IC	N	Used in conjunction with perfusion
Isoflurane	3-5%	Inhalation	N	Used in conjunction with perfusion
Sevoflurane	5-8%	Inhalation	N	Used in conjunction with perfusion
0.9% saline	1-2 L	IC	N	Used in conjunction with perfusion
4% formaldehyde	1-2 L	IC	N	Used in conjunction with perfusion

C. If euthanasia is being done by a physical means (e.g., decapitation, cervical dislocation) without anesthesia, provide scientific justification:
N/A

APPENDIX 1: ANTEMORTEM SPECIMEN COLLECTION

I. BLOOD COLLECTION

A. Will blood be collected?

☐ No. Proceed to section II.

☒ Yes. Complete the following.

Site	Volume (ml)	% BW	Max. # of collections	Min. Interval
femoral vein	≤10 mL	≤0.5%	Up to 13 planned, 15 max including potential redraws	Typically 1 month; Rarely within 7 days (see below)

B. Will anesthetics, sedatives, or other drugs be used during blood collection?

☐ No. Proceed to section I. C.

☒ Yes. Complete the following.

Drug	Dose	Route	Purpose
Ketamine	3-10 mg/kg	IM	Anesthesia
Dexmedetomidine	0.03 mg/kg	IM	Anesthesia
Midazolam	0.05-0.5 mg/kg	IM	Anesthesia
Atropine	0.02-0.05 mg/kg	IM	Reduce respiratory secretions

C. Describe the methods used to draw the blood including physical restraint, if any.

Animals will be anesthetized with ketamine and either dexmedetomidine or midazolam. Blood samples will be obtained from the femoral vein and separated for serum collection. Sedation is expected to last 30 minutes.

D. Provide scientific justification for blood collection and justification for the frequency of it.

Serum will be stored for future analysis of disease biomarkers. Collections spaced approximately a month apart will allow for adequate bodily replacement. In the event that a blood collection attempt does not yield an adequate sample (i.e.: no sample, inadequate volume [<1 mL serum/plasma]), the blood collection may be repeated up to one additional time within a 7-day period, well below accepted blood draw volume levels and frequency limits for animals of this size (2 – 10 kg).

II. OTHER TISSUE/BODY FLUID COLLECTION

A. Will other tissues or body fluids be collected prior to death?

☐ No. Appendix 1 is completed.

☒ Yes. Complete the following. Surgical procedures should be described more fully in Appendix 2.

Tissue/Fluid	Site and Method	Amt	# of collections	Min Interval
CSF	lumbar or cisternal puncture	≤0.5 mL	Up to 13 planned, 15 max including potential redraws	Typically 1 month; Rarely within 7 days (see below)

B. Will anesthetics, sedatives, or other drugs be used during tissue/body fluid collection?

☐ No. Proceed to section II. C.

☒ Yes. Complete the following.

Drug	Dose	Route	Purpose
Ketamine	3-10 mg/kg	IM	Anesthesia
Dexmedetomidine	0.03 mg/kg	IM	Anesthesia
Midazolam	0.05-0.5 mg/kg	IM	Anesthesia
Atropine	0.02-0.05 mg/kg	IM	Reduce respiratory secretions
Betadine/Isopropyl alcohol	N/A	Topical	Topical disinfectant

C. Describe the methods used to collect the samples, including physical restraint, if any.
Animals will be anesthetized with ketamine and either dexmedetomidine or midazolam. CSF collection is performed as a sterile procedure. The lumbar or cervical area of the animal will be shaved and scrubbed alternating with povidone iodine and alcohol three times to prepare the collection site. A sterile drape will be placed over the collection site and sterile surgical gloves will be worn for the collection. For lumbar collection, a 22G spinal needle will be advanced into the spinal subarachnoid space until CSF begins to flow spontaneously. For cisternal collection, a 22G spinal needle attached to a 3-6 mL syringe will be advanced into the cisterna magna and CSF will be withdrawn. Sedation is expected to last 30 minutes.

D. Provide scientific justification for the sample collection(s) and justification for the frequency of it
CSF will be used for measuring neurofilament light chain, which is increased in our NHP models to a level seen in patients with neurodegenerative diseases. This will also allow us to assess the use of this molecule as a biomarker for progression of pathology in control animals and reversal of degenerative processes in treated animals. Collections spaced approximately a month apart will allow for adequate bodily replacement. In the event that a CSF collection attempt does not yield an adequate sample (i.e.: no sample, inadequate volume [<0.2 mL], or blood contamination), the CSF collection may be repeated up to one additional time within a 7-day period.

APPENDIX 2: SURGICAL PROCEDURES

I. GENERAL INFORMATION

A. Species
Cynomolgus macaque

B. Surgical Procedure(s)
Intracarotid injection
Intracranial injection

C. Room/location of surgery
[redacted]

II. PRE-SURGICAL CARE

A. Will the animals undergo pre-surgical fasting?
☐ No. Proceed to section III.
☒ Yes. Provide the details:
The day before a scheduled surgical procedure, animals are offered their full diet allotment in the early afternoon, and any remaining diet is removed at the end of the workday. The animal is then fasted overnight until the scheduled surgery the following morning in order to mitigate the risk of emesis and aspiration during the procedure.

III. SURGICAL PROCEDURE:

☒ Survival ☐ Nonsurvival

***Note:** A surgical checklist is recommended for each survival surgery, and possibly non-survival surgeries. These checklists should be submitted to DACT's Research Support Services [redacted] for review before implementing procedures.

A. Describe each surgical procedure (e.g., approach, tissue manipulation, closure):
Intracarotid Injections:
Intracarotid injections of methyl-phenyl-tetrahydropyridine (MPTP) will be performed according to standard protocol to establish a unilateral PD model. Anesthesia will be induced with injectable anesthetics, and animals will then be intubated and maintained on gas anesthesia. Morphine or hydromorphone will be administered pre-operatively, as will Cefazolin. Each animal will be placed in the supine position with the neck hyperextended and turned slightly left. Under sterile conditions a number 15 blade will be used to cut through the skin along the medial edge of the sternocleidomastoid muscle. The carotid sheath of the right carotid (never the left, in order to maintain consistency of the unilateral model) will be opened using fine iris scissors and the common carotid artery, internal jugular vein and vagus nerve identified. The common carotid artery will be exposed below the carotid bifurcation. Silk (2-0) thread will be looped around the common carotid artery while the external carotid artery will be identified with the superior thyroid artery seen branching distal to the bifurcation and permanently ligated. A 25G butterfly needle or 24G IV catheter will be inserted into the common carotid artery retrograde to the direction of blood flow. Twenty mL of saline containing MPTP-HCL (3 mg) will be infused at a rate of 1.33 ml/min (15 min). After the infusion is complete, 3 mL of saline will be delivered to flush the dosing apparatus. The needle will be withdrawn from the artery and a small piece of Gelfoam will be used to apply focal pressure to the penetrated vessel. The musculature, SC tissues, and skin will then be closed using absorbable suture. Bupivacaine (1-2 mg/kg, SQ) will be administered to the incision site prior to closure. Anesthesia depth will be monitored approximately every 10 minutes through jaw tone, palpebral reflex and vitals measurements (e.g., heart rate, ventilatory rate, oxygen saturation, blood pressure, temperature, CO2 level). Animals will receive Buprenorphine SR and Meloxicam. Surgery is expected to last approximately 1 hour. Should any animal experience adverse effects post-surgery (including signs of infection) as determined by the veterinary staff, they will be evaluated and treated as appropriate.

Intracranial Injections:
Anesthesia will be induced with injectable anesthetics, and animals will then be intubated and maintained on gas anesthesia. Morphine or hydromorphone will be administered pre-operatively, as will Cefazolin. Animals will be

placed in stereotaxic frames. Surgical targeting will be accomplished using a [redacted] surgical neuronavigation system, which will allow in-op visualization of the surgical instruments within and around the brain. The MRI images will be uploaded to the [redacted] system and coordinates for target areas will be marked. Under sterile conditions, an 8 cm incision will be made along the midsagittal plane of the scalp. Entry points will be identified using the [redacted] system. One entry hole will be drilled on the lesioned hemisphere of the skull (10mm x 10mm). Animals will receive two injections of AAV-shPTB or AAV-shGFP, both co-injected with AAV-Cre in the left SN (20 µL in the lateral left SN, and 20 µL in the medial left SN). Infusion will be performed with an infusion pump attached to a stereotaxic micromanipulator, [redacted] syringes will be lowered to the targets, and the contents (40µL per animal) infused at a rate of 1 µL/min. After the injection is complete, the needle/syringe will be left in place for an additional 2 minutes to allow infusate to diffuse from the needle tip and prevent backflow prior to retracting the syringe. The entry holes will be filled with Gelfoam. The SC tissues, and skin will then be closed using absorbable suture. Bupivacaine (1-2 mg/kg, SQ) will be administered to the incision site prior to closure. Anesthesia depth will be monitored approximately every 10 minutes through jaw tone, palpebral reflex and vitals measurements (e.g., heart rate, ventilatory rate, oxygen saturation, blood pressure, temperature, CO2 level). Animals will receive Buprenorphine SR and Meloxicam. Surgery is expected to last approximately 2 hours. Should any animal experience adverse effects post-surgery (including signs of infection) as determined by the veterinary staff, they will be evaluated and treated as appropriate.

B. Anesthetic regimen:

Various combinations of the following drugs may be used in the induction and maintenance of anesthesia for surgery.

Drug & concentration (e.g., mg/ml)	Dose (e.g., mg/kg) & maximum volume to be given	Route	Is this a DEA controlled substance (Y/N)?
Ketamine (100 mg/mL)	10-15 mg/kg, 1 mL	IM	Y
Midazolam (5 mg/mL)	0.05-0.5 mg/kg	IM	Y
Dexmedetomidine	0.015-0.05 mg/kg	IM	N
Atropine (0.54 mg/mL)	0.02-0.05 mg/kg	IM	N
Isoflurane	0.5-5%	Inhalation	N
Sevoflurane	1-8%	Inhalation	N
Propofol (10 mg/mL)	2-5 mg/kg, 5 mL (Bolus) 0.2-0.6 mg/kg/min (CRI)	IV	N
Cetacaine Spray (Benzocaine 14%, Butamben 2%, Tetracaine 2%)	200 mg	Topical	N

Please refer to the IACUC approved document "**Macaque Anesthesia/Analgesia/Antibiotics Regimens**"

Note: Use of gas anesthetics requires completion of the EH&S-based Anesthetic Gas Safety training prior to use and refreshed annually.

1. Describe measures used to indicate a surgical plane of anesthesia to keep animals from getting too light or too deep:
   Anesthesia depth will be monitored approximately every 10 minutes through jaw tone, palpebral reflex, and vitals measurements (e.g., ECG, heart rate, ventilatory rate, oxygen saturation, blood pressure, temperature, end tidal gases).

C. Additional pharmacological agents used during surgery (include analgesics, supportive medications, and research drugs):

Drug and concentration	Dose & max volume	Route	Purpose	Frequency	Is this a DEA controlled substance (Y/N)?
Betadine/Chlorhexidine/ Isopropyl alcohol	N/A	Topical	Topical Disinfectant	Once, as needed	N
Bupivacaine (5 mg/mL)	1-2 mg/kg, 2 mL	SC	Analgesia	Once during closure	N
Cefazolin (330 mg/mL)	20-25 mg/kg, 0.76 mL	IV	Antibiotic	Every 2-4 hours, intraoperatively	N

Gelfoam	Cut to size	Topical	Hemostasis/Seal surgical holes	Once, as needed	N
Hydromorphone (2 mg/mL)	0.05-0.2 mg/kg	SC, IM, IV	Analgesia	Once, as needed	Y
Morphine	1-2 mg/kg	IM, IV	Analgesia	Once, as needed	Y
MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)	3 mg/kg	Intracarotid	PD modeling	Once	N
Ophthalmic ointment	Dab	Topical	Prevent corneal desiccation	Once, as needed	N
Saline or Lactated Ringer's Solution	5-15 mL/kg/hr, 300 mL	IV	Fluid replacement	Constant-rate infusion	N
Saline	3-20 mL	IV	Suspension for MPTP; post injection flush	Twice during intracarotid injections	N
Sufentanil (0.5 µg/mL)	0.25-2 µg/kg/hr, 120 mL	IV	Analgesia	Constant-rate infusion	Y

D. Describe the steps taken to maintain an aseptic surgery:
Trained individuals will perform standard sterile prep of the scalp. The site will be scrubbed alternating with povidone iodine/chlorhexidine and alcohol three times. Sterile drapes, gowns, gloves, and instruments will be used.

E. What is the maximum duration of each surgery?
Intracarotid injection: 2 hours
Intracranial injection: 3 hours

F. Will any animals recover from surgery?
☐ No. This involves terminal, or non-survival, procedures; Appendix 2 is complete.
☒ Yes. Complete Section IV.

IV. POST-SURGICAL CARE

A. Is there a potential for post-operative pain or distress?
☐ No. Proceed to section C.
☒ Yes.

B. Will analgesics be used?
(For analgesic options, refer to the IACUC Standard Institutional Guideline on analgesia (https://researchintegrity.asu.edu/animals/procedures-library-and-guidelines) or contact a DACT veterinarian
☐ No. Provide a scientific justification:

☒ Yes. Complete the following.

Drug & concentration	Dose & max. volume	Route	Frequency	Is this a DEA controlled substance (Y/N)?
Buprenorphine Sustained release (1-3 mg/mL)	0.2 mg/kg	SC	Once post-op	Y
Meloxicam Sustained release (10 mg/mL)	0.6 mg/kg	SC	Once post-op	N
Meloxicam (5 mg/mL injection; 1.5 mg/mL oral)	0.1-0.2 mg/kg	SC, PO	SID as needed/ variable duration	N

			based on procedure	

Please refer to the IACUC approved document **"Macaque Anesthesia/Analgesia/Antibiotic Regimens"**

Who will administer these drugs?
Veterinary staff or other trained individuals.

C. Post-operative routine care:

i. What other drugs will be administered, if any (e.g., antibiotics, fluids)?

Drug & concentration	Dose & max. volume	Route	Purpose	Frequency	Is this a DEA controlled substance (Y/N)?
Cefazolin (330 mg/mL)	20-25 mg/kg	IM	Antibiotic	BID as needed/ variable duration based on procedure	N
Cephalexin (50 mg/mL)	20-30 mg/kg	PO	Antibiotic	BID as needed/ variable duration based on procedure	N

Please refer to the IACUC approved document "Macaque Anesthesia/Analgesia/Antibiotic Regimens" (choice of antibiotic and route of administration dictated by patient compliance. We try oral administration first, but default to injectable if NHP is not compliant)

ii. What other post-operative support and monitoring will be provided, how often, for how long, and by whom?
Pain assessment scoring is performed following major surgical procedures and continues until the pain score is 0 as determined by the veterinarians or trained research staff. Monitoring is provided by both trained DACT and PI personnel. Should any animal experience adverse effects post-surgery (including signs of cerebral infection, cranial incision complications, or neurologic deficits) as determined by the veterinary staff, they will be evaluated and treated as appropriate by the veterinary staff.

D. Is post-operative intensive care required?
☒ No. Proceed to section E.
☐ Yes.
What special care is required?

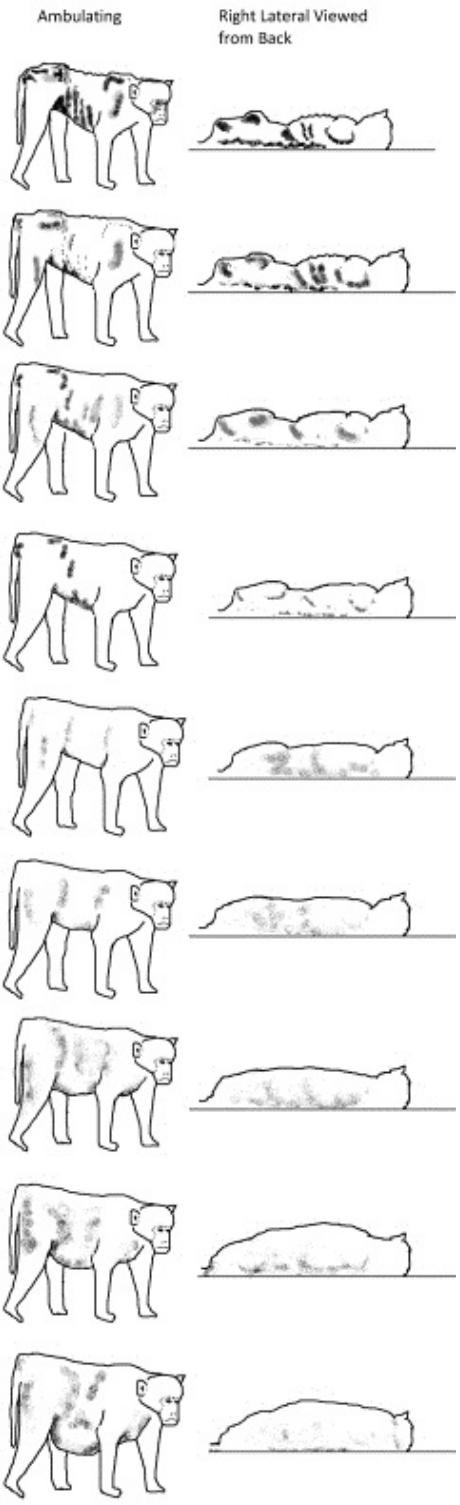
Who will provide special care and what are their qualifications?

For how long will special care be needed?

E. Will animals undergo multiple survival surgical procedures?
☐ No. Appendix 2 is complete.
☒ Yes. Describe which surgeries, the sequence (specifying time between surgeries), and frequency. Provide scientific justification:
The single intracarotid MPTP injection surgery is necessary to establish the unilateral PD model. Peripheral IV MPTP administration alone would result in a bilateral model that has a higher risk of over impairment. Animals with a unilateral PD model are more likely to retain sufficient use of at least one limb in order to feed and locomote. Animals will have at least one month to recover from this surgery prior to the intracranial surgery. The single intracranial injection surgery is necessary to administer the AAV vectors into the target areas of the brain as these vectors cannot cross the blood-brain barrier.

9-point Body Condition Score

1	**EMACIATED** – Very prominent hip bones (easily palpable and likely visible), prominent facial bones, spinous processes and ribs. Minimal to no muscle mass is palpable over ileum or ischium. Anus may be recessed between ischial callosities. Body is very angular, no subcutaneous fat layer to smooth out prominences.
2	**VERY THIN** – Hips, spinous processes, and ribs are prominent. Facial bones may be prominent. There is very little muscle present over the hips and back. Anus may be recessed between ischial callosities. Body is angular, no subcutaneous fat to smooth out prominences
3	**THIN** – Very minimal fat reserves, prominent hip bones and spinous processes. Hips, spinous processes and ribs are easily palpable with only a small amount of muscle mass over hips and lumbar region.
4	**LEAN** – Overlying muscle gives hips and spine a more firm feel. Hip bones and spinous processes are readily palpable, but not prominent. Body is less angular because there is a thin layer of subcutaneous fat.
5	**OPTIMUM** –Hip bones, ribs and spinous processes are palpable with gentle pressure but generally not visible. Well developed muscle mass and subcutaneous fat layer gives spine and hips smooth but firm feel. No abdominal, axillary or inguinal fat pads.
6	**SLIGHTLY OVERWEIGHT** – Hip bones and spinous processes palpable with firm pressure but are not visible. Bony prominences smooth. Rib contours are smooth and only palpable with firm pressure. Small abdominal fat pad may be present.
7	**HEAVY** – Bony contours are smooth and less well defined. Hip bones, spinous processes and ribs may be difficult to palpate due to more abundant subcutaneous fat layer. May have fat deposits starting to accumulate in the axillary, inguinal or abdominal areas.
8	**OBESE** – This animal will often have prominent fat pads in the inguinal, axillary or abdominal region. Abdomen will be pendulous when animal sitting or ambulating. Hip bones and spinous processes difficult to palpate. Bony contours smooth and poorly defined.
9	**GROSSLY OBESE** –Obvious, large fat deposits in the abdominal, inguinal and axillary regions. Abdominal palpation is very difficult due to large amount of mesenteric fat. Pronounced fat deposits may alter posture/ambulation. Hip bones, rib contours and spinous processes only palpable with deep palpation.



IACUC Protocol Trackable Components Checklist

Protocol #: 22-1873R If for amendment, amendment #:

PI: [redacted]

Species: NHP Highest Category of Pain: D

Completed by: [redacted] Date completed: 8/19/21

☐ No trackable components in this document

Exceptions to the Guide:

☒ Food/Fluid Regulation

Species: NHP

What Restricted: Food

Parameters: Animals performing the hand reach task may have their biscuit allotment restricted to half the normal allotment to provide incentive for the task. Restriction during the initial task training period will last up to one month, and post-surgery restriction may last up to one week out of every 4 weeks. Food restricted animals will be weighed weekly; animals that lose 10% or more body weight or whose BCS drops to 3/9 or below will be removed from food restriction.

☐ Prolonged Restraint

Species:

Details:

☒ Husbandry Deviation from the Guide

Species: NHP

Deviation: Single housing if suitable pairing partners are not available. Animals that will undergo the hand reach task are permanently exempt from establishment of new social housing pairs.

☐ Other:

Other Trackable Components:

☒ Survival Surgerie(s)

Species: NHP

Surgerie(s): Intracarotid injection, intracranial injection

Multiple Major?: ☒ Yes ☐ No

☒ Hazardous Agents

Biological (list agent and hazard level): AAV constructs

Chemical (note category – toxicant, toxin, irritant, carcinogen, etc.): MPTP, 4% Formaldehyde, PE2I DAT radiotracer

Physical (note type - radiation, UV light, lasers, noise, magnetic fields, etc.): MRI (magnetic fields and up to ~110 dB noise)

☐ Non-Centralized Animal Housing

IACUC Protocol Trackable Components Checklist

Location:
Maximum duration:

☐ Decapitation

☐ USDA-covered Species exempt from USDA reporting

From: IACUC@asu.edu
To: [redacted]
Subject: FW: [redacted] protocol
Date: Friday, September 10, 2021 5:38:59 PM
Attachments: [redacted] 22-1873R Final.docx

From: Karen Kibler [redacted]
Sent: Friday, September 10, 2021 11:35:38 PM (UTC+00:00) Monrovia, Reykjavik
To: iacuc@asu.edu [redacted]
Cc: Dale DeNardo [redacted]
Subject: [redacted] protocol

This version has cleared DR.

Thanks,
Karen

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 1
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in non-
ir
Principal Investigator: [redacted]
Date of Action: 12/6/2021

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] [redacted] and [redacted] as additional personnel to the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT a[redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contac[redacted] to schedule.

☐ This protocol indicates that there are surgical pro[redacted] checklist may be required to be submitted to Research Support Services within DAC[redacted] prior to starting surgeries.

☒ Other requirements[redacted] must be ad[redacted] disclosure before working with biohazardous materials.

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 12/17/2021
IACUC Chair or Designee

Cc: IACUC Office; IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name: [redacted]	Phone: [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email: [redacted]

Participant #1	Add to: ☐ IBC # ☒ IACUC #21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R Delete from: ☐ IBC # ☐ IACUC #	FOR ORIA USE ONLY Training Verification
Name: [redacted]	ASURITE [redacted] Email: [redacted]	
Project Responsibilities in IBC:		
Experience/Training in These Responsibilities:		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Intracranial surgery, intracarotid surgery, intracisternal injection, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified).		11/2021 OHSP
Species: Macaques, Mice **Experience and training with species and procedures:** 17 years' experience in primate research. 14 years' experience in rodent research. Experienced with intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy. Will be trained in intracisternal injection by Dr. [redacted]		

Participant #2	Add to: ☐ IBC # ☒ IACUC #21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R Delete from: ☐ IBC # ☐ IACUC #	FOR ORIA USE ONLY Training Verification
Name: [redacted]	ASURITE: [redacted] Email: [redacted]	
Project Responsibilities in IBC:		
Experience/Training in These Responsibilities:		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Intracranial surgery, intracarotid surgery, intracisternal injection, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified).		11/2021 OHSP
Species: Macaques, Mice **Experience and training with species and procedures:** 2 years' experience in primate research. 3 years' experience in rodent research. Experienced with intracranial surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy. Will be trained in intracarotid surgery by [redacted] and [redacted] will be trained in PET scan by [redacted] will be trained in intracisternal injection by Dr [redacted]		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 12/2/2021

Revised 11/20/12

FOR ORIA USE ONLY	☐ IBC Approved	☒ IACUC Approved 12/6/2021

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 2
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain
Principal Investigator: [redacted]
Date of Action: 12/10/2021

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] as additional personnel to the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT a[redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contact[redacted] to schedule.

☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DAC[redacted] prior to starting surgeries.

☒ Other requirements[redacted] must be added to IBC disclosure before working with biohazardous materials.

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 12/17/2021
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name: [redacted]	Phone [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email: [redacted]

Participant #3	Add to: ☐ IBC # ☒ IACUC #21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R Delete from: ☐ IBC # ☐ IACUC #	FOR ORIA USE ONLY Training Verification
Name: [redacted]	ASURITE [redacted] Email: [redacted]	
Project Responsibilities in IBC:		
Experience/Training in These Responsibilities:		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Intracranial surgery, intracarotid surgery, intracisternal injection, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified).		11/2021 Basics & NHP 12/2021 Rodent OHSP
Species: Macaques, Mice **Experience and training with species and procedures:** 2 years' experience in primate research. 4 years' experience in rodent research. Experienced with intracranial surgery, MRI, blood/CSF collection, behavioral tests, administration of medications, and necropsy. Will be trained in intracarotid surgery by [redacted] and [redacted] will be trained in PET scan by [redacted] will be trained in intracisternal injection by Dr [redacted]		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 12/2/2021

FOR ORIA USE ONLY	☐ IBC Approved	☒ IACUC Approved 12/10/2021

Revised 11/20/12

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 3
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 3/10/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was approved by Designated Review to change the PET imaging radiotracer on the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT a[redacted]

Additional requirements:

☐ This protocol requires that Research Sup[redacted] within DACT provide supervision for the first time a procedure is conducted. Contac[redacted] to schedule.
☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT[redacted] prior to starting surgeries.
☐ Other requirements:

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 3/11/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

ARIZONA STATE UNIVERSITY

Institutional Animal Care and Use Committee

REQUEST FOR CHANGES TO AN APPROVED PROTOCOL

Protocol No. 22-1873R RFC 3
Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted] Email Address: [redacted]
If not PI, whom should we contact for questions related to this amendment: [redacted] Email Address: [redacted]

☒ Funded ☐ Unfunded

Requested Change (check all that apply):

☐ New procedures to be performed – complete Part A, and Appendix 1 and/or 2 as applicable, and sign assurance.
☐ New species and or an increase in the number of animals to be used complete Part A and sign assurance.
☐ New location of housing or procedures complete Part A and sign assurance.
☐ New personnel complete Part B and sign assurance.
☒ Other (includes changes in dosages, funding, etc.) complete Part A and sign assurance.

A. Description of Requested Changes

For new procedures or additional animals that are USDA-covered species (all mammals EXCEPT mice and rats bred for research), list the **Category of Pain:**

For new procedures or additional animals that are not USDA-covered species, will there be the potential to involve more than slight or momentary pain or distress that will NOT be relieved with anesthetics, analgesics, tranquilizer drugs, or other methods for relieving pain or distress (e.g., negative conditioning, unrelieved post-surgical pain, death without euthanasia)? ☐ No ☐ Yes

If yes, describe and justify:

If you are adding a procedure that could create pain or distress, you need to include a **literature search** for alternatives.
If you are adding a new survival surgery, submit a surgical checklist.
If you are requesting an increase in animal numbers, provide justification with supportive statistics.
If you are adding additional funding sources, provide the grant agency, grant title and ASU proposal or award number.

Describe the changes you are requesting. We would like to change the PET imaging radiotracer from ^{11}C-PE2I to ^{18}F-dopa. The dose will remain <20 mCi and all other parameters of the procedure will remain the same. ^{18}F-dopa is a clinically approved radiotracer for patients with Parkinson's disease. While both radiotracers can be used in evaluating dopaminergic function in Parkinson's disease, ^{11}C-PE2I binds to dopamine transporter (DAT) while ^{18}F-dopa binds to aromatic l-amino acid decarboxylase (AADC). Additionally, ^{18}F has a longer half-life (110 min) than ^{11}C (20 min) allowing transportation of the radiotracer from the site of production to the imaging site a[redacted]

B. Addition of Personnel

All personnel who work with animals are required to have animal care training within the last four years. ASU IACUC training modules can be completed at https://asu.co1.qualtrics.com/jfe/form/SV_b2b2XRXRRs1309f. Personnel are required to have Level III training certification on file with the IACUC office in order to perform procedures independently (without supervision). Training can be received from DACT staff or PIs can have a member of their lab approved by DACT to be a Certified Trainer who can then train others. Simply being Level III certified does not allow the training of others. See the IACUC web site (https://researchintegrity.asu.edu/animals/training) for more information on training and Level III forms.

*** Procedures other than husbandry, handling, or behavioral testing MUST be performed under supervision unless the person is Level III certified to conduct the procedure independently. Personnel are not Level III certified until the IACUC has reviewed and approved the Level III training documentation. The PI is responsible for ensuring that personnel who are not Level III certified are supervised at all times.**

Name	Title	ASURITE name	What activities will each person perform on live	What activities will each person be allowed to perform	Species with which individual will have	IACUC USE ONLY Training

			animals ONLY while under direct supervision?	independently (including appropriate Level 3 certification*) at the time of protocol submission?	direct contact ("all" or list species) *	(mm/yy)

For each individual, describe the individual's training and years of experience with all listed species and procedures they will be conducting under this protocol. For procedures for which they are not yet trained, but will likely be trained to do during the activity period of this protocol, provide a description of who will provide such training:

Assurance

As Principal Investigator of this protocol, I assure that all procedures will be conducted as described in this request for changes and that personnel will receive appropriate additional training prior to conducting any new procedures that are not listed above.

SIGNED: [redacted]

Principal Investigator

3/2/22
Date

For IACUC use only:

- ☐ Administratively approved - Approving administrator: Date of approval:
- ☐ Administratively handled by VCV - Veterinarian providing verification: Date of verification:
  Sources used for verification:
- ☒ Approved by Designated Review – Designated reviewer: Karen Kibler Date of approval: 3/10/2022
- ☐ Approved by Full Committee Review – Primary reviewer: Date of approval:

From: [redacted]
To: [redacted]
Cc: IACUC@asu.edu
Subject: RE: [redacted] 22-1873R RFC 3 - Ready for Assignment
Date: Tuesday, March 8, 2022 12:00:48 PM
Attachments: image001.png

Hello [redacted]

Please send for DR process approval with me as the DR. If the process is approved, I approve as written.

Thanks,
Karen

From: [redacted]
Sent: Monday, March 07, 2022 7:48 AM
To: Karen Kible, [redacted]
Cc: IACUC@asu.edu
Subject: [redacted] 22 1873R RFC 3 Ready for Assignment

Hello Karen,

The attached RFC has cleared vet review. Who would you like to serve as the DR/PR?

Sincerely,

[redacted] | Compliance Coordinator, Office of Research Integrity & Assurance
Arizona State University | Knowledge Enterprise | Operations
[redacted] f 480-965-777
[redacted] | http://researchintegrity.asu.edu
How am I doing? Email m[redacted]or send a Sun Award
[redacted] ASU Users Only)

[redacted]

To: [redacted]iacuc@asu.edu
Subject: RE: Action Required: Designated Review fo[redacted]22 1873R RFC 3

From [redacted]
Sent: Tuesday, March 8, 2022 12:57 PM
To [redacted] Dale DeNardo [redacted] Karen Kibler [redacted]
Cc: IACUC@asu.edu
Subject: Action Required: Designated Review fo[redacted]22-1873R RFC 3
Importance: High

Designated Reviewer: Karen Kibler
Principal Investigator: [redacted]
Peer Reviewer: N/A
Protocol Number: 22-1873R RFC 3

Tracking:

Recipient	Response
[redacted]	Yes: 3/8/2022 1:03 PM
Dale DeNardo	Yes: 3/8/2022 1:54 PM
[redacted]	Yes: 3/8/2022 12:59 PM
Karen Kibler	Yes: 3/8/2022 12:59 PM
[redacted]	Yes: 3/8/2022 2:03 PM
[redacted]	Yes: 3/8/2022 1:20 PM
[redacted]	Yes: 3/8/2022 1:04 PM
[redacted]	Yes: 3/8/2022 1:03 PM
[redacted]	Yes: 3/8/2022 12:58 PM
[redacted]	Yes: 3/8/2022 3:53 PM

A request for an amendment to the referenced protocols has been submitted. The request for amendment is attached and the various related protocols are available at the SharePoint site. The Designated Review process allows IACUC members, by voting, to permit the Designated Reviewer to approve or disapprove an amendment request.

Select "**YES**" if you approve the use of the designated review process for this amendment.

Select "**NO**" if you disapprove the use of designated review process regarding this amendment request. The amendment will then be reviewed at the next monthly IACUC meeting.

Select "**Abstain**" if you would like to abstain from the vote for any reason.

Select "**Recuse**" if you have a conflict of interest.

Please indicate your approval or disapproval of the request for designated review by using the YES or NO button in the toolbar at the top of this message. The use of "YES or NO" buttons allows you to submit comments along with your choice. **You may also send your comments to me directly or to the primary reviewer without using the selection buttons. Please copy me on all correspondence and email related to this request.**

Sincerely,

IACUC Protocol Trackable Components Checklist

Protocol #: 22-1873R If for amendment, amendment #: 3

PI [redacted]

Species: NHP Highest Category of Pain: D

Completed by [redacted] Date completed: 3/4/22

☐ No trackable components in this document

Exceptions to the Guide:

☒ Food/Fluid Regulation

Species: NHP

What Restricted: Food

Parameters: Animals performing the hand reach task may have their biscuit allotment restricted to half the normal allotment to provide incentive for the task. Restriction during the initial task training period will last up to one month, and post-surgery restriction may last up to one week out of every 4 weeks. Food restricted animals will be weighed weekly; animals that lose 10% or more body weight or whose BCS drops to 3/9 or below will be removed from food restriction.

☐ Prolonged Restraint

Species:

Details:

☒ Husbandry Deviation from the Guide

Species: NHP

Deviation: Single housing if suitable pairing partners are not available. Animals that will undergo the hand reach task are permanently exempt from establishment of new social housing pairs.

☐ Other:

Other Trackable Components:

☒ Survival Surgerie(s)

Species: NHP

Surgerie(s): Intracarotid injection, intracranial injection

Multiple Major?: ☒ Yes ☐ No

☒ Hazardous Agents

Biological (list agent and hazard level): AAV constructs

Chemical (note category – toxicant, toxin, irritant, carcinogen, etc.): MPTP, 4% Formaldehyde, ^{18}F-dopa radiotracer (RFC 3, replaced PE2I DAT radiotracer)

Physical (note type - radiation, UV light, lasers, noise, magnetic fields, etc.): MRI (magnetic fields and up to ~110 dB noise)

☐ Non-Centralized Animal Housing

IACUC Protocol Trackable Components Checklist

Location:
Maximum duration:

☐ Decapitation

☐ USDA-covered Species exempt from USDA reporting

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 4
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 4/21/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was approved by Designated Review to add the option for an additional craniotomy during intracranial injection surgeries.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contact [redacted] to schedule.
☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT [redacted] prior to starting surgeries.
☐ Other requirements:

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 4/22/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

ARIZONA STATE UNIVERSITY

Institutional Animal Care and Use Committee

REQUEST FOR CHANGES TO AN APPROVED PROTOCOL

Protocol No. 21-1867R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1918R

Title: Differential diagnosis of Parkinson's and multiple system atrophy in non-human primate models using a novel a-synuclein retinal contrast agent and AI-assisted analytics
Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain
Co-Pathologies Drive Neuroinflammation and Progression in PD
Genetic Silencing of Striatal CaV1.3 Calcium Channels as a Potent Antidyskinetic Therapy for PD
AAV Trehalose in an NHP model of Alzheimer's DiseaseAAV-GBA Therapy in an NHP model of PD

Principal Investigator: [redacted] Email Address: [redacted]

If not PI, whom should we contact for questions related to this amendment: [redacted] Email Address: [redacted]

☒ Funded ☐ Unfunded

Requested Change (check all that apply):

☐ New procedures to be performed complete Part A, and Appendix 1 and/or 2 as applicable, and sign assurance.
☐ New species and or an increase in the number of animals to be used complete Part A and sign assurance.
☐ New location of housing or procedures complete Part A and sign assurance.
☐ New personnel – complete Part B and sign assurance.
☒ Other (includes changes in dosages, funding, etc.) complete Part A and sign assurance.

A. Description of Requested Changes

For new procedures or additional animals that are USDA-covered species (all mammals EXCEPT mice and rats bred for research), list the **Category of Pain:**

For new procedures or additional animals that are not USDA-covered species, will there be the potential to involve more than slight or momentary pain or distress that will NOT be relieved with anesthetics, analgesics, tranquilizer drugs, or other methods for relieving pain or distress (e.g., negative conditioning, unrelieved post-surgical pain, death without euthanasia)? ☐ No ☐ Yes

If yes, describe and justify:

If you are adding a procedure that could create pain or distress, you need to include a **literature search** for alternatives.

If you are adding a new survival surgery, submit a surgical checklist.

If you are requesting an increase in animal numbers, provide justification with supportive statistics.

If you are adding additional funding sources, provide the grant agency, grant title and ASU proposal or award number.

Describe the changes you are requesting. We would like to add the option to make one additional craniotomy to visualize the superior sagittal sinus during intracranial injection surgeries under this protocol. Intraoperative navigation with the [redacted] is generally highly accurate following initial skin registration (i.e., correlation of the MRI scan with the anima's actual position in the stereotaxic frame using fiducial marker locations or tracing the skin surface with a tracked instrument). However, it is occasionally necessary for the surgeon to confirm navigational accuracy after the skin has been retracted with an anatomical landmark that is clearly visible on MRI. The superior sagittal sinus is ideal for this purpose and, prior to the adoption of intraoperative navigation with the [redacted] visualizing the sinus was the primary method of establishing a mediolateral zero point for stereotaxic MRI coordinates in all surgical cases, as described by [redacted] (1). In cases where visualizing the sinus is deemed necessary, the surgeon will make a small craniotomy (up to 10 x 3 mm) along the mediolateral axis. It is usually not necessary for the craniotomy to fully penetrate the skull and the surgeon will stop once the sinus is visible through the bone. In the very rare occasions when the sinus is inadvertently penetrated, digital pressure with surgical gel foam is sufficient to control bleeding. The craniotomy will be filled with gel foam prior to wound closure, which will be as previously described.

References:

1 [redacted]

B. Addition of Personnel

All personnel who work with animals are required to have animal care training within the last four years. ASU IACUC training modules can be completed at https://asu.co1.qualtrics.com/jfe/form/SV_b2b2XRXRRs1309f. Personnel are required to have Level III training certification on file with the IACUC office in order to perform procedures independently (without supervision). Training can be received from DACT staff or PIs can have a member of their lab approved by DACT to be a Certified Trainer who can then train others. Simply being Level III certified does not allow the training of others. See the IACUC web site (https://researchintegrity.asu.edu/animals/training) for more information on training and Level III forms.

*** Procedures other than husbandry, handling, or behavioral testing MUST be performed under supervision unless the person is Level III certified to conduct the procedure independently. Personnel are not Level III certified until the IACUC has reviewed and approved the Level III training documentation. The PI is responsible for ensuring that personnel who are not Level III certified are supervised at all times.**

Name	Title	ASURITE name	What activities will each person perform on live animals ONLY while under direct supervision?	What activities will each person be allowed to perform independently (including appropriate Level 3 certification*) at the time of protocol submission?	Species with which individual will have direct contact ("all" or list species) *	IACUC USE ONLY Training (mm/yy)

For each individual, describe the individual's training and years of experience with all listed species and procedures they will be conducting under this protocol. For procedures for which they are not yet trained, but will likely be trained to do during the activity period of this protocol, provide a description of who will provide such training:

Assurance

As Principal Investigator of this protocol, I assure that all procedures will be conducted as described in this request for changes and that personnel will receive appropriate additional training prior to conducting any new procedures that are not listed above.

SIGNED: [redacted]

Principal Investigator

4/6/2022
Date

For IACUC use only:

☐ Administratively approved - Approving administrator: Date of approval:
☐ Administratively handled by VCV - Veterinarian providing verification: Date of verification:
Sources used for verification:
☒ Approved by Designated Review – Designated reviewer: [redacted] Date of approval: 4/21/2022
☐ Approved by Full Committee Review – Primary reviewer: Date of approval:

From: [redacted]
To:
Cc: [redacted] IACUC@asu.edu
Subject: RE: Action Required: Designated Review fo[redacted] Multiprotocol RFC
Date: Tuesday, April 19, 2022 4:18:09 PM
Attachments: image002.png

Thanks [redacted] I approve the modified amendment as the designated reviewer.

Good luck on the researc[redacted]

From: [redacted]
Sent: Tuesday, April 19, 2022 2:51 PM
To [redacted]
Cc: [redacted] IACUC@asu.edu <IACUCasu.edu@mainex1.asu.edu>
Subject: RE: Action Required: Designated Review fo[redacted] Multiprotocol RFC

Great, please see the attached revisions.

[redacted]
ASU-Banner Neurodegenerative Disease Research Center (NDRC)
Arizona State University
[redacted]

From: [redacted]
Sent: Tuesday, April 19, 2022 2:34 PM
To [redacted]
Cc: [redacted] IACUC@asu.edu <IACUCasu.edu@mainex1.asu.edu>
Subject: RE: Action Required: Designated Review fo[redacted] Multiprotocol RFC

Hi [redacted] Yes this outlines and justifies the process. This is very helpful. Please add a sentence with the reference to the amendment. Thanks!

From [redacted]
Sent: Tuesday, April 19, 2022 2:14 PM
To [redacted]
Cc: [redacted] IACUC@asu.edu <IACUCasu.edu@mainex1.asu.edu>
Subject: RE: Action Required: Designated Review fo[redacted] Multiprotocol RFC

H[redacted] the attached paper describes the stereotaxic surgery without the[redacted] neuronavigation, including the exposure of the sagittal sinus for mediolateral zero. Is that what you are looking for?

[redacted]
Laboratory Manager
ASU-Banner Neurodegenerative Disease Research Center (NDRC)
Arizona State University
[redacted]

From[redacted]
Sent: Tuesday, April 19, 2022 10:21 AM
To[redacted]
Subject: FW: Action Required: Designated Review fo[redacted] Multiprotocol RFC

See below

[redacted]
Professor of Life Sciences
College of Liberal Arts and Sciences
[redacted]

From:[redacted]
Date: Tuesday, April 19, 2022 at 10:15 AM
To:[redacted]
Cc:[redacted] "iacuc@asu.edu" <iacuc@asu.edu>
Subject: RE: Action Required: Designated Review for[redacted] Multiprotocol RFC

H[redacted]

I am the designated reviewer for your amendment. I have no concerns, but can you please add some references to justify your discussion. Thank you!

Best,

[redacted]

[redacted]
Professor of Nutrition
[redacted]

College of Health Solutions
Arizona State University

From [redacted]
Sent: Tuesday, April 19, 2022 9:47 AM
To [redacted] Dale DeNardo [redacted] Karen Kibler [redacted]
Cc: IACUC@asu.edu
Subject: Action Required: Designated Review fo [redacted] Multiprotocol RFC
Importance: High

Designated Reviewer: [redacted]
Principal Investigator:
Peer Reviewer:
Protocol Number: **Multiprotocol RFC**

A request for an amendment to the referenced protocols has been submitted. The request for amendment is attached and the various related protoc s are available at the SharePoint site. The Designated Review process allows IACUC members, by voting, to permit the Designated Reviewer to approve or disapprove an amendment request.

Select "**YES**" if you approve the use of the designated review process for this amendment.

Select "**NO**" if you disapprove the use of designated review process regarding this amendment request. The amendment will then be reviewed at the next monthly IACUC meeting.

Select "**Abstain**" if you would like to abstain from the vote for any reason.

Select "**Recuse**" if you have a conflict of interest.

Please indicate your approval or disapproval of the request for designated review by using the YES or NO

[redacted]

To: [redacted]uc@asu.edu
Subject: RE: Action Required: Designated Review fo[redacted] Multiprotocol RFC

From [redacted]
Sent: Tuesday, April 19, 2022 10:47 AM
To: [redacted] Dale DeNardo [redacted] Karen Kibler [redacted]
Cc: IACUC@asu.edu
Subject: Action Required: Designated Review fo[redacted] Multiprotocol RFC
Importance: High

Designated Reviewer: [redacted]
Principal Investigator:
Peer Reviewer:
Protocol Number: **Multiprotocol RFC**

Tracking:	**Recipient**	**Response**
	[redacted]	Yes: 4/19/2022 3:25 PM
		Yes: 4/19/2022 4:18 PM
		Yes: 4/19/2022 11:56 AM
	Dale DeNardo [redacted]	Yes: 4/19/2022 11:02 AM
	Karen Kibler	Yes: 4/19/2022 10:49 AM
	[redacted]	Yes: 4/19/2022 12:20 PM
		Yes: 4/19/2022 4:08 PM
		Yes: 4/19/2022 12:53 PM
		Yes: 4/19/2022 11:51 AM

A request for an amendment to the referenced protocols has been submitted. The request for amendment is attached and the various related protocols are available at the SharePoint site. The Designated Review process allows IACUC members, by voting, to permit the Designated Reviewer to approve or disapprove an amendment request.

Select "**YES**" if you approve the use of the designated review process for this amendment.

Select "**NO**" if you disapprove the use of designated review process regarding this amendment request. The amendment will then be reviewed at the next monthly IACUC meeting.

Select "**Abstain**" if you would like to abstain from the vote for any reason.

Select "**Recuse**" if you have a conflict of interest.

Please indicate your approval or disapproval of the request for designated review by using the YES or NO button in the toolbar at the top of this message. The use of "YES or NO" buttons allows you to submit comments along with your choice. **You may also send your comments to me directly or to the primary reviewer without using the selection buttons. Please copy me on all correspondence and email related to this request.**

Sincerely,

IACUC Protocol Trackable Components Checklist

Protocol #: 22-1873R If for amendment, amendment #: 4

PI [redacted]

Species: NHP Highest Category of Pain: D

Completed by [redacted] Date completed: 4/13/2022

☐ No trackable components in this document

Exceptions to the Guide:

☒ Food/Fluid Regulation

Species: NHP

What Restricted: Food

Parameters: Animals performing the hand reach task may have their biscuit allotment restricted to half the normal allotment to provide incentive for the task. Restriction during the initial task training period will last up to one month, and post-surgery restriction may last up to one week out of every 4 weeks. Food restricted animals will be weighed weekly; animals that lose 10% or more body weight or whose BCS drops to 3/9 or below will be removed from food restriction.

☐ Prolonged Restraint

Species:

Details:

☒ Husbandry Deviation from the Guide

Species: NHP

Deviation: Single housing if suitable pairing partners are not available. Animals that will undergo the hand reach task are permanently exempt from establishment of new social housing pairs.

☐ Other:

Other Trackable Components:

☒ Survival Surgerie(s)

Species: NHP

Surgerie(s): Intracarotid injection, intracranial injection

Multiple Major?: ☒ Yes ☐ No

☒ Hazardous Agents

Biological (list agent and hazard level): AAV constructs

Chemical (note category – toxicant, toxin, irritant, carcinogen, etc.): MPTP, 4% Formaldehyde, ^{18}F-dopa radiotracer (RFC 3, replaced PE2I DAT radiotracer)

Physical (note type - radiation, UV light, lasers, noise, magnetic fields, etc.): MRI (magnetic fields and up to ~110 dB noise)

☐ Non-Centralized Animal Housing

IACUC Protocol Trackable Components Checklist

Location:
Maximum duration:

☐ Decapitation

☐ USDA-covered Species exempt from USDA reporting

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University
[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 5
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 7/6/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] as additional personnel to the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contact [redacted] to schedule.
☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT [redacted] prior to starting surgeries.
☐ Other requirements:

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 7/7/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name [redacted]	Phone: [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email:

Participant #1	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY Training Verification**
Name [redacted] **ASURITE** [redacted] **Email:** [redacted]		
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		Added in ERA
Experience/Training in These Responsibilities: 7 years' experience in rodent and macaque research with ASU DACT.		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		5/2019 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** 7 years' experience in rodent and macaque research with ASU DACT.		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 7/1/22

FOR ORIA USE ONLY	☐ **IBC Approved**	☒ **IACUC Approved 7/6/2022**

Revised 11/20/12

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 6
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 8/2/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] and [redacted] as additional personnel to the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contac[redacted]to schedule.

☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DAC[redacted] prior to starting surgeries.

☒ **Other requirements: IBC approval of new personnel is required before work with biohazardous materials may begin.**

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 8/2/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name: [redacted]	Phone: [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email: [redacted]

Participant #1	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY Training Verification**
Name: [redacted]	**ASURITE:** [redacted]	**Email:** [redacted]
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		7/2022 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** No previous experience		
Participant #2	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY Training Verification**
Name: [redacted]	**ASURITE:** [redacted]	**Email:** [redacted]
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		7/2022 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** No previous experience		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 8/1/22

FOR ORIA USE ONLY	☐ IBC Approved	☒ IACUC Approved 8/2/2022

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University
[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 7
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 8/11/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was approved by Designated Review to update the possible detrimental sequelae on the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contact [redacted] to schedule.
☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT [redacted] prior to starting surgeries.
☐ Other requirements:

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 8/11/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

ARIZONA STATE UNIVERSITY

Institutional Animal Care and Use Committee

REQUEST FOR CHANGES TO AN APPROVED PROTOCOL

Protocol No. 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R

Title: Differential diagnosis of Parkinson's and multiple system atrophy in non-human primate models using a novel a-synuclein retinal contrast agent and AI-assisted analytics
Kinase activation in multiple system atrophy
Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain
Co-Pathologies Drive Neuroinflammation and Progression in PD
Genetic Silencing of Striatal CaV1.3 Calcium Channels as a Potent Antidyskinetic Therapy for PD
AAV Trehalose in an NHP model of Alzheimer's Disease
BAG3 in Rodent Models of Neurodegenerative Disease
Bifunctional intrabody targeting intracellular alpha-synuclein
Primate Holding, Assessment, and Training
AAV-GBA Therapy in an NHP model of PD

Principal Investigator: [redacted] Email Address: [redacted]

If not PI, whom should be contact for questions related to this amendment: [redacted] Email Address:

☒ Funded ☐ Unfund

Requested Change (check all that apply):

☐ New procedures to be performed – complete Part A, and Appendix 1 and/or 2 as applicable, and sign assurance.
☐ New species and or an increase in the number of animals to be used – complete Part A and sign assurance.
☐ New location of housing or procedures – complete Part A and sign assurance.
☐ New personnel – complete Part B and sign assurance.
☒ Other (includes changes in dosages, funding, etc.) – complete Part A and sign assurance.

A. Description of Requested Changes

For new procedures or additional animals that are USDA-covered species (all mammals EXCEPT mice and rats bred for research), list the **Category of Pain:**

For new procedures or additional animals that are not USDA-covered species, will there be the potential to involve more than slight or momentary pain or distress that will NOT be relieved with anesthetics, analgesics, tranquilizer drugs, or other methods for relieving pain or distress (e.g., negative conditioning, unrelieved post-surgical pain, death without euthanasia)? ☐ No ☐ Yes

If yes, describe and justify:

If you are adding a procedure that could create pain or distress, you need to include a **literature search** for alternatives.
If you are adding a new survival surgery, submit a surgical checklist.
If you are requesting an increase in animal numbers, provide justification with supportive statistics.
If you are adding additional funding sources, provide the grant agency, grant title and ASU proposal or award number.

Describe the changes you are requesting. We would like to add additional possible detrimental sequelae.

Possible Clinical Effect	Probability of Occurrence	Treatment
Surgical and other procedures performed under anesthesia may rarely result in death or permanent disability due to hemorrhage, edema, thrombosis, infection, toxicity, or complications due to anesthesia.	Rare	Consult with veterinary staff if clinical signs develop. Euthanasia may be considered.

B. Addition of Personnel

All personnel who work with animals are required to have animal care training within the last four years. ASU IACUC training modules can be completed at https://asu.co1.qualtrics.com/jfe/form/SV_b2b2XRXRRs1309f. Personnel are required to have Level III training certification on file with the IACUC office in order to perform procedures independently (without supervision). Training can be received from DACT staff or PIs can have a member of their lab approved by DACT to be a Certified Trainer who can then train others. Simply being Level III certified does not allow the training of others. See the IACUC web site (https://researchintegrity.asu.edu/animals/training) for more information on training and Level III forms.

*** Procedures other than husbandry, handling, or behavioral testing MUST be performed under supervision unless the person is Level III certified to conduct the procedure independently. Personnel are not Level III certified until the IACUC has reviewed and approved the Level III training documentation. The PI is responsible for ensuring that personnel who are not Level III certified are supervised at all times.**

Name	Title	ASURITE name	What activities will each person perform on live animals ONLY while under direct supervision?	What activities will each person be allowed to perform independently (including appropriate Level 3 certification*) at the time of protocol submission?	Species with which individual will have direct contact ("all" or list species) *	IACUC USE ONLY Training (mm/yy)

For each individual, describe the individual's training and years of experience with all listed species and procedures they will be conducting under this protocol. For procedures for which they are not yet trained, but will likely be trained to do during the activity period of this protocol, provide a description of who will provide such training:

Assurance

As Principal Investigator of this protocol, I assure that all procedures will be conducted as described in this request for changes and that personnel will receive appropriate additional training prior to conducting any new procedures that are not listed above.

SIGNED: [redacted] 8/4/2022

Principal Investigator Date

For IACUC use only:

- ☐ Administratively approved - Approving administrator: Date of approval:
- ☐ Administratively handled by VCV - Veterinarian providing verification: Date of verification:
  Sources used for verification:
- ☒ Approved by Designated Review – Designated reviewer: Karen K bler Date of approval: 8/11/2022
- ☐ Approved by Full Committee Review – Primary reviewer: Date of approval:

From: Karen Kibler
To: [redacted]
Cc: IACUC@asu.edu
Subject: Multiprotocol RFC
Date: Tuesday, August 9, 2022 10:46:50 AM
Attachments: [redacted]Multiprotocol RFC 8.5.2022 Final.docx

Hello [redacted]

The attached version is DR approved.

Thanks,
Karen

[redacted]

To: [redacted]iacuc@asu.edu
Subject: RE: Action Required: Designated Review fo[redacted]Multiprotocol RFC 8.5.2022

From[redacted]
Sent: Tuesday, August 9, 2022 9:47 AM
To: [redacted] Dale DeNardo [redacted] Karen Kibler [redacted]
Cc: IACUC@asu.edu
Subject: Action Required: Designated Review for[redacted]Multiprotocol RFC 8.5.2022
Importance: High

Designated Reviewer: Karen Kibler
Principal Investigator: [redacted]
Peer Reviewer: N/A
Protocol Number: [redacted]**Multiprotocol RFC 8.5.2022**

Tracking:	Recipient	Response
	[redacted]	Yes: 8/9/2022 10:15 AM
	Dale DeNardo	Yes: 8/9/2022 10:10 AM
	[redacted]	Yes: 8/9/2022 10:31 AM
	Karen Kibler	Yes: 8/10/2022 7:56 AM
	[redacted]	Yes: 8/9/2022 10:15 AM
	[redacted]	Yes: 8/9/2022 11:17 AM
	[redacted]	Yes: 8/9/2022 3:29 PM
	[redacted]	Yes: 8/10/2022 5:06 PM

A request for an amendment to the referenced protocols has been submitted. The request for amendment is attached and the various related protocols are available at the SharePoint site. The Designated Review process allows IACUC members, by voting, to permit the Designated Reviewer to approve or disapprove an amendment request.

Select "**YES**" if you approve the use of the designated review process for this amendment.

Select "**NO**" if you disapprove the use of designated review process regarding this amendment request. The amendment will then be reviewed at the next monthly IACUC meeting.

Select "**Abstain**" if you would like to abstain from the vote for any reason.

Select "**Recuse**" if you have a conflict of interest.

Please indicate your approval or disapproval of the request for designated review by using the YES or NO button in the toolbar at the top of this message. The use of "YES or NO" buttons allows you to submit comments along with your choice. **You may also send your comments to me directly or to the primary reviewer without using the selection buttons. Please copy me on all correspondence and email related to this request.**

Sincerely,

IACUC Protocol Trackable Components Checklist

Protocol #: 22-1873R If for amendment, amendment #: 7

PI [redacted]

Species: NHP Highest Category of Pain: D

Completed by [redacted] Date completed: 8/8/22

☐ No trackable components in this document

Exceptions to the Guide:

☒ Food/Fluid Regulation

Species: NHP

What Restricted: Food

Parameters: Animals performing the hand reach task may have their biscuit allotment restricted to half the normal allotment to provide incentive for the task. Restriction during the initial task training period will last up to one month, and post-surgery restriction may last up to one week out of every 4 weeks. Food restricted animals will be weighed weekly; animals that lose 10% or more body weight or whose BCS drops to 3/9 or below will be removed from food restriction.

☐ Prolonged Restraint

Species:

Details:

☒ Husbandry Deviation from the Guide

Species: NHP

Deviation: Single housing if suitable pairing partners are not available. Animals that will undergo the hand reach task are permanently exempt from establishment of new social housing pairs.

☐ Other:

Other Trackable Components:

☒ Survival Surgerie(s)

Species: NHP

Surgerie(s): Intracarotid injection, intracranial injection

Multiple Major?: ☒ Yes ☐ No

☒ Hazardous Agents

Biological (list agent and hazard level): AAV constructs

Chemical (note category – toxicant, toxin, irritant, carcinogen, etc.): MPTP, 4% Formaldehyde, ^{18}F-dopa radiotracer (RFC 3, replaced PE2I DAT radiotracer)

Physical (note type - radiation, UV light, lasers, noise, magnetic fields, etc.): MRI (magnetic fields and up to ~110 dB noise)

☐ Non-Centralized Animal Housing

IACUC Protocol Trackable Components Checklist

Location:
Maximum duration:

☐ Decapitation

☐ USDA-covered Species exempt from USDA reporting

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University
[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 8
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 9/2/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] as additional personnel to the protocol.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contact [redacted] to schedule.

☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT [redacted] prior to starting surgeries.

☒ **Other requirements: IBC approval of new personnel is required before work with biohazardous materials may begin.**

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 9/7/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name: [redacted]	Phone [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email: [redacted]

Participant #1	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY Training Verification**
Name: [redacted] **ASURITE:** [redacted]	**Email:** [redacted]	
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		Being added in ERA
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		8/2022 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** 1 year experience working with rats in research		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 9/1/22

FOR ORIA USE ONLY	☐ **IBC Approved**	☒ **IACUC Approved 9/2/2022**

Revised 11/20/12

Institutional Animal Care and Use Committee (IACUC)
Office of Research Integrity and Assurance
Arizona State University

[redacted]

Animal Protocol Review

ASU Protocol Number: 22-1873R RFC 9
Protocol Title: Reprogramming astrocytes to functional dopaminergic neurons in nonhuman primate brain
Principal Investigator: [redacted]
Date of Action: 9/23/2022

The animal protocol review was considered by the Committee and the following decisions were made:

The request for changes was administratively approved to add [redacted] and [redacted] as additional personnel.

NOTE: If you have not already done so, documentation of Level III Training (i.e., procedure-specific training) will need to be provided to the IACUC office before participants can perform procedures without supervision. For more information on Level III requirements see https://researchintegrity.asu.edu/animals/training, or contact Research Support Services within DACT at [redacted]

Additional requirements:

☐ This protocol requires that Research Support Services group within DACT provide supervision for the first time a procedure is conducted. Contac[redacted] to schedule.

☐ This protocol indicates that there are surgical procedures. A surgical checklist may be required to be submitted to Research Support Services within DACT[redacted], prior to starting surgeries.

☒ **Other requirements: IBC approval of new personnel is required before work with biohazardous materials may begin.**

Total # of Animals: 24
Species: NHP **Pain Category:** D

Protocol Approval Period: 9/10/2021 – 9/9/2024

Sponsor: Michael J. Fox Foundation
ASU Proposal/Award #: [redacted]
Title: Reprogramming astrocytes to functional dopaminergic neurons in non-human primate brain

Signature: [redacted] Date: 9/27/2022
IACUC Chair or Designee

Cc: IACUC Office
IACUC Chair

PERSONNEL MODIFICATION FORM
IACUC and IBC

This form can be used to add or remove participants from both an IACUC protocol and an IBC disclosure. Please submit only one form to Research.Integrity@asu.edu and it will be processed by both committees.

Principal Investigator Name: [redacted]	Phone: [redacted]
Dept: ASU-Banner Neurodegenerative Disease Research Center	Email: [redacted]

Participant #1	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY** **Training Verification**
Name: [redacted]	**ASURITE:** [redacted]	**Email:** [redacted]
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		Already on IBC in ERA
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		8/2022 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** No previous experience		
Participant #2	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R **Delete from:** ☐ **IBC #** ☐ **IACUC #**	**FOR ORIA USE ONLY** **Training Verification**
Name: [redacted]	**ASURITE:** [redacted]	**Email:** [redacted]
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		Being added in ERA
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		10/2018 9/2022 NHP OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** 3 years experience working with mice in research		
Participant #3	**Add to:** ☒ **IBC #**SPROTO202100000070 ☒ **IACUC #** 21-1867R, 22-1872R, 22-1873R, 22-1880R, 22-1886R, 22-1887R, 22-1898R, 22-1901R, 22-1903R, 22-1918R	**FOR ORIA USE ONLY** **Training Verification**

	Delete from: ☐ IBC # ☐ IACUC #	
Name: [redacted]	ASURITE: [redacted] Email: [redacted]	
Project Responsibilities in IBC: Will handle AAV viral vectors, alpha-synuclein preformed fibrils, Human Lewy Body extracts, and mouse/rat/nonhuman primate blood/CSF/brain tissue.		Need to add in ERA
Experience/Training in These Responsibilities: No previous experience		
What procedures are they responsible for on the IACUC protocol (please note which procedures are being done independently and which are done under supervision: Macaques: Intracranial surgery, intracarotid surgery, MRI, PET scan, blood/CSF collection, behavioral tests, administration of medications, and necropsy (all under direct supervision until certified). Rats: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified). Mice: Intracranial surgery, blood/CSF collection, behavioral tests, administration of any medications, and necropsy (all under direct supervision until certified).		9/2022 OHSP
Species: Macaques, Rats, Mice **Experience and training with species and procedures:** No previous experience		

Assurance

As Principal Investigator, I assure that personnel will receive appropriate training prior to working with animals or biological materials as applicable.

Principal Investigator Signature: [redacted] Date: 8/25/22

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Revised 11/20/12