



Addendum to the FY2019APHIS Form 7023 Submission for North Carolina State University USDA Registration #55-R-005/842-Category E Report

Category E Report for the Reporting Period of FY2019

Category E Study # 1

1. **Registration Number:** 55-R-005
2. **Number of animals used under Column E conditions in this study:** 6
3. **Species (common name):** Ferret
4. **Explain the procedure producing pain and/or distress, including reason(s) for species selected:**

Bartonella species are bacteria that causes disease in both humans and dogs. Historically, it has been difficult to study Bartonellosis – the disease caused by *Bartonella* spp. infection – in animal models, due to difficulty in producing (or detecting) bacteremia or clinical signs that mimic human infection in lab species (rodents, cats, dogs). The goal of this pilot study is to determine if ferrets become bacteremic, or display clinical signs of Bartonellosis, when infected with *Bartonella* species by methods mimicking natural vector-borne transmission.

Bartonella infection has been found in mustelid species previously (otters, stoats, badgers), so it is a possibility in ferrets (though *Bartonella* infection in ferrets specifically has not previously been studied). Ferrets provide an ideal model for Bartonellosis due to their small size and tractability; in addition they are not known to be natural reservoirs of *Bartonella* species and may therefore be more susceptible to clinical disease from *Bartonella* species affecting humans and dogs. Finally, collaborators at UNC have a well-developed system for studying 12 behavior and neurological function in ferrets, which we would be able to utilize in the future for evaluation of potential neurologic and behavioral manifestations of Bartonellosis in this model organism.

5. **Provide scientific justification why pain and/or distress could not be relieved. State methods or means used to determine that pain and/or distress relief would interfere with test results. (For Federally mandated testing, see item 6 below):**

Because we hope to create a model for *Bartonella* infection using ferrets, we need the ferrets to demonstrate clinical disease. This may lead to ferrets displaying none, some, or all of these signs:

- Fever in excess of 103.5 deg. F persists longer than 72 hours



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Exceptions to Standards Report for the Reporting Period of October 1, 2018 through September 30, 2019

Species: Pig **Number Affected:** 17

Exception to Standards: Large sows recovering from abdominal surgery are housed in a stall measuring 3 x 8 feet. Animals are housed singly until the surgical wound is completely healed (up to two weeks), after which time, they are returned to standard housing generally consisting of two sows per 10 x 10 foot pen during the gestation period. Sows will be transferred to farrowing crates (3 X 8 feet) two weeks prior to parturition and will farrow in these crates. The sow will remain in the restricted environment until the piglets are 2-4 weeks of age, so a total of 6 weeks.

Standard: 9CFR Ch.1. Pt.2, Subpt. F. Sec. 3.128 - Enclosures shall be constructed and maintained so as to provide sufficient space to allow each animal to make normal postural and social adjustments with adequate freedom of movement. Inadequate space may be indicated by evidence of malnutrition, poor condition, debility, stress, or abnormal behavior patterns.



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Category E Report for the Reporting Period of FY2019 (Continued)

- Refusal of food for 72 hours or loss of >15% of body weight
- Progressive dehydration over 72 hours (based on the clinical assessment of the veterinary staff, including skin turgor, tear film, and mucous membrane appearance)

The clinical course and severity of Bartonella infection in ferrets is unknown, and we therefore propose – for this pilot study – minimal supportive intervention for mild clinical signs (including inappetence, nausea, fever, or dehydration) so that we can determine the clinical course of infection in the absence of intervention; ferrets that develop severe clinical signs will be euthanized promptly to minimize suffering and maximize the amount of information we are able to gather from histopathology. In the future, once the clinical course has been described, we will then be prepared to offer more supportive care to ferrets showing mild clinical signs to relieve any discomfort. We cannot treat with antibiotics to eliminate this infection since we need to characterize the disease course over time. We will euthanize any ferrets using the criteria above in conjunction with consultation of the LAR veterinary staff.