PhysiciansCommittee
for Responsible Medicine
PCRM.ORG
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Feb. 9, 2023

The Honorable Pete Buttigieg
Secretary
U.S. Department of Transportation
1200 New Jersey Ave. SE
Washington, DC 20590

William Schoonover
Associate Administrator
Pipeline and Hazardous Material Safety Administration
U.S. Department of Transportation
1200 New Jersey Ave. SE
Washington, DC 20590

*Submitted via email (DOTExecSec@dot.gov and william.schoonover@dot.gov)*

**RE: Request for Investigation of Neuralink for Transporting Hazardous Materials in Violation of Federal Regulations**

Dear Secretary Buttigieg and Mr. Schoonover:

On behalf of the Physicians Committee for Responsible Medicine, our 17,000 doctor members, and our 175,000 total members, we are writing to request that the U.S. Department of Transportation ("DOT") investigate the medical device company Neuralink for violations of the federal hazardous material transportation law and fine it accordingly. As the company continues to operate research facilities in California and Texas, its actions may pose a serious and ongoing public health risk. Neuralink continues to employ the neurosurgeon who oversaw the experiments during which violations occurred and may employ other staff who were similarly involved.

Public records recently obtained by the Physicians Committee reveal that individuals working for Neuralink appear to have unsafely packaged and transported materials (specifically, implants removed from the brains of nonhuman primates) carrying infectious pathogens on several occasions. The unsafe handling may have occurred due to the failure of the Neuralink employees to undergo legally required safety training. According to emails, the materials may have been contaminated with antibiotic-resistant pathogens including *Staphylococcus* and *Klebsiella*, which can cause pneumonia, bloodstream infections, wound or surgical site infections, and meningitis, according to the U.S. Centers for Disease Control ("CDC").[1] The materials may also have been contaminated with *Corynebacterium ulcerans*, which is known to circulate among rhesus macaques,[2] is a recognized "emerging human pathogen,"[3] and can produce fatal diphtheria.[4] The materials also came from the skulls of monkeys who may have been suffering from bacterial meningitis and may have been infected with *Macacine herpesvirus 1* (Herpes B),

[1] National Center for Emerging and Zoonotic Infectious Diseases, Division of Healthcare Quality Promotion. (2010). *Klebsiella pneumoniae in Healthcare Settings*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
[2] Thomas, A. et al. (2022). Active Circulation of Corynebacterium ulcerans Among Nonhuman Primates. *Microbiol Spect*, Aug 31;10(4).
[3] Hacker, E. et al. (2016). Corynebacterium ulcerans, an Emerging Human Pathogen. *Future Microbiol.*, Sep;11.
[4] Otsuji, K. et al. (2017). The First Fatal Case of Corynebacterium ulcerans Infection in Japan. *JMM Case Rep.*, Aug; 4(8).

which can "lead to severe brain damage or death if you do not get treatment immediately," according to the CDC.[5]

## I. Background

Since 2016, Neuralink has been conducting experiments in animals with the intention of developing an implantable brain-machine interface. Between May 2017 and December 2020, the company partnered with the University of California, Davis, where Neuralink employees performed invasive, exploratory brain studies in rhesus macaques, resulting in many animals suffering chronic infections, paralysis, seizures, and other debilitating or deadly side effects.

Since 2021, the Physicians Committee has been obtaining documents about the experiments from UC Davis via the California Public Records Act. Most recently, in January 2023, we received 327 pages of communications between Neuralink and UC Davis as a partial response to a February 2022 request. Included in the communications were several emails between the university and company from March and April 2019 related to the removal and return of "contaminated hardware" that had been explanted (i.e., removed from monkeys' brains following experiments). In those emails, UC Davis employees repeatedly raised concerns about Neuralink's removal of explanted devices from the university's California National Primate Research Center ("CNPRC") as well as the return of those devices to CNPRC, even going so far as to suggest that the actions may have violated federal and state laws.

## II. Timeline of Events

**Jan. 16, 2019:** A UC Davis employee identified only as an Occupational Health and Safety Officer emailed Neuralink to emphasize the importance of training staff on the safe transport of "biohazardous materials." The employee wrote: "I wanted to let you know that DOT and California code of regulations requires all staff involved in the packaging and transport of hazardous material be trained hazardous material handlers. Fines for untrained shippers transporting materials can be significant, up to $5,000 per infraction."[6]

**March 4, 2019:** Neuralink and UC Davis killed a six-year-old female rhesus macaque later identified by the university as "Animal 13." More than four months earlier, experimenters had drilled holes in her skull and used a robot to place two implants in her brain. They then attached titanium plates to her head using bone screws and stitched up the skin around the implants. About one month prior to her death, staff noted discharge coming from her head implant, which they believed was likely a *Staphylococcus* infection. They noted extensive "purulence" and, due to Animal 13's declining condition and worsening infection, suggested that they "coordinate terminal [i.e., fatal] project surgery within [the] next week." But three weeks later, she was still alive. On March 1, Animal 13 was on a cocktail of medications including antibiotics, probiotics, and pain-relieving drugs, and staff wrote she should continue those until she was "s/c'd" (sacrificed). The next day, one of the implants in her head was still infected, swollen, and bloody, and she was picking at it. Finally, on March 4, staff killed Animal 13 and Neuralink performed a necropsy, which noted evidence of bacterial meningitis and confirmed the presence of many bacteria, including *Staphylococcus*, *Klebsiella*, and *Corynebacterium ulcerans*.[7] The devices in Animal 13's head were then explanted and transported from UC Davis to a Neuralink facility.

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[5] National Center for Immunization and Respiratory Diseases, Division of Viral Diseases. (2019). *B Virus (herpes B, monkey B virus, herpesvirus simiae, and herpesvirus B).* U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. https://www.cdc.gov/herpesbvirus/index.html

[6] [Redacted] (personal communication, Jan. 16, 2019).

[7] California National Primate Research Center. (Oct. 22, 2018 – March 4, 2019). *Records for "Animal 13."*

**March 13, 2019:** An email from an unknown sender (likely a UC Davis employee) titled "Transport of biological substances" reveals that Neuralink may have failed to follow legal requirements in transporting materials on March 4. The sender wrote:

> Over the phone, you mentioned that the explanted hardware from [redacted but likely a reference to Animal 13] was packaged by [redacted] and translocated off site to a [Neuralink] location. [Redacted] has provided the training link (see below) to distribute to your personnel to allow translocation of hazardous material off site from the Primate Center. Packaging of hazardous material (e.g., monkey contaminated hardware) needs to be performed by a trained hazardous material handler along with a completed Biohazard Notice & Acknowledgement form. The form ensures that the Biosafety Officer at your institution is aware of the arrival of hazardous materials and is equipped with a BSL level 2 lab.

The sender continued:

> Since the hardware components of the explanted neural device are not sealed and it was not disinfected prior to leaving the Primate Center, this presents a hazard for anyone potentially coming in contact with the device. Simply labeling it "hazardous" doesn't account for the risk of potentially contracting Herpes B.[8]

**March 15, 2019:** Neuralink and UC Davis killed a 10-year-old female rhesus macaque later identified by the university as "Animal 11." About three months earlier, experimenters had drilled holes in her skull and implanted electrodes in her brain using "investigational robotics." They then attached titanium plates to her head using bone screws, filles gaps with "gelfoam," and stitched up the skin around the implants. Almost immediately, staff noted that the head implants had become infected, the "skin was eroded," and that she was "scratching at left implant." A microbial analysis showed that Animal 11 had *Staphylococcus* and *Enterobacter* infections, and staff noted that she was continuing to pick at the implants in her head and that the "skin appears pierced from [the] implant." A microbiology report from March 1 documented "[l]arge numbers of bacteria," including *Staphylococcus*. Another report from March 5 confirmed the presence of *Staphylococcus, Enterococcus*, and "very rare extracellular coccoid bacteria forming short chains." Also on March 5, staff attempted to clean the bloody, infected implants in Animal 11's head—they were able to "express" some of the "purulence" but not all of it. On March 12, staff noted that the infection was persisting and that a "terminal surgery [was] planned" for later that week. Finally, on March 15, they killed Animal 11. A necropsy revealed that she had been suffering from an "acute hemorrhage" in her brain and that her cerebral cortex was "tattered."[9] The devices in Animal 11's head were then explanted and transported from UC Davis to a Neuralink facility.

**April 2, 2019:** An email from an unknown UC Davis employee emphasized the need to train Neuralink employees in the handling and transport of biohazardous materials by summarizing recent incidents that had caused concerns. "To recap," the email states, "for the first infected implant monkey [redacted, but likely Animal 13] necropsied on 3/4, the CNPRC was unaware explanted hardware was taken off site." That appears to contrast with how explanted hardware from two other "infected" monkeys, including Animal 11, were transported: those were transported by "DOT trained" individuals. The author of the email continued:

> I, [redacted] have impressed upon [redacted] the importance of translocating equipment and devices coming in contact with unfixed monkey tissues and the infectious risks posed

[8] [Redacted] (personal communication, March 13, 2019).
[9] California National Primate Research Center. (Dec. 3, 2018 – March 15, 2019). Records for "Animal 11."

> to human health. Today (4/2), when [redacted] came on site to receive training for the [redacted] Biosafety cabinet, the three explanted devices had made their way back on site in an open box with no secondary container. Ultimately, we the Primate Center (Pl: [redacted]) are at risk for this re-entrance of uncontained, monkey contaminated hardware since our [CNPRC] certified shippers packaged it for off site [sic] transport. This is an exposure to anyone coming in contact with the contaminated explanted hardware and we are making a big deal about this because we are concerned for human safety.[10]

## III. Applicable Regulations

DOT is responsible for regulating the transportation of hazardous materials,[11] including infectious substances known or reasonably expected to contain a pathogen.[12] A pathogen is defined as "a microorganism (including bacteria, viruses, parasites, and fungi) or other agent, such as a proteinaceous infectious particle (prion) that can cause disease in humans or animals."[13]

UC Davis employees were concerned about the unsafe packaging and transport of hardware potentially containing pathogens from the university to a Neuralink facility and back to UC Davis. Numerous pathogens commonly found in primates used in laboratories could fall under Category A of the Hazardous Materials Regulations pertaining to infectious substances: "An infectious substance in a form capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure to it occurs. An exposure occurs when an infectious substance is released outside of its protective packaging, resulting in physical contact with humans or animals."[14]

Emails indicate that Neuralink employees failed to disinfect or protectively package hardware that had been removed from the heads of monkeys infected with several pathogens. Regulations dictate that Category A infectious substances must be transported in three specific layers of packaging that consist of a leakproof primary receptacle, a leakproof secondary receptacle, and rigid outer packaging.[15] The regulations also specify that when transporting infectious substances at room temperature, as the explanted hardware likely were, one must use "[p]rimary receptacles…made of glass, metal, or plastic" with a "leakproof seal…such as heat seal, skirted stopper, or metal crimp seal."[16]

Since Neuralink employees removed hardware from an infected monkey and transported the hardware from UC Davis without first disinfecting it,[17] the company would have been transporting an infectious substance. In addition, on at least one occasion, Neuralink employees transported explanted hardware carrying potentially infectious substances from the company's facility to UC Davis "in an open box with no secondary container."[18]

Further, Neuralink may have failed to train its employees on the transport of hazardous materials. DOT emphasizes that "[e]mployees involved in the packaging and transport of infectious substances are subject

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[10] [Redacted] (personal communication, April 2, 2019).
[11] 49 C.F.R. § 171.1.
[12] 49 C.F.R. § 171.134(a)(1).
[13] Ibid.
[14] 49 C.F.R. § 171.134(a)(1)(i).
[15] 49 C.F.R. § 173.196.
[16] 49 C.F.R. § 173.196(b)(1).
[17] [Redacted] (personal communication, March 13, 2019).
[18] [Redacted] (personal communication, April 2, 2019).

to the training requirements of the [Hazardous Materials Regulations]."[19] Such training must include general awareness of the many regulations, measures to protect employees from dangers associated with possible exposure to hazardous materials, and an awareness of security risks.[20] Yet on at least one occasion (on March 4, 2019 following the necropsy of Animal 13), it appears that an untrained Neuralink employee transported hardware that had been removed from a monkey infected with several pathogens.[21]

**IV. Request for Department of Transportation Investigation**

The law dictates that a "person who knowingly violates" the Federal hazardous material transportation law is liable for a civil penalty of up to $96,624 for each violation, "except the maximum civil penalty is $225,455 if the violation results in death, serious illness, or severe injury to any person or substantial destruction of property."[22] Also relevant to Neuralink's actions, the law dictates "a minimum civil penalty of $582 for a violation relating to training."[23]

Neuralink continues to operate facilities at 7400 Paseo Padre Pkwy in Fremont, Calif., and 2200 Caldwell Lane in Del Valle, Texas. As such, the company's documented track record of sloppy, unsafe laboratory practices compel DOT to investigate and levy appropriate fines.

Thank you for considering this request. Please contact us if we can be of further assistance.

Sincerely,

Deborah Dubow Press
Associate General Counsel
Phone: 202-717-8675
Email: dpress@pcrm.org

Ryan Merkley
Director of Research Advocacy
Phone: 202-527-7336
Email: rmerkley@pcrm.org

**Enclosures:**
1. Emails Between Neuralink and UC Davis
2. "Animal 13" Selected Records
3. "Animal 11" Selected Records

[19] U.S. Department of Transportation, Pipeline and Hazardous Material Safety Administration. (n.d.). *Transporting Infectious Substances Safely*. https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/Transporting-Infectious-Substances-Safely.pdf
[20] 49 C.F.R. § 172.704.
[21] [Redacted] (personal communication, April 2, 2019).
[22] 49 C.F.R. § 171.1(g).
[23] Ibid.

# Enclosure 1

Emails Between Neuralink and UC Davis

**From:** [redacted] <[redacted]@neuralink.com>
**Sent:** Tuesday, April 02, 2019 3:55 PM PDT
**To:** [redacted] <[redacted]@ucdavis.edu>
**CC:** [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>
**Subject:** [CONFIDENTIAL] Re: Transport of biological substances
**Attachment(s):** "image002.gif","image003.gif","image004.png","image005.png"

Hi [redacted],

[redacted] (cc'd) is our Biosafety Officer: <[redacted]@neuralink.com> [redacted]
[redacted] (also cc'd) may better address your PI question: [redacted]@neuralink.com>

Best,
[redacted]
---
[redacted]@neuralink.com
[redacted]



On Tue, Apr 2, 2019 at 3:30 PM [redacted] <[redacted]@ucdavis.edu> wrote:

> Hi [redacted]-
>
> Can you please address [redacted]'s question.
>
> Thank you,
>
> [redacted]

---

**From:** [redacted]
**Sent:** Tuesday, April 2, 2019 3:20 PM
**To:** [redacted]
**Cc:** [redacted]
**Subject:** RE: Transport of biological substances

Hi [redacted]

I'm not sure who is signing these forms. Would you please let me know who from neuroalink is the Principle Investigator and who is the biosafety officer or Occupational Health Official please include there titles?

Cordially,

[redacted]

[redacted]

Occupational Health and Safety Officer

CNPRCWordmarkSig

Desk [redacted]

Cell [redacted]

[redacted]@ucdavis.edu

Think Safe, Act Safe, Be Safe

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**From:** [redacted] <[redacted]@ucdavis.edu>
**Sent:** Tuesday, April 02, 2019 2:52 PM
**To:** [redacted] <[redacted]@ucdavis.edu>
**Cc:** [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>
**Subject:** Fw: Transport of biological substances

Hi [redacted]-

These are the two BioHaz Acknowledgement forms I have on file for NRL. The form signed by [redacted] was initiated for plasma/serum samples for bioassays in Oct 2018. The form signed by [redacted] was initiated for where the explanted implant was being translocated off site on March 15, 2019.

To recap, for the first infected implant monkey ([redacted], necropsied on 3/4, the CNPRC was unaware explanted hardware was taken off site. For the second infected implant monkey ([redacted], necropsied on 3/15, [redacted] packaged the explanted device and [redacted] personally gave to [redacted] (DOT trained). For the third infected implant monkey ([redacted], [redacted] packaged and gave to [redacted] (DOT trained) for translocation offsite.

Email communication between [redacted] and [redacted] dating back to Jan 31, 2019 launched a conversation about NRL working on explanted devices in the [redacted] biosafety cabinet that evolved into making arrangements for on site biosafety cabinet training for [redacted] on 4/2/2019. I, [redacted] have impressed upon [redacted] the importance of translocating equipment and devices coming in contact with unfixed monkey tissues and the infectious risks posed to human health. Today (4/2), when [redacted] came on site to receive training for the [redacted] Biosafety cabinet, the three explanted devices had made their way back on site in an open box with no secondary container. Ultimately, we the Primate Center (PI: [redacted]) are at risk for this re-entrance of uncontained, monkey contaminated hardware since our [CNPRC] certified shippers packaged it for off site transport. This is an exposure to anyone coming in contact with the contaminated explanted hardware and we are making a big deal about this because we are concerned for human safety.

[redacted]

---

9am sounds good to me.

See you then!

-[redacted]

On Mon, Apr 1, 2019 at 3:07 PM [redacted] <[redacted]@neuralink.com> wrote:

> Hey [redacted],
>
> Would you be able to train [redacted] at 9am tomorrow? Then she can work in the cabinet from 10-1pm (maybe done even sooner).
>
> Thanks for your help!

[redacted]

---

[redacted]@neuralink.com

[redacted]



On Mon, Apr 1, 2019 at 10:08 AM [redacted] <[redacted]@ucdavis.edu> wrote:

> [redacted],
>
> Wonderful! Sometimes it takes a few days for it to update on my end, so I'm glad you sent the certificates.
>
> What time tomorrow are you planning on starting the procedure, and how long do you expect it to take?
>
> I can do the onsite training with you either today or tomorrow. Which do you prefer?
>
> Thanks,
>
> [redacted]
>
> On Mon, Apr 1, 2019 at 9:55 AM [redacted] <[redacted]@neuralink.com> wrote:
>
> > Hi all,
> >
> > Attached are the C of C. Please let me know if any questions.
> >
> > Thanks!
> >
> > [redacted]
> >
> > On Apr 1, 2019, at 8:14 AM, [redacted] [redacted]@neuralink.com> wrote:
> >
> > Hey [redacted],
> >
> > Hope you had a nice weekend. Sorry for not getting back to you on Friday -- we've still been working [redacted]'s schedule. Would Tuesday morning still work out? [redacted] has now completed the listed online trainings and is ready for the onsite training.
> >
> > UC Laboratory Safety Fundamentals
> >
> > Proper Handling of Materials at Biosafety Level 1
> >
> > UC Davis Biosafety Level 2 Online Training
> >
> > UC Davis Medical Waste Management
> >
> > UC Davis Bloodborne Pathogen Awareness
> >
> > Safe Use of Biological Safety Cabinets
> >
> > Thanks,
> >
> > [redacted]
> >
> > ---
> >
> > [redacted]@neuralink.com
> >
> > [redacted]
> >
> > 
> >
> > On Fri, Mar 29, 2019 at 9:22 AM [redacted] <[redacted]@neuralink.com> wrote:
> >
> > > Thank you [redacted]! We really appreciate your generosity in letting us borrow the cabinet.
> > >
> > > I'll have a better idea of date and time later today but of course please plan anything you need to, we will work around your schedule.
> > >
> > > -[redacted]
> > >
> > > ---
> > >
> > > [redacted]@neuralink.com
> > >
> > > [redacted]
> > >
> > > 
> > >
> > > On Fri, Mar 29, 2019 at 9:16 AM [redacted] <[redacted]@ucdavis.edu> wrote:
> > >
> > > > Dr. [redacted]'s group are planning on processing human samples in the hallway biosafety cabinet on Tuesday starting at ~2pm.
> > > >
> > > > On Thu, Mar 28, 2019 at 8:51 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > > >
> > > > > Great. [redacted] has been added to the LHAT.
> > > > >
> > > > > I will also need to go through lab-specific safety training as well before the procedures, but that shouldn't take long. We can stick to the relevant topics. I think we can get through the in-person lab-specific training in about an hour. This is on top of the training modules on lms.ucdavis.edu listed previously.
> > > > >
> > > > > Please let me know what day/time you would like to use the biosafety cabinet so I can make sure we don't have anything planned either.
> > > > >
> > > > > I just remembered about another group who might need the BSC -- They have been using it on-and-off for the past few weeks. Double-checking now.
> > > > >
> > > > > On Thu, Mar 28, 2019 at 8:33 PM [redacted] <[redacted]@neuralink.com> wrote:
> > > > >
> > > > > > Thanks for clarifying [redacted], [redacted] (cc'd) will be the only one participating. -[redacted]
> > > > > >
> > > > > > ---
> > > > > >
> > > > > > [redacted]@neuralink.com
> > > > > >
> > > > > > [redacted]
> > > > > >
> > > > > > 
> > > > > >
> > > > > > On Thu, Mar 28, 2019 at 8:21 PM [redacted] <[redacted]@ucdavis.edu> wrote:

If there is a chance someone will participate, they need to be added to the list. Whoever is NOT on the LHAT is unable to participate, meaning they will not be able to enter the hallway while procedures are happening in the biosafety cabinet.

Once you give me a finalized list, I can get them on the LHAT.

On Thu, Mar 28, 2019 at 6:39 PM [redacted] @neuralink.com> wrote:

> Awesome! Thanks for getting back to me so quickly. Is there a time that we have to keep to? We can remove Logan from the list. It will most likely be [redacted] or [redacted]
>
> [redacted]
>
> ---
>
> [redacted]@neuralink.com
>
> [redacted]
>
> CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.
>
> On Thu, Mar 28, 2019 at 6:36 PM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > [redacted] will be using it next on April 5th, so it is available next Monday/Tuesday.
> >
> > On Thu, Mar 28, 2019 at 6:29 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> >
> > > Hello [redacted],
> > >
> > > Yes, that is the correct set of training modules. Who will be participating? Does everyone have a TAF completed?
> > >
> > > [redacted] is also on our Roster, but the only training I see he completed was PPE: LHAT Safety Training on 11/28/18. Is he planning on doing any work in the biosafety cabinet?
> > >
> > > I have an email from Feb 8 with you asking about [redacted] doing the explants. Is he still the one? I am still unable to find him in the LHAT system. Is the TAF completed?
> > >
> > > Please ask them to attempt the modules ASAP. If one is unavailable for whatever reason, I will need to email out to fix the problem. It happens ~25% of the time, but usually takes a day to fix.
> > >
> > > There is another group using the BSCs next week, but I think he is planning for Thursday. I am confirming with him and his schedule to see if Mon/Tues is available.
> > >
> > > Thank you,
> > >
> > > [redacted]
> > >
> > > On Thu, Mar 28, 2019 at 5:23 PM [redacted] @neuralink.com> wrote:
> > >
> > > > Also, you have an estimate as to how long all the modules would take to complete? If I have the correct set, it should be:
> > > >
> > > > UC Laboratory Safety Fundamentals
> > > >
> > > > Proper Handling of Materials at Biosafety Level 1
> > > >
> > > > UC Davis Biosafety Level 2 Online Training
> > > >
> > > > UC Davis Medical Waste Management
> > > >
> > > > UC Davis Bloodborne Pathogen Awareness
> > > >
> > > > Safe Use of Biological Safety Cabinets
> > > >
> > > > Thanks again. [redacted]
> > > >
> > > > ---
> > > >
> > > > [redacted]@neuralink.com
> > > >
> > > > [redacted]
> > > >
> > > > CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.
> > > >
> > > > On Thu, Mar 28, 2019 at 5:06 PM [redacted] @neuralink.com> wrote:
> > > >
> > > > > Hey [redacted],
> > > > >
> > > > > Hope you're doing well. My team is finally ready to look at our explants. Are your biosafety cabinets still open to us? If so, is there any availability on Monday or Tuesday? I have a few team members in mind to start the initial analysis who already have TAFs. We can get them started on the LHAT as soon as I line up who can make it.
> > > > >
> > > > > Thank you,
> > > > >
> > > > > [redacted]
> > > > >
> > > > > ---
> > > > >
> > > > > [redacted]@neuralink.com
> > > > >
> > > > > [redacted]
> > > > >
> > > > > CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.
> > > > >
> > > > > On Mon, Feb 4, 2019 at 1:34 PM [redacted] @neuralink.com> wrote:
> > > > >
> > > > > > [redacted] handles our TAF but we they haven't completed their TAFs yet. Will get back to you as soon as we get things going. Thanks again [redacted]
> > > > > >
> > > > > > On Fri, Feb 1, 2019 at 8:54 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > > > > >
> > > > > > > As long as their TAF is completed, they can do the online training. Who handles your group's TAFs? (Temporary Affiliate Form, its what gives you an @ucdavis.edu email address, a Kerberos account, and allows you to get onto occupational health and lms.ucdavis.edu )

**UC Davis**

ucdavis.edu

UC Davis is one of the world's leading cross-disciplinary research and teaching institutions, located in Davis, California. Check out our latest videos and news.

On Fri, Feb 1, 2019 at 6:34 PM [redacted] <[redacted]@neuralink.com> wrote:

> Thanks [redacted]! The people we have in mind to do the testing aren't cleared to be at the CNPRC yet. Would they be able to get started on the training before they're cleared?
>
> -[redacted]
>
> ---
>
> [redacted]@neuralink.com
>
> [redacted]
>
> CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.
>
> On Fri, Feb 1, 2019 at 12:48 PM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > Yes, anyone who uses the biosafety cabinet will need to be safety trained and added to our LHAT. Please let me know the names + emails of those using it, and I can send them a list of training modules to take.
> >
> > Cheers,
> >
> > [redacted]
> >
> > On Thu, Jan 31, 2019 at 3:15 PM [redacted] <[redacted]@neuralink.com> wrote:
> >
> > > That sounds perfect! Will we need lab safety training to use those cabinets? I won't be at the Primate Center tomorrow but will be next Wednesday, 2/6, I'll catch you then -- it's not urgent. Thanks [redacted]! -[redacted]
> > >
> > > ---
> > >
> > > [redacted]@neuralink.com
> > >
> > > [redacted]
> > >
> > > CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.
> > >
> > > On Thu, Jan 31, 2019 at 3:08 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > >
> > > > We have biosafety cabinets that can be used. Will you be around tomorrow morning? I can show you. Unfortunately it's pretty small, but it will work.
> > > >
> > > > On Thu, Jan 31, 2019, 15:00 [redacted] <[redacted]@neuralink.com wrote:
> > > >
> > > > > Hi [redacted],
> > > > >
> > > > > Thanks again for all your help with the robot move! I meant to ask when I saw you today but it slipped my mind:
> > > > >
> > > > > Would we be be able to do testing on non-sterilized explanted devices in the lab area? If not, do you know if there are any spaces at the Primate Center where we can? Would I talk to [redacted] about this?
> > > > >
> > > > > We'd like to do electrical assessments of our devices that sterilization may interfere with. We don't need any equipment outside of what we'd be bringing with us. It'd be great if we were able to take advantage of the resources the Primate Center has for exposure incidents.
> > > > >
> > > > > With appreciation,
> > > > >
> > > > > [redacted]
> > > > >
> > > > > ---
> > > > >
> > > > > [redacted]@neuralink.com
> > > > >
> > > > > [redacted]
> > > > >
> > > > > CONFIDENTIALITY NOTICE: The contents of this email message and any attachments are intended solely for the addressee(s) and may contain confidential and/or privileged information that may be legally protected from disclosure. If you are not the intended recipient of this message, promptly delete, and immediately notify the sender.

---

**From:** [redacted]
**Sent:** Wednesday, March 13, 2019 4:47 PM
**To:** [redacted]; [redacted]; [redacted]
**Cc:** [redacted]; [redacted]; [redacted]; [redacted]; Sympa List
**Subject:** Transport of biological substances

Hi [redacted],

Following up to our phone conversation, I wanted to capture the information we have on file in an email for where NRL is approved to translocate monkey (Herpes B contaminated) tissues. The only Biohazard Notice & Acknowledgement form we have is when I was coordinating (with [redacted]'s help) the shipment of monkey serum and plasma to [redacted] at the [redacted] location in October 2018.

Over the phone, you mentioned that the explanted hardware from [redacted] ([redacted]) was packaged by [redacted] and translocated off site to a NRL location. [redacted] has provided the training link (see below) to distribute to your personnel to allow translocation of hazardous material off site from the Primate Center. Packaging of hazardous material (e.g. monkey contaminated hardware) needs to be performed by a trained hazardous material handler along with a completed Biohazard Notice & Acknowledgement form. The form ensures that the Biosafety Officer at your institution is aware of the arrival of hazardous materials and is equipped with a BSL level 2 lab.

If you, [redacted], others? have not completed the hazardous material handler training, we (shipping trained CNPRC personnel) are always happy to package and ship the hazardous material to your desired location provided the Biosafety Officer at your institution is aware of the shipment. Since the hardware components of the explanted neural device are not sealed and it was not disinfected prior to leaving the Primate Center, this presents a hazard for *anyone* potentially coming in contact with the device. Simply labeling it "hazardous" doesn't account for the risk of potentially contracting Herpes B. [redacted] including loaned equipment being brought to the Primate Center.

I'm sure NRL is interested in taking the explanted hardware from [redacted] ([redacted]) this Friday (3/15) off site. If so, please fill out the blank Biohazard Notice & Acknowledgement form and

indicate where the explanted neural components are being sent.

Thank you,

[redacted]

---

**From:** [redacted] <[redacted]@neuralink.com>
**Sent:** Wednesday, January 16, 2019 10:47 AM
**To:** [redacted]
**Cc:** [redacted]
**Subject:** [CONFIDENTIAL] Re: Transport of biological substances

Hi [redacted],

Thank you for bringing this to our attention. I will make sure the appropriate personnelle from my team completes the training. Please let me know if there's anything else.

Thanks,

[redacted]

---
[redacted]@neuralink.com
[redacted]
Excuse the brevity, I'm mobile!

On Wed, Jan 16, 2019, 10:39 AM [redacted] <[redacted]@ucdavis.edu> wrote:

> Hi [redacted] and [redacted]:
>
> We were discussing the transport of biohazardous materials today and I learned CNPRC provides support in packaging the research materials to meet IATA and DOT guidelines for shipping hazardous materials but the box may be transported in personal vehicles not shipped by a vendor. You may have already provided hazardous goods shipping training to the staff that transport the packages but if not, I wanted to let you know that DOT and California code of regulations requires all staff involved in the packaging and transport of hazardous material be trained hazardous material handlers. Fines for untrained shippers transporting materials can be significant, up to $5,000 per infraction. Training is good for two years and can be completed online. One of the better resources for training is https://shop.saftpak.com/collections/training-products-global-excluding-u-k/products/shipping-category-b-biological-substance-and-related-materials-training-course
>
> Cordially,
>
> [redacted]
>
> [redacted]
>
> Occupational Health and Safety Officer
>
> CNPRCWordmarkSig
>
> Desk [redacted]
>
> Cell [redacted]
>
> [redacted]@ucdavis.edu
>
> Think Safe, Act Safe, Be Safe

[redacted] <[redacted]@neuralink.com>

Reply all

Tue 10/2/2018, 12:09 AM

[redacted]@neuralink.com>

Inbox

tissue_biohazard_ackno...
5 MB

Download Save to OneDrive - UC Davis

Hi [redacted],

Sorry for the short notice; would it be possible to send one vial of each NHP serum and plasma to the below address to arrive by Wed evening or Thur morning at the latest? In addition, can we have [redacted]'s serum and plasma shipped as well? With the 10 NHP controls and [redacted]s, that should come out to 22 vials with ~0.5 ml of fluid, correct?

[redacted]

All relevant parties have been informed of the macaque tissue biohazard; we've worked out a plan with our biosafety officer to accept the samples at our location. Please find the signed acknowledgement attached.

[redacted]

**From:** [redacted] <[redacted]@neuralink.com>
**Sent:** Tuesday, April 02, 2019 4:12 PM PDT
**To:** [redacted] <[redacted]@ucdavis.edu>
**CC:** [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>
**Subject:** Re: [CONFIDENTIAL] Re: Transport of biological substances

[redacted] is our safety officer: [redacted] <[redacted]@neuralink.com>

---

[redacted]@neuralink.com

[redacted]



On Tue, Apr 2, 2019 at 4:05 PM [redacted] <[redacted]@ucdavis.edu> wrote:

> [redacted] only signed one of the forms who is [redacted]?
>
> [redacted]
>
> [redacted]
>
> Occupational Health and Safety Officer
>
> UCDAVIS
> CALIFORNIA NATIONAL
> PRIMATE RESEARCH CENTER
>
> Desk [redacted]
>
> Cell [redacted]
>
> [redacted]@ucdavis.edu
>
> Think Safe, Act Safe, Be Safe
>
> **From:** [redacted] <[redacted]@neuralink.com>
> **Sent:** Tuesday, April 02, 2019 3:56 PM
> **To:** [redacted] <[redacted]@ucdavis.edu>
> **Cc:** [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>
> **Subject:** [CONFIDENTIAL] Re: Transport of biological substances
>
> Hi[redacted],
>
> [redacted] (cc'd) is our Biosafety Officer: <[redacted]@neuralink.com>[redacted]
>
> [redacted] (also cc'd) may better address your PI question: <[redacted]@neuralink.com>
>
> Best,
>
> [redacted]
>
> ---
>
> [redacted]@neuralink.com
>
> [redacted]
>
> 
>
> On Tue, Apr 2, 2019 at 3:30 PM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > Hi[redacted],
> > Can you please address [redacted]'s question.
> > Thank you,
> > [redacted]
> >
> > ---
> >
> > **From:** [redacted]
> > **Sent:** Tuesday, April 2, 2019 3:20 PM
> > **To:** [redacted]
> > **Cc:** [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]; [redacted]
> > **Subject:** RE: Transport of biological substances
> >
> > Hi[redacted],
> >
> > I'm not sure who is signing these forms. Would you please let me know who from neuroalink is the Principle Investigator and who is the biosafety officer or Occupational Health Official please include there titles?
> >
> > Cordially,
> >
> > [redacted]
> >
> > [redacted]
> >
> > Occupational Health and Safety Officer
> >
> > CNPRCWordmarkSig
> >
> > Desk [redacted]
> >
> > Cell [redacted]
> >
> > [redacted]@ucdavis.edu
> >
> > Think Safe, Act Safe, Be Safe

**From:** [redacted] <[redacted]@ucdavis.edu>
**Sent:** Tuesday, April 02, 2019 2:52 PM
**To:** [redacted] <[redacted]@ucdavis.edu>
**Cc:** [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@UCDAVIS.EDU>; [redacted] <[redacted]@ucdavis.edu>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>; [redacted] <[redacted]@neuralink.com>
**Subject:** Fw: Transport of biological substances

Hi [redacted]-

These are the two BioHaz Acknowledgement forms I have on file for NRL. The form signed by [redacted] was initiated for plasma/serum samples for bioassays in Oct 2018. The form signed by [redacted] was initiated for where the explanted implant was being translocated off site on March 15, 2019.

To recap, for the first infected implant monkey ([redacted]) necropsied on 3/4, the CNPRC was unaware explanted hardware was taken off site. For the second infected implant monkey ([redacted]) necropsied on 3/15, [redacted] packaged the explanted device and [redacted] personally gave to [redacted] (DOT trained). For the third infected implant monkey ([redacted]), [redacted] packaged and gave to [redacted] (DOT trained) for translocation offsite.

Email communication between [redacted] and [redacted] dating back to Jan 31, 2019 launched a conversation about NRL working on explanted devices in the [redacted] biosafety cabinet that evolved into making arrangements for on site biosafety cabinet training for [redacted] on 4/2/2019. I, [redacted] have impressed upon [redacted] the importance of translocating equipment and devices coming in contact with unfixed monkey tissues and the infectious risks posed to human health. Today (4/2), when [redacted] came on site to receive training for the [redacted] Biosafety cabinet, the three explanted devices had made their way back on site in an open box with no secondary container. Ultimately, we the Primate Center (PI: [redacted]) are at risk for this re-entrance of uncontained, monkey contaminated hardware since our [CNPRC] certified shippers packaged it for off site transport. This is an exposure to anyone coming in contact with the contaminated explanted hardware and we are making a big deal about this because we are concerned for human safety.

[redacted]

---

9am sounds good to me.

See you then!

-[redacted]

On Mon, Apr 1, 2019 at 3:07 PM [redacted] <[redacted]@neuralink.com> wrote:

> Hey[redacted]
>
> Would you be able to train [redacted] at 9am tomorrow? Then she can work in the cabinet from 10-1pm (maybe done even sooner).
>
> Thanks for your help!
>
> [redacted]
>
> ---
>
> [redacted]@neuralink.com
>
> [redacted]
>
> 
>
> On Mon, Apr 1, 2019 at 10:08 AM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > [redacted],
> >
> > Wonderful! Sometimes it takes a few days for it to update on my end, so I'm glad you sent the certificates.
> >
> > What time tomorrow are you planning on starting the procedure, and how long do you expect it to take?
> >
> > I can do the onsite training with you either today or tomorrow. Which do you prefer?
> >
> > Thanks,
> >
> > [redacted]
> >
> > On Mon, Apr 1, 2019 at 9:55 AM [redacted] <[redacted]@neuralink.com> wrote:
> >
> > > Hi all,
> > >
> > > Attached are the C of C. Please let me know if any questions.
> > >
> > > Thanks!
> > >
> > > [redacted]
> > >
> > > > On Apr 1, 2019, at 8:14 AM, [redacted] <[redacted]@neuralink.com> wrote:
> > > >
> > > > Hey[redacted],
> > > >
> > > > Hope you had a nice weekend. Sorry for not getting back to you on Friday -- we've still been working [redacted]'s schedule. Would Tuesday morning still work out? [redacted] has now completed the listed online trainings and is ready for the onsite training.
> > > >
> > > > UC Laboratory Safety Fundamentals
> > > >
> > > > Proper Handling of Materials at Biosafety Level 1
> > > >
> > > > UC Davis Biosafety Level 2 Online Training
> > > >
> > > > UC Davis Medical Waste Management
> > > >
> > > > UC Davis Bloodborne Pathogen Awareness
> > > >
> > > > Safe Use of Biological Safety Cabinets
> > > >
> > > > Thanks,
> > > >
> > > > [redacted]
> > > >
> > > > ---
> > > >
> > > > [redacted]@neuralink.com
> > > >
> > > > [redacted]
> > > >
> > > > 
> > > >
> > > > On Fri, Mar 29, 2019 at 9:22 AM [redacted] <[redacted]@neuralink.com> wrote:
> > > >
> > > > > Thank you [redacted]! We really appreciate your generosity in letting us borrow the cabinet.
> > > > >
> > > > > I'll have a better idea of date and time later today but of course please plan anything you need to, we will work around your schedule.
> > > > >
> > > > > -[redacted]

---

[redacted]@neuralink.com

[redacted]



On Fri, Mar 29, 2019 at 9:16 AM [redacted] <[redacted]@ucdavis.edu> wrote:

> Dr. [redacted]'s group are planning on processing human samples in the hallway biosafety cabinet on Tuesday starting at ~2pm.
>
> On Thu, Mar 28, 2019 at 8:51 PM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > Great. [redacted] has been added to the LHAT.
> >
> > I will also need to go through lab-specific safety training as well before the procedures, but that shouldn't take long. We can stick to the relevant topics. I think we can get through the in-person lab-specific training in about an hour. This is on top of the training modules on lms.ucdavis.edu listed previously.
> >
> > Please let me know what day/time you would like to use the biosafety cabinet so I can make sure we don't have anything planned either.
> >
> > I just remembered about another group who might need the BSC -- They have been using it on-and-off for the past few weeks. Double-checking now.
> >
> > On Thu, Mar 28, 2019 at 8:33 PM [redacted] <[redacted]@neuralink.com> wrote:
> >
> > > Thanks for clarifying [redacted] (cc'd) will be the only one participating. -[redacted]
> > >
> > > ---
> > >
> > > [redacted]@neuralink.com
> > >
> > > [redacted]
> > >
> > > 
> > >
> > > On Thu, Mar 28, 2019 at 8:21 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > >
> > > > If there is a chance someone will participate, they need to be added to the list. Whoever is NOT on the LHAT is unable to participate, meaning they will not be able to enter the hallway while procedures are happening in the biosafety cabinet.
> > > >
> > > > Once you give me a finalized list, I can get them on the LHAT.
> > > >
> > > > On Thu, Mar 28, 2019 at 6:39 PM [redacted] <[redacted]@neuralink.com> wrote:
> > > >
> > > > > Awesome! Thanks for getting back to me so quickly. Is there a time that we have to keep to? We can remove Logan from the list. It will most likely be [redacted] or [redacted]
> > > > >
> > > > > -[redacted]
> > > > >
> > > > > ---
> > > > >
> > > > > [redacted]@neuralink.com
> > > > >
> > > > > [redacted]
> > > > >
> > > > > 
> > > > >
> > > > > On Thu, Mar 28, 2019 at 6:36 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > > > >
> > > > > > [redacted] will be using it next on April 5th, so it is available next Monday/Tuesday.
> > > > > >
> > > > > > On Thu, Mar 28, 2019 at 6:29 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > > > > >
> > > > > > > Hello [redacted]
> > > > > > >
> > > > > > > Yes, that is the correct set of training modules. Who will be participating? Does everyone have a TAF completed?
> > > > > > >
> > > > > > > [redacted] is also on our Roster, but the only training I see he completed was PPE: LHAT Safety Training on 11/28/18. Is he planning on doing any work in the biosafety cabinet?
> > > > > > >
> > > > > > > I have an email from Feb 8 with you asking about [redacted] doing the explants. Is he still the one? I am still unable to find him in the LHAT system. Is the TAF completed?
> > > > > > >
> > > > > > > Please ask them to attempt the modules ASAP. If one is unavailable for whatever reason, I will need to email out to fix the problem. It happens ~25% of the time, but usually takes a day to fix.
> > > > > > >
> > > > > > > There is another group using the BSCs next week, but I think he is planning for Thursday. I am confirming with him and his schedule to see if Mon/Tues is available.
> > > > > > >
> > > > > > > Thank you,
> > > > > > >
> > > > > > > [redacted]
> > > > > > >
> > > > > > > On Thu, Mar 28, 2019 at 5:23 PM [redacted] <[redacted]@neuralink.com> wrote:
> > > > > > >
> > > > > > > > Also, you have an estimate as to how long all the modules would take to complete? If I have the correct set, it should be:
> > > > > > > >
> > > > > > > > UC Laboratory Safety Fundamentals
> > > > > > > >
> > > > > > > > Proper Handling of Materials at Biosafety Level 1
> > > > > > > >
> > > > > > > > UC Davis Biosafety Level 2 Online Training
> > > > > > > >
> > > > > > > > UC Davis Medical Waste Management
> > > > > > > >
> > > > > > > > UC Davis Bloodborne Pathogen Awareness
> > > > > > > >
> > > > > > > > Safe Use of Biological Safety Cabinets
> > > > > > > >
> > > > > > > > Thanks again. [redacted]
> > > > > > > >
> > > > > > > > ---
> > > > > > > >
> > > > > > > > [redacted]@neuralink.com
> > > > > > > >
> > > > > > > > [redacted]
> > > > > > > >
> > > > > > > > 
> > > > > > > >
> > > > > > > > On Thu, Mar 28, 2019 at 5:06 PM [redacted] <[redacted]@neuralink.com> wrote:
> > > > > > > >
> > > > > > > > > Hey [redacted]!
```
```

Hope you're doing well. My team is finally ready to look at our explants. Are your biosafety cabinets still open to us? If so, is there any availability on Monday or Tuesday? I have a few team members in mind to start the initial analysis who already have TAFs. We can get them started on the LHAT as soon as I line up who can make it.

Thank you,

[redacted]

---

[redacted]@neuralink.com

[redacted]



On Mon, Feb 4, 2019 at 1:34 PM [redacted] <[redacted]@neuralink.com> wrote:

> [redacted] handles our TAF but we they haven't completed their TAFs yet. Will get back to you as soon as we get things going. Thanks again [redacted]! [redacted]
>
> On Fri, Feb 1, 2019 at 8:54 PM [redacted] <[redacted]@ucdavis.edu> wrote:
>
> > As long as their TAF is completed, they can do the online training. Who handles your group's TAFs? (Temporary Affiliate Form, its what gives you an @ucdavis.edu email address, a Kerberos account, and allows you to get onto occupational health and lms.ucdavis.edu )
> >
> > UC Davis
> >
> > ucdavis.edu
> >
> > UC Davis is one of the world's leading cross-disciplinary research and teaching institutions, located in Davis, California. Check out our latest videos and news.
> >
> > On Fri, Feb 1, 2019 at 6:34 PM [redacted] <[redacted]@neuralink.com> wrote:
> >
> > > Thanks [redacted]! The people we have in mind to do the testing aren't cleared to be at the CNPRC yet. Would they be able to get started on the training before they're cleared?
> > >
> > > - [redacted]
> > >
> > > ---
> > >
> > > [redacted]@neuralink.com
> > >
> > > [redacted]
> > >
> > > 
> > >
> > > On Fri, Feb 1, 2019 at 12:48 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > >
> > > > Yes, anyone who uses the biosafety cabinet will need to be safety trained and added to our LHAT. Please let me know the names + emails of those using it, and I can send them a list of training modules to take.
> > > >
> > > > Cheers,
> > > >
> > > > [redacted]
> > > >
> > > > On Thu, Jan 31, 2019 at 3:15 PM [redacted] <[redacted]@neuralink.com> wrote:
> > > >
> > > > > That sounds perfect! Will we need lab safety training to use those cabinets? I won't be at the Primate Center tomorrow but will be next Wednesday, 2/6, I'll catch you then -- it's not urgent. Thanks [redacted]! [redacted]
> > > > >
> > > > > ---
> > > > >
> > > > > [redacted]@neuralink.com
> > > > >
> > > > > [redacted]
> > > > >
> > > > > 
> > > > >
> > > > > On Thu, Jan 31, 2019 at 3:08 PM [redacted] <[redacted]@ucdavis.edu> wrote:
> > > > >
> > > > > > We have biosafety cabinets that can be used. Will you be around tomorrow morning? I can show you. Unfortunately it's pretty small, but it will work.
> > > > > >
> > > > > > On Thu, Jan 31, 2019, 15:00 [redacted] <[redacted]@neuralink.com> wrote:
> > > > > >
> > > > > > > Hi [redacted],
> > > > > > >
> > > > > > > Thanks again for all your help with the robot move! I meant to ask when I saw you today but it slipped my mind:
> > > > > > >
> > > > > > > Would we be be able to do testing on non-sterilized explanted devices in the lab area? If not, do you know if there are any spaces at the Primate Center where we can? Would I talk to [redacted] about this?
> > > > > > >
> > > > > > > We'd like to do electrical assessments of our devices that sterilization may interfere with. We don't need any equipment outside of what we'd be bringing with us. It'd be great if we were able to take advantage of the resources the Primate Center has for exposure incidents.
> > > > > > >
> > > > > > > With appreciation,
> > > > > > >
> > > > > > > [redacted]
> > > > > > >
> > > > > > > ---
> > > > > > >
> > > > > > > [redacted]@neuralink.com
> > > > > > >
> > > > > > > [redacted]
> > > > > > >
> > > > > > > 

**From:** [redacted]

**Sent:** Wednesday, March 13, 2019 4:47 PM
**To:** [redacted]
**Cc:** [redacted] Sympa List
**Subject:** Transport of biological substances

Hi [redacted]

Following up to our phone conversation, I wanted to capture the information we have on file in an email for where NRL is approved to translocate monkey (Herpes B contaminated) tissues. The only Biohazard Notice & Acknowledgement form we have is when I was coordinating (with [redacted]'s help) the shipment of monkey serum and plasma to [redacted] at the [redacted] location in October 2018.

Over the phone, you mentioned that the explanted hardware from [redacted] ([redacted]) was packaged by [redacted] and translocated off site to a NRL location. [redacted] has provided the training link (see below) to distribute to your personnel to allow translocation of hazardous material off site from the Primate Center. Packaging of hazardous material (e.g. monkey contaminated hardware) needs to be performed by a trained hazardous material handler along with a completed Biohazard Notice & Acknowledgement form. The form ensures that the Biosafety Officer at your institution is aware of the arrival of hazardous materials and is equipped with a BSL level 2 lab.

If you, [redacted], others? have not completed the hazardous material handler training, we (shipping trained CNPRC personnel) are always happy to package and ship the hazardous material to your desired location provided the Biosafety Officer at your institution is aware of the shipment. Since the hardware components of the explanted neural device are not sealed and it was not disinfected prior to leaving the Primate Center, this presents a hazard for *anyone* potentially coming in contact with the device. Simply labeling it "hazardous" doesn't account for the risk of potentially contracting Herpes B. [redacted], including loaned equipment being brought to the Primate Center.

I'm sure NRL is interested in taking the explanted hardware from [redacted] ([redacted]) this Friday (3/15) off site. If so, please fill out the blank Biohazard Notice & Acknowledgement form and indicate where the explanted neural components are being sent.

Thank you,

[redacted]

---

**From:** [redacted] <[redacted]@neuralink.com>
**Sent:** Wednesday, January 16, 2019 10:47 AM
**To:** [redacted]
**Cc:** [redacted]
**Subject:** [CONFIDENTIAL] Re: Transport of biological substances

Hi [redacted],

Thank you for bringing this to our attention. I will make sure the appropriate personnelle from my team completes the training. Please let me know if there's anything else.

Thanks,

[redacted]

---
[redacted]@neuralink.com
[redacted]
Excuse the brevity, I'm mobile!

On Wed, Jan 16, 2019, 10:39 AM [redacted] <[redacted]@ucdavis.edu wrote:

> Hi [redacted] and [redacted]
>
> We were discussing the transport of biohazardous materials today and I learned CNPRC provides support in packaging the research materials to meet IATA and DOT guidelines for shipping hazardous materials but the box may be transported in personal vehicles not shipped by a vendor. You may have already provided hazardous goods shipping training to the staff that transport the packages but if not, I wanted to let you know that DOT and California code of regulations requires all staff involved in the packaging and transport of hazardous material be trained hazardous material handlers. Fines for untrained shippers transporting materials can be significant, up to $5,000 per infraction. Training is good for two years and can be completed online. One of the better resources for training is https://shop.saftpak.com/collections/training-products-global-excluding-u-k/products/shipping-category-b-biological-substance-and-related-materials-training-course
>
> Cordially,
>
> [redacted]
>
> [redacted]
>
> Occupational Health and Safety Officer
>
> **Error! Filename not specified.**
>
> **Error! Filename not specified.**Error! Filename not specified.
>
> Desk [redacted]
>
> Cell [redacted]
>
> [redacted]@ucdavis.edu
>
> Think Safe, Act Safe, Be Safe

# Enclosure 2

"Animal 13" Selected Records

351-359

☐ VIRAL PRECAUTION

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

NX

B259 / NRL02
I.D. PROJECT CODE

MMU [redacted]
ANIMAL I.D.

/ [redacted]
INVESTIGATOR REQUESTOR

3 / 4 / 19
DATE OF SAMPLE

ANIMAL DATA: ____ - ____
ROOM CAGE

F
SEX

____ YR ____ MO ____ KG
AGE WEIGHT

PROCEDURE IS: ____ DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA

HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:
(1) left under insertion cap(IC)
(2) Left SQ

SOURCE OF SPECIMEN(S)
(3) left under IC scar tissue
(4) Right frontal brain SQ
(5) right brain under IC
(6) R anterior port
(7) R bone under pill back
(8) R SQ under pill cover
(9) R Brain under IC

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| X AEROBIC | | |
| X ANAEROBIC 1-8 | //////// | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 3/5 (9): 1+ STAPH coagulase positive, 1+ Klebsiella pneumonia
2. 3/6 (8): 1+ STAPH Coagulase positive, Few colonies Klebsiella pneumoniae
3. 3/6 (7): Few colonies Klebsiella pneumoniae
4. 3/6 (6): 1+ STAPH coagulase positive, Few staph Coagulase Negative
5. 3/6 (5): 1 colony Klebsiella pneumoniae, 2 colonies STAPH coagulase Negative
6. 3/6 (4): 1+ STAPH Coagulase positive, 1+ staph Coagulase Neg, Few Klebsiella pneumo.
7. 3/6 (3): Few colonies Staph coagulase positive, 1+ Corynebacterium ulceran
8. 3/6 (2): 1+ STAPH Coagulase positive, 1+ Corynebacterium ulcerans

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 3/7/19

CLINICAL MICROBIOLOGY

2/2014

351

☐ VIRAL PRECAUTION

B259, NRL02
I.D. PROJECT CODE

CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

NX

mmu [redacted]
ANIMAL I.D.

/ [redacted]
INVESTIGATOR REQUESTOR

3/4/19
DATE OF SAMPLE

ANIMAL DATA: ____ - ____
ROOM CAGE

F ____ ____ ____
SEX AGE WEIGHT
YR MO KG

PROCEDURE IS: ____ DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA

HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S): ① left under (IC) Insertion Cap

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☒ AEROBIC | | |
| ☒ ANAEROBIC | ✓ | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 3/6 ①: 2colonies Corynebacterium ulcerans
2.
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 3/7/19

CLINICAL MICROBIOLOGY

327-328

DEAD

# CALIFORNIA PRIMATE RESEARCH CENTER

## MICROBIOLOGY

☐ VIRAL PRECAUTION

BZ59 / NRL02
I.D. PROJECT CODE

[redacted]
ANIMAL I.D.

[redacted]
INVESTIGATOR REQUESTOR

2 / 28 / 19
DATE OF SAMPLE

ANIMAL DATA: [redacted]
ROOM CAGE

F SEX | 6 YR 9 MO AGE | 7.5 KG WEIGHT

PROCEDURE IS: ✓ DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA
Abscess - implant

HOSPITALIZED NO ☒ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S) ① deep purulence ② superficial

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☒ AEROBIC | ✓ | |
| ☒ ANAEROBIC | ✓ | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 3/5 ① 2+ STAph Coagulase positive
2. 3/5 ② 1+ STAph Coagulase positive
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | S | S | S | | S | | S |
| 2 | | I | S | S | S | | S | | S |

REPORTED BY: [redacted]

REPORT DATE: 3/5/19

CLINICAL MICROBIOLOGY

2/2014

1020

DEAD

CALIFORNIA PRIMATE RESEARCH CENTER

# MISCELLANEOUS

☐ VIRAL PRECAUTION

B259, NRL02
I.D. PROJECT CODE

[redacted]
INVESTIGATOR REQUESTOR

[redacted]
ANIMAL I.D.

2 , 28 , 19
DATE OF SAMPLE

ANIMAL DATA: [redacted]
ROOM CAGE

F 6 YR 9 MO 7.5 KG
SEX AGE WEIGHT

PROCEDURE IS: X DIAGNOSTIC AID: _____ COLONY MANAGEMENT: _____ EXPERIMENTAL: _____

CLINICAL SIGNS / PROBLEMS:

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

HOSPITALIZED NO ☒ YES ☒ ① _____ - _____
ROOM CAGE

BLEEDING CONDITIONS: ☐ Squeezed – limb pulled ☐ Caught on run ☐ Fasted _____hrs ☐ Anesthetized ☐ Other_____

PROCEDURE(S) REQUESTED: cyto + gram stain - 4 slides submitted.

SPECIMEN: Head implant - swabbed purulence on slides.

RESULTS

Cytology - Large numbers of degenerate and non-degenerate neutrophils were mixed with cellular debris.
Gram's stain: A few neutrophils contained small gram positive coccoid bacteria. Short chains of similar bacteria were also found in the extracellular fluid.

① [redacted] 2/28/19

MISCELLANEOUS

☐ VIRAL PRECAUTION 188

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

B259 / DRL02
I.D. PROJECT CODE

[redacted]
INVESTIGATOR REQUESTOR

MMu [redacted]
ANIMAL I.D.

2 / 1 / 19
DATE OF SAMPLE

ANIMAL DATA: [redacted]
ROOM CAGE

F
SEX

6 YR 8 MO
AGE

6.7 KG
WEIGHT

PROCEDURE IS: X DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA
Discharge around head implant
HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S) discharge

| CULTURES REQUESTED | NEGATIVE RESULT: NEGATIVE | NEGATIVE RESULT: NO GROWTH |
|---|---|---|
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | ✓ | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☒ AEROBIC | | ✓ |
| ☒ ANAEROBIC | | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 2/6 4+ Enterobacter cloacae
2. 2/6 4+ E. coli
3. 2/7 4+ STAPH coagulase Negative
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | S | R | | S | S | S | | S | |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 2/7/19

CLINICAL MICROBIOLOGY

2/2014

CALIFORNIA PRIMATE RESEARCH CENTER

# INTERVENTION / SURGERY

| PROJECT: | ANIMAL SP ID# MMU | DATE OF EVENT MO DAY YR |
|---|---|---|
| NRL02 | [redacted] | 10 22 18 |

| | | |
|---|---|---|
| PROCEDURE: Cranial Implant | ROOM: [redacted] | AGE: 6y 4m |
| INVESTIGATOR: [redacted] | CAGE: [redacted] | SEX: F |
| REQUESTOR: [redacted] | W/O: 3210 | WT: 7.00 kg |

**Circle one: Experimental (XI) / Colony (SN)**

| SNOMED CODES | CODED BY:cm | SNOMED TERMS |
|---|---|---|
| T-10101 | P-yy444 | Craniotomy |
| T-10101 | P-1000 | Surgical Incision |
| T-X2070, T-X2080 | P-Y8971 | L/R Recording Device Implantation |
| T-X2070, T-X2080 | P-YY041 | L/R Electrophysiology Readings |
| T-10101 | P-1640 | Surgical closure |

DESCRIPTION OF PROCEDURES PERFORMED

Procedure: Electrode insertion survivability study

Animal prepared for surgery in normal manner. Once sedated thoroughly on isoflurane, fentanyl and propofol, the animal's head was placed into the stereotaxic frame. The head was sterilely prepped. Midline incision made approximately 6cm in length. Fascia incised and temporalis muscle elevated bilaterally from temporal ridges. Fifteen millimeters anterolateral to bregma, burr holes were made bilaterally using a cranial perforator. Exposed dura was incised and reflected anteriorly. Electrode implants were placed using investigational robotics. Gelfoam and titanium plate were used to seal burr hole. This process was repeated on the right hemisphere. Two separate stab incisions were made 1.5cm off midline in the posterior portion of the exposure and transcutaneous ports were passed through the incision. The main midline incision was closed in an inverted, interrupted fashion using 3-0 vicryl in the fascia. The skin was closed using a running subcuticular stich using 4-0 monocryl. Electrophysiology was undertaken. Animal removed from stereotax and monitored.

Estimated blood loss: minimal (<2cc).

TIME IN: 8:50 am

TIME OUT: 2:24 pm

POST OPERATIVE CARE:

Hydromorphone TID Q4h x3 days
Buprenex SID (pm dose only) x3 days
Dexamethasone SID x7 days
Cefazolin BID x7 days
Omeprazole SID x7 days
Famotidine SID x3 days
Levetiracetam BID x7d

SURGEON: [redacted] ASSISTANT: [redacted] ANESTHETIST: [redacted]

*Animal Chart* *Data Entry* *Surgery* *Requestor Veterinarian*

Animal ID# [redacted]

**California National Primate Research Center**



| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/3/19 | | G | G | N | SO: BAR OPM: cranial implant infection | Mild- |
| | | | | | Mod. swelling around (L) implant. No | |
| | | | | | D/C Noted. Very Mild erythema present | |
| | | | | | Animal is Moving around cage well | |
| | | | | | and has good appetite. No Neurologic | |
| | | | | | deficits observed. NEPD | |
| | | | | | A: Apparently stable animal w/ cranial | |
| | | | | | implant inf. | |
| | | | | | P: CBC on ASAP Daily, cont tx as | |
| | | | | | planned. Nx scheduled 3/4. | [redacted] |
| **3/4/19** | | MMU [redacted] 0.8 MLS KET/D->NECROPSY W.O. 4852 NRL02 | | | | |
| | | WT: 6.96 CAGE TIME_____15MIN___30MIN___45MIN___1HR___1.25HR___1.5HR___1.75HR___2HR___ | | | | |



G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

Animal ID# [redacted] **California National Primate Research Center** Page # SS

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3-1-19 | | G | G | N | SO BAR, OP: implant infection: Animal Active with NEPO. mild Erythem and scabbing at implant noted. Animal stable. | [redacted] |
| 3/1/19 | | | | | -SO. Cytology (2/22) was inconclusive because it was contaminated w/ blood Dx Infected head implant Unable to P/O strep @ this time so elected to switch to clindamycin R/ cont ketoprofen & buprenorphine s/c bid euthanasia for project adoption 3/4 VMS & head implant daily | |

MMU [redacted] F
6yrs 9mos 7.50kg NRL02

**Cefazolin** 330 mg/mL
25.00 mg/kg Dose — 188 mg Total Dose

0.60 mLs Volume — IM Rte — BID Freq — 2 Days
Start 02-28-2019 — End 03-01-2019

Ended

6yrs 9mos 7.50kg NRL02

**Clindamycin** 150 mg/mL
12.50 mg/kg Dose — 94 mg Total Dose

0.60 mLs Volume — IM Rte — TID Freq — 3 Days
Start 03-01-2019 — End 03-03-2019

MMU [redacted] F
6yrs 9mos 7.50kg NRL02

**Simbadol** (Buprenorp
0.72 mg/kg Dose — 5.4 mg Total Dose

3.00 mLs Volume — SC Rte — Q3D Freq — 5 Days
Start 02-28-2019 — End 03-04-2019

Extended

MMU [redacted] F
6yrs 9mos 7.50kg NRL02

**Ketoprofen** 100 mg/mL
5.00 mg/kg Dose — 38 mg Total Dose

0.38 mLs Volume — IM Rte — SID Freq — 5 Days
Start 02-28-2019 — End 03-04-2019

[redacted] Printed
C-118958 Upd01MAR315:42 Prn01MAR315:42

MMU [redacted] F
6yrs 9mos 7.50kg NRL02

**Probiotic Sandwich**
1.00 sndwch/animal Dose — 1. sndwch Total Dose

1.00 sndwch Volume — PO Rte — BID Freq — 27 Days
Start 03-01-2019 — End 03-27-2019

| | | | | | | |
|---|---|---|---|---|---|---|
| 3/2/19 | | | | | SO: BAR (P) OP: Infected cranial implant Mod. erythema and swelling around (L) cranial implant. Mild amt of bloody d/c (Animal appeared to be picking). Moving around cage well, eagerly accepting treats. Pupils same size, NO uncoordination, No other (L) Neurological signs observed cage-side. A: Stable animal w/ cranial implant inf. P: CTM daily, assess comfort. Supportive care until NX 3/4. | |

① KC [redacted] 5/2/19

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

Animal ID# [redacted] California National Primate Research Center Page # 54

| Date | Weight (kg) | Appetite (G, F, P) ⊖ | Hydration (G, F, P) ⊖ | Stool (N, SS, L, B) ⊘ | Observations | Initials |
|---|---|---|---|---|---|---|
| 2/27/19 | | | | | P: GTM Reeval @ cleaning Cont to apply TAO or NZF puffer @ sedated cleaning | [redacted] |

2/ /19 MMU [redacted] LOCATION [redacted] 1.9 MLS KET

WT: 7.65 CAGE TIME 2:20 15MIN 3 30MIN ___ 45MIN ___ 1HR ___ 1.25HR ___ 1.5HR ___ 1.75HR ___ 2HR ___

MMU [redacted] F
6yrs 9mos 7.50kg NRL02

**Cefazolin** 330 mg/mL
25.00 mg/kg Dose — 188 mg Total Dose
0.60 mLs Volume — IM Rte — BID Freq — 7 Days
Start 02-28-2019 — End 03-06-2019

**Simbadol** (Buprenorp)
0.72 mg/kg Dose — 5.4 mg Total Dose
3.00 mLs Volume — SC Rte — Q3D Freq — 3 Days
Start 02-28-2019 — End 03-02-2019

**Ketoprofen** 100 mg/mL
5.00 mg/kg Dose — 38 mg Total Dose
0.38 mLs Volume — IM Rte — SID Freq — 3 Days
Start 02-28-2019 — End 03-02-2019

2/28/19

S: Received sedated. AARi Lab observed purulence from L implant, elected to move implant cleaning up. On initial assessment there was a small new draining tract rostro medial to the (L) implant. Expressed purulence from implant margin & draining tract - collected samples for culture & cytology. Pockets of purulence extended in a 4x5cm area, able to express >2 ml purulence. Flushed w/ large volume of NS. Consulted w/ lab staff & started antibiotics & analgesics. Gave 0.2 ml Dexmed/Ketamine IM & 0.2 ml Ketamine IV

A: Implant infection

P: Start tx, coordinate terminal project surgery within next week

Admit ⊘ Prob. Sheet ⊘

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

Animal ID# [redacted] California National Primate Research Center Page # 152

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 2/7/19 | | | | | PMN inflam due to bact inf, likely staph A: mild cranial implant ○ inf w/ v. mild d/c P: GTM when sedated clean w/ DNS & apply either TAO or use NZF puffer on cranial implant contact labs to update & develope plan for long term | [redacted] |
| 2/8/19 | | | | | SO: Recd in [redacted] per WO# 4521. Cleaned implants w/ DNS and applied TAO to margins. Implant margins clean & dry. No discharge or crustiness. | [redacted] |
| 2/8/19 | | | | | MMU [redacted] 0.8 CC KET /D->SURGERY W/O 4521 NRL02 | [redacted] |
| WT: 7.30 | | | | | CAGE TIME 1:25 15MIN 2 30MIN 3 45MIN 1HR 1.25HR 1.5HR 1.75HR 2HR | |
| | | | | | SO2: Micro results: 4+ Enterobacter cloacae<br>4+ E. Coli<br>4+ Staph coag (-) | |
| | | | | | A/P see 2/7 entry | [redacted] |
| 2-13-19 | | G | G | N | SO: BAR, OP: Discharge. heal implants: Implants C+D. Animal active with no signs of pain or discomfort at observation. | [redacted] |
| 2/14/19 | | G | G | N | SO: BAR OPM: D/C head implant. Implants C+D w/ very minor scabbing @ base No erythema, swelling or D/c noted A: stable implant. P: D/C to LTOP ☒, cont weekly cleanings w/ TAO application. | [redacted] |
| | | | | | ☒ D/C ☒ Snomed ☒ Recharge | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

(13)

CNPRC Web Vitals | Search | Vacant | Animal On Date | Submit

Home | Animal Selection | MH Files | Exit

Animal Summary | Assignment | BB Assessment | Conception | Enrichment | Diarrhea | Fostering | Immunization

Morning Health | Housing Condition | Pedigree | Project | Relocation | Reproductive | Serum Bank | Snomed | Virology | Weight TB

**Report ID: 66788**

## Final Necropsy Report

**Timestamp: Sep 29, 2021 02:34 PM**

| | | | | | |
|---|---|---|---|---|---|
| Animal ID | [redacted] | Sex | F | Death Date | 03/04/2019 |
| Location | | Age (yr:mon:day) | 6 : 9 : 7 | Death Type | X |
| Investigator | | Project | NRL02 | Charge ID | BZ59 |
| Pathologist | | Clinician | | Work Performed | 2019-03-04 |
| Weight (grams) | | Pathology Condition | | Hydration | |

**Gross Observations**

| Organ | Text |
|---|---|
| BODY AS A WHOLE | The IFS=3/5. The lung lobes are pale pink and float in formalin. The stomach is empty, the small intestine contains scant amounts of tan mucoid material, and the distal colon has formed feces. The liver is mottled tan to red, and the gallbladder is full of green bile. There are no other significant gross lesions |
| BRAIN | The subcutaneous tissues overlying the left and right portions of the implant are thickened, gelatinous, and tan-red. The external tissue surrounding the external ports are slightly red but have no overt exudate. The subcutaneous tissue anterior to the right insertion cap ooze small amounts of tan opaque exudate. The tissue under the right insertion cap is composed of ~0.5cm thick, tan-red, soft mucoid material. The material is firmly adhered to the dura. The dura is tan-red, and firmly adhered to the underlying brain. When the dural flap is lifted small amounts of brain stay stuck to the dura. The underlying surface of the brain is red-tan and granular. The lesion does not extend deep into the parenchyma. The calvarium under the right pill box is covered by slightly edematous red tissue. The tissue under the left insertion cap over the dura is ~0.5cm thick, tan, and granular. The dura is lightly adhered to the brain in region of the dural flap. The underlying brain is pale tan and slightly granular. The calvarium under the pill box is within normal limits. The remainder of the brain is within normal limits. |

**Gross Diagnosis**

| Seq | Organ | Text |
|---|---|---|
| 1 | BRAIN | BRAIN AND MENINGES, CS INFLAMMATION |
| 2 | SUBCUTIS | SKULL CELLULITIS |
| 3 | BONE | CALVARIUM DISCOLORATION |

**Gross Comments**

There was evidence of a meningitis effecting the right side of the brain under the insertion cap. Given the amount of exudate over the dura, discoloration of the calvarium under the right pill box, and previous cytology results, the source of the meningitis is likely due to seeding of bacteria from the skin around the right external implant; however, contamination of the internal portions of the implant cannot be completely ruled out. The inflammation was very superficial and did not extend deep into the brain to form an abscess. The left side tissues under the insertion cap was most consistent with granulation tissue from the previous surgery based on gross examination alone; however, a concurrent left sided infection cannot be completely ruled out. Cellulitis was evident within the subcutaneous tissues overlying both the right and left portions of the implant. Histology of major organs along with a section through the left and right side of the brain in affected regions, affected dura, tissues overlying the dura under the insertion cap, and regions of subcutaneous tissues at affected site are pending. In addition, numerous bacterial cultures and impression smears of affected regions were collected prior to the perfusion and have also been submitted.

**Final Observations**

| Organ | Text |
|---|---|
| BODY AS A WHOLE | The following tissues are within normal limits: Liver with gallbladder, lung, heart, cervical spinal cord, stomach, duodenum with pancreas, ileum, cecum, colon |
| BRAIN | Slide 1 (right brain under insertion cap), slide 2 (left brain under insertion cap): Both sections of brain have similar findings. The cerebral surface subjacent to the dural flap is tattered, scalloped, and lacks the leptomeninges. The surface has multiple fragments of bone, but there is no extension of bone into the parenchyma (possible artifact from explant). There is mild multifocal hemorrhage of superficial cerebral vessels, rare neuronal necrosis of adjacent neurons, and mild satellitosis. The deep cortex at the white matter junction has numerous linear vacuoles. Some vacuoles contain central axons that do not appear swollen (possible electrode thread tract). Slide 3 (right side, tissue medial to implant), slide 4 (right side, dura under insertion cap), slide 5 (right side, tissue lateral to implant), slides 6 and 7 (left side, dura under insertion cap): All tissues have similar findings. There is abundant mature to immature granulation tissue lined by a thick surface layer of neutrophils intermixed with fewer hemosiderin laden or foamy macrophages, lymphocytes, and plasma cells. Slide 4 (right side) has a 200-400um thick section of cerebrum attached to the dura which has small numbers of neutrophils, lymphocytes and plasma cells, abundant granulation tissue, and numerous remnants of electrode threads associated with the attachment. In slide 6 (left side), there are large numbers of remnant electrode threads throughout the granulation tissue and often surrounded by multinucleated giant cells, but there is no overt brain tissue in the section examined. |
| CYTOLOGY | All slides have numerous neutrophils, few foamy macrophages, and moderate numbers of intra- and extracellular bacterial cocci. Cytology Slides 1. Right side, subcutaneous tissue over pill cover 2. Right side, subcutaneous tissues in front of insertion cover 3. Right side, brain under insertion cover 4. Left subcutaneous tissues directly under skin Bacterial Culture Results: 1. Left insertion cap over scar tissue: 2 colonies of Corynebacterium ulcerans 2. Left SQ: 1+ Staph coag positive, 1+ Corynebacterium ulcerans 3. Left under insertion cap scar tissue (dural flap): Few colonies of Staph coag positive, 1+ Corynebacterium ulcerans 4. Right SQ in anterior to insertion cap: 1+ Staph coag positive, 1+ Staph coag negative, few Klebsiella pneumoniae 5. Right under insertion cap (dural flap): 1 colony of Klebsiella pneumoniae, 2 colonies of Staph coag negative 6. Right SQ anterior to port: 1+ Staph coag positive, few Staph coag negative 7. Right bone under pill box: Few colonies of Klebsiella pneumoniae 8. Right SQ under pill cover: 1+ Stahg coag positive/few colonies of Klebsiella pneumoniae 9. Right brain under insertion cap: 1+ Staph coag positive, 1+ Klebsiella pneumoniae |
| KIDNEY | Both left and right kidneys have minimal multifocal interstitial aggregates of lymphocytes and plasma cells (incidental) |
| SPLEEN | Mild follicular hyperplasia (incidental) |

**Final Diagnosis**

| Seq | Organ | Text |
|---|---|---|
| 1 | BRAIN | MENINGITIS |

(13)

| Seq | Organ | Text |
|---|---|---|
| 2 | SUBCUTIS | HEAD IMPLANT CELLULITIS |

**Final Comments**

Bacterial cultures, cytology, and histopathology are consistent a bacterial infection for which Staphylococcus aureus is suspected to be of primary concern. Klebsiella pneumonia was also cultured from some samples, suggesting it may have also played a role. Klebsiella pneumonia is an oral commensal in rhesus macaques and may have been introduced to the site in a similar way as Staphylococcus aureus. The haired skin regions around the left and right external portions of the port did not have grossly evident exudate suggesting localized management prior to necropsy was successful. The inflammation was predominantly located on the superficial surfaces of tissues, including the left and right pachymeninges under the insertion cap. Although bacteria was cultured from the cortical brain, inflammation did not extend into the underlying cortical brain at time of necropsy. There was evidence of cortical brain matter firmly attached to the overlying pachymeninges (dural flap) along with numerous remnants of electrode threads on the right side. The left side did not have cortical matter on the dural flap in the section examined, but the tattered appearance of the brain is concerning for some attachment. Main organs collected per the NRL protocol are within normal limits. The follicular hyperplasia in the spleen and mild interstitial infiltrates in the kidneys are considered normal background lesions that are not related to the project.

Images Link




email: colonydb_help@primate.ucdavis.edu
Web VITALS Version: release 2.5.3
Last Updated: 4/26/2012

# Enclosure 3

"Animal 11" Selected Records

Animal ID# MMU [redacted] **California National Primate Research Center** Page # 54

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/14/19 | cont. | | | | A/P. see 3/12 entry. | [redacted] |
| **3/15/19** | | MMU [redacted] | | | 0.7 MLS KET /D→SURGERY W.O. 4986 NRL02 | |
| | 6.52 | | | | | |
| 3/15/19 | | | | | SO: Recd in [redacted] cage per WO#4986, NRL02. | |
| | | | | | Intubated and placed catheter w/ | |
| | | | | | PRN. moved to [redacted] for Ephys Recordings | |
| | | | | | Aseptically prepped. Performed bilateral | |
| | | | | | cranial explants. A: Terminal | |
| | | | | | bilateral cranial explants | |
| | | | | | P: Delivered to necropsy post [redacted] | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 53

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3·9·19 | cont'd | | | | → suppartive material and inflammation. | [redacted] |
| 3/9/19 | | G | G | N | SO: BAR Ⓟ opm: cran. imp. inf., imp. C+D, NEPD. | |
| | | | | | recent cleaning. Inc CDI. | [redacted] |
| 3/10/19 | | G | G | N SS | SO: BAR Ⓟ opm: cran imp. inf; inc. CDI w/ mild scabbing, & erythema. Wells C+D, NEPD. | |
| | | | | | | [redacted] |
| 3/11/19 | | G | G | N | SO: BAR, paired OP: cranial implant & implant appears | |
| | | | | | C+D, no d/c seen, good mentation, moving normally | [redacted] |
| 3/12/19 | | good | G | N | SO: BAR opm: cran. imp. inf; implant CDI, no purulence | |
| | | | | | observed. Inc CDI, scabbed @ midline inc. | |
| 3·12·19 | | | | | Evaluate animal when sedated for cleaning, small | |
| | | | | | circular ulcers on the incisional line, two | |
| | | | | | abrasion over both pillbox, no discharge, | |
| | | | | | unable to find a pocket | |
| | | | | | A: Stable infected head implant, control w/ | |
| | | | | | antibiotherapy (cephalexin) | |
| | | | | | P: Terminal Sx planned for Friday (March 15) | |
| | | | | | Continue cephalexin (3·19) | [redacted] |
| 3/12/19 MMU [redacted] LOCATION [redacted] MLS KET | | | | | | [redacted] |
| WT: 6·57 CAGE TIME 2·20 15MIN 2 30MIN 3 45MIN ___ 1HR ___ 1.25HR ___ 1.5HR ___ 1.75HR ___ 2HR ___ | | | | | | |
| 3/13/19 0·32 | | | | | | [redacted] |
| 3/13/19 | | G | G | N | SO: BAR Ⓟ opm: Cranial implant intact | |
| | | | | | Ate PBS. (1) pinpoint lesion on dorsal | |
| | | | | | aspect of head (C+D), scabbed Implant | |
| | | | | | CDI margins WNL, no crusting, no | |
| | | | | | erythema, no swelling, no picking. NEPD. | [redacted] |
| 3/14/19 | | G | G | N | SO: BAR Ⓟ opm: cran. imp. inf.; Noted 1-10mls vomit in | |
| | | | | | cage pan. Inc CDI, scabbed, no reshening or exudate. | |
| | | | | | Animal ate PBS, readily took treats, active. | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 52

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/6/19 | | G | G | N | SO: BAR OPM: head abscess ; no discharge seen, | |
| | | | | | mild crusting around base of implant, difficult | |
| | | | | | to see as animal is not very compliant | [redacted] |
| 3/7/19 | | G | G | N SS | SO: BAR OPM: CRAN IMP. INF. ; Head wells CDI w/ mild | |
| | | | | | scabbing surrounding. No purulence observed. Ate PBS, | |
| | | | | | stool mostly normal, no liq. seen. Active animal, NEPD. | |
| | | | | | A/P: See 3/5 entry. | [redacted] |
| 3/8/19 | | fast | G | N | SO: BAR (P) OPM: cranial imp.inf.; animal bright + active, no | |
| | | | | | obvious changes from 3/7 observation. | |
| | | | | | A/P: see 3/5 entry. | [redacted] |
| | | | | | Evaluate when animal sedate, (R) pill box w/ | |
| | | | | | 1 drop of perseverance material, no pocket or | |
| | | | | | tract @ this time, clean w/ DNS + cot base | |
| | | | | | A: Very mild presumed d/c from (R) pill box | |
| | | | | | P: Finish cephalexin (3-19-19) | |
| | | | | | Clean weekly | [redacted] |
| | | | | | CTH implant | |

3/8/19 MMU [redacted] 0.7 MLS KET/ D→ 1310 W.O. 4903 NRL02 [redacted]

WT: 6.38 CAGE TIME 2:00 15MIN 2 30MIN 3 45MIN ___ 1HR ___ 1.25HR ___ 1.5HR ___ 1.75HR ___ 2HR ___

| | | | | | | |
|---|---|---|---|---|---|---|
| 3-9-19 | | | | | Microbiology results: on 3/7 Staph coag + (1+) | |
| | | | | | on 3/8 Enterococcus sp (1+) | |
| | | | | | Staph coag + susceptible to cefazolin, ceftrioxone | |
| | | | | | enrofloxacin + penicillin + vancomycin. Cont: cephalexin | [redacted] |
| | | | | | Cytology results: Moderate to large #'s of neutrophils | |
| | | | | | w/ scattered foamy macrophages and epithelial cells + | |
| | | | | | rare eosinophils. Gram stain: very rare extracellular | |
| | | | | | Gm + coccoid bacteria forming short chain. Conclusion: | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 5

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/3/19 | cont | | | | implant infection and 2° LS form abx. | |
| | | | | | P: vis ✓ Daily, cont tx as planned | |
| | | | | | cont weekly cleanings | [redacted] |
| 3/4/19 | | G | G | N | SO: BAR, pained OFW: Implant infection, mild crusting @ rostral R implant, no erythema. A/P sw 3/3 | [redacted] |
| 3/5/19 | 6.18 | | | | SO: Anmal sedated for cranial implant assessment + cleaning. Bx applying pressure on the (R) pillbox + laterally we were able to express ~1 ml of purulence. d/c. We were unable to expel all of it w/o creating a bigger pocket. Obtained a culture + swab for cytology. Cleaned w/ betadine + saline. | |
| 3-5-19 | | | | | ANI # [redacted] LOC: [redacted] DATE: 3-5-19 (1 sedate) (2 moving) (3 sitting up) 0 min 1 15min 2 30min 3 45min ____ 60min ____ 1.25hr ____ 1.5hr ____ 1.75hr ____ 2hr ____ | A Lt |
| 3/5/19 | | | | | SO: Cytology (3/1) coccoid bact in chains (that's why the cephalexin was changed to clindamycin). Culture (3/1) 1+ Staph coag + sensitive to cephalexin + enro A: No real change in out of purulence P: D/C AB back to cephalexin as it is only BID'd we can't longer w/o fear of diarrhea CTM Anicet culture/cytology recheck, f/u d/c daily | [redacted] |

MMU [redacted] F
10yrs 9mos 6.58kg NRL02

**Clindamycin** 150 mg/mL
12.50 mg/kg Dose — 82 mg Total Dose
0.50 mLs Volume — IM Rte — TID Freq — 4 Days
Start 03-02-2019 End 03-05-2019

10yrs 9mos 6.58kg NRL02

**Cephalexin** 250 mg/caplet
30.00 mg/kg Dose — 197 mg Total Dose
0.80 caps Volume — PO Rte — BID Freq — 14 Days
Start 03-06-2019 End 03-19-2019

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody
PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 50

MMU [redacted] F
10yrs 9mos 6.58kg NRL02

**Cephalexin** 250 mg/caplet
30.00 mg/kg Dose — 197 mg Total Dose
0.80 caps Volume — PO Rte — BID Freq — 2 Days
Start 03-01-2019 End 03-02-2019

**Probiotic Sandwich**
1.00 sndwch/animal Dose — 1. sndwch Total Dose
1.00 sndwch Volume — PO Rte — BID Freq — 27 Days
Start 03-02-2019 End 03-28-2019

**Clindamycin** 150 mg/mL
12.50 mg/kg Dose — 82 mg Total Dose
0.50 mLs Volume — IM Rte — TID Freq — 7 Days
Start 03-02-2019 End 03-08-2019

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/2/19 | | G | G- | N | SO: cytology - Marked Neutrophils ranging from degenerate - Non-degenerate to bands, Extracellular bacteria Small and coccoid chains consistent w/ strep. A: head well inf. P: vet assess daily, end cephalexin, Start Clindamycin + PBS | [redacted] |
| | | | | | SO2: BAR ⓟ OPM Cranial implant infection. Skin Margins around implant are CDT w/ Minor scabbing. Did Not observe any erythema or Swelling Cage-side. No Clinical Signs (Neuro) Noted. Eagerly ate treats. VEPD A: Cranial Implant infection. on tx P: CTM on OPM Daily, vet assess tomorrow. Cont tx as Planned. | [redacted] |
| | | | | | Admit ⊘ Prob. Sheet ⊘ | [redacted] |
| 3/3/19 | | G | G | CC | SO: BAR Rc. light ↓ paired, mild tail staining, case recently housed A: 1st recent report for diarrhea, likely secondary to abx, on PBS P: CTM on OP ↑ as reported | [redacted] |
| 3/3/19 | | G | G- | CC | SO2 BAR OPM: Cranial implant infection Animal active in cage No discharge, swelling or erythema noted around implant. Currently on tx. A2: Apparently stable animal w/ cranial | |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody
PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

mmu

Animal ID# [redacted] **California National Primate Research Center** Page # 49

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 3/1/19 | | | | | SO: Rec'd in [redacted] per WO#47660, NRL02. monitored under ketamine sedation. crusted blood around (R) implant port, clean off w/ DNS. skin on/around (R) port seemingly healthy. Expressed ~1-2mL yellow purulent d/c from the top of (R) pillbox, stemming from area between pillboxes. SRA obtained sample for cytology & submitted to clin. labs. Hair was trimmed around implants & area cleaned w/ dilute betadine scrub. Toward the end of recording it was noted that there was a bulge over the (R) pillbox w/ when pressed & pressed ~0.5mL of serosanguinous fluid that wells up over/around (R) pillbox) A culture was obtained re: infected implant P: SICA AB Rx +/- antiinflam Discuss ST & LT plan Monitor dose ✓ IMS ? for d/c ? "swelling" daily Consider sedating for assessment/eval on 3/5 | [redacted] |

MMU [redacted] F
10yrs 9mos 6.58kg NRL02

**Cephalexin** 250 mg/caplet
30.00 mg/kg Dose — 197 mg Total Dose

0.80 caps Volume — PO Rte — BID Freq — 10 Days
Start 03-01-2019 End 03-10-2019

MMU [redacted] F
10yrs 9mos 6.58kg NRL02

**Ketoprofen** 100 mg/mL
5.00 mg/kg Dose — 33 mg Total Dose

0.33 mLs Volume — IM Rte — SID Freq — 3 Days
Start 03-01-2019 End 03-03-2019

~~Office Rx → Cote #47660~~

ANI # [redacted] LOC: [redacted] DATE: 3-1-19 (1 sedate) (2 moving) (3 sitting up)

Orig Time 0 min 2:12 15min 1 30min 2 45min 3 60min 1.25hr 1.5hr 1.75hr 2hr

[redacted]

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 40

| | Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|---|
| ① | 12/21/18 | | P | G | N | SO: BAR OPM: Cranial Implant. + Re: Head other + PA. Active & moving well, no noted changes to Implant. Ate 0 chow, did eat all forage & readily ate fresh fruit & peanuts. Suspect decreased app. may be due to sedation/procedure on 12/20/18. A: Poor app. 1st recent report. P: CTM on OP & MH daily. | [redacted] |
| | 12/20/18 | | P/F | G | N | SO: BAR Re: PA + Head crusty. Noted dry d/c @ (R) implant. (L) side implant & incision appear CDI. Ate 0 chow, did eat all forage & readily took & ate fresh fruit & peanuts. Noted normal amount of stool in pan. Suspect MMH grazing. A: Poor app. for chow, fair app. for fresh fruit & peanuts. P: CTM on OP & MH daily. | [redacted] |
| ② | 12/14/18 | | P/F | G | N | SO: BAR OPM: Cranial implant. + Re: PA. Active & moving well. implant appears CDI. Ate 1 chow, all forage & readily ate fresh fruit. A: P/F Poor/Fair app. Stable implant. P: CTM on OP & MH daily. | [redacted] |
| ③ | ~~12/24/18~~ | | G | G | N | SO: BAR OPM: Cranial implant +Re: (L) implant CDI, (R) implant suspect picking, no d/c seen but skin appears pulled from implant. A: Stable implant, (R) side possible picking, Good app | [redacted] |
| | 12/24/18 | | G | G | N | SO: BAR OPM: Cranial implant, Not actively picking implant. Implants CDI. Dried d/c surrounding implant. Actively took treats SO2: BAR. Re: crusty nares. Same entry as above. | [redacted] |

142 i.e. 12/27/18 [redacted] ③ RE [redacted] 12/24/18, should read 12/23/18

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 39

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 12/20/18 | cont | | | | (both bacterium susceptible both species) | [redacted] |

MMU [redacted] F
10yrs 7mos 5.88kg NRL02

**Enrofloxacin** 100 mg/mL
5.00 mg/kg Dose — 29 mg Total Dose

0.29 mLs Volume — IM Rte — BID Freq — 14 Days
Start 12-20-2018 End 01-02-2019

| | | | | | | |
|---|---|---|---|---|---|---|
| 12/20/18 | | | | | SO: Rec'd in [redacted] wo# 3939, NRL02 Add 0.50mL Ketamine IM given during recdangs. Monitored under propofol/ketamine sedation (did/did not intubate). Cleaned implants with chlorhexidine scrub. Performed neuro recordings then returned to homecage for recovery | [redacted] |
| 12/20/18 | | Fast ① | G | CC | SO: BAR OPM: Cranial implant. Active and moving around cage well. Implants did not have any swelling, erythem or d/c @ margins. However, did have Staph + Enterobacter on culture. A: Cranial implant margins CDI, w/ infection P: Start enro, Monitor implant w/ weekly Project sedations | [redacted] |

**12/20/18** MMU [redacted] / 0.6 CC KET / D→ SURGERY W/O 3939 NRL02
WT: 6.96
CAGE TIME 11:05 15MIN 2 30MIN 3 45MIN ___ 1HR ___ 1.25HR ___ 1.5HR ___ 1.75HR ___ 2HR ___ [redacted]

| | | | | | | |
|---|---|---|---|---|---|---|
| ② 12/19/18 | | 6 | 6 | N | SO: BAR OPM: Cranial implant + Re: Head implant Note moist cloudy d/c green in color @ base of ® implant. Other implant Ⓛ + incision appear CDI. | [redacted] |
| ③ 12/20/18 | | | | | SO: BAR OPM: Cranial Implant. Active + moving well. Noted dry d/c @ base of ® implan. Ⓛ implant + incision appear CDI. | [redacted] |

① RC [redacted] L.t. 12/22/18 [redacted]

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody
PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] California National Primate Research Center Page # 38

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 12/17/18 | | | | | Sl. erythema & thickening of skin @ cran aspect of the collar too. Obtained a culture & swab for cbc prep/cytology. Cytology revealed sm # of PMNs w/ a few intra & extracellular cocci (gr +) probable localized staph inf. A: localized staph inf noted around (R) collar P: CTM closely, clean & neurorecording consider adding biopatch under collar (once lethal approves) Consider CBC, Chem 20 &/or antibiotics if cond worsens await R/C | [redacted] |
| 12/18/18 | | | | | 30: Decided to prophylactically or conservatively start tAB Rx prior to the culture results since the skin was eroded P: Await culture results R/C skin resection 12/20 Consider labs @ the time | [redacted] |
| 12/17/18 | | G | G | N | SU3 Fe: read other; | |
| 12/18/18 | | G | G | N | 30: bare sm cranial implant, Fe: read other; Noted mild crusting @ (R) implant, c+D (L) implant has a small amount of serous dic @ margin. Inc. CD1, noted scratching @ (L) implant @ observation. | [redacted] |
| 12/20/18 | | | | | So: Micro Results 4+ Staph Coag +, 4+ Enterobacter sp A: Infection @ Cranial implant. P: Stop Cephalexin, Start enro due to Infection being susceptible to enro | |

MMU [redacted] F
10yrs 7mos 5.88kg NRL02
Cephalexin 250 mg/caplet
30.00 mg/kg Dose 176 mg Total Dose
0.70 caps Volume PO Rte BID Freq 14 Days
Start 12-18-2018 End 12-31-2018
switch to cefazolin if animal is not taking oral cefalexin

KLC C-115599 Ins18DEC@16:20 Prn18DEC@16:20

MMU [redacted] F
10yrs 7mos 5.88kg NRL02
Cephalexin 250 mg/caplet
30.00 mg/kg Dose 176 mg Total Dose
0.70 caps Volume PO Rte BID Freq 3 Days
Start 12-18-2018 End 12-20-2018

2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 37

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ① | Observations | Initials |
|---|---|---|---|---|---|---|
| **12/13/18** | | | | | MMU [redacted] 0.6MLS KET, ~> SURGEY MV'D TO [redacted] MV# 18-_____ | [redacted] |
| | WT: 5.90 | | | | W/O 3795 NRL02 | |
| | CAGE TIME_____ | 15MIN___ | 30MIN___ | 45MIN___ | 1HR___ 1.25HR___ 1.5HR___ 1.75HR___ 2HR___ | |
| 12/13/18 | | | | | SO: Rec'd in [redacted] per wo#3795, NRL02 Monitored under propofol/ketamine sedation (did/did not intubate). Cleaned implants with chlorhexidine scrub. Performed neuro recordings then returned to homecage for recovery. Glue and very mild exudate cleaned from implants. | [redacted] |
| | | | | | Gave additional 0.50mL Ket IM during recordings | |
| | | | | | T-100.5, bilateral warmed, serous secretions around bolton | [redacted] |
| 12/13/18 | | | | | D/c from [redacted] ⇒ [redacted] | |
| 12/14/18 | 5.80 | | | | | |
| 12/15/18 | | F | G | N | SO: BAR c/m cranial implant. Re: crusty head, Inc. CDI. (L) implant margin c/d scabbed. (R) implant margin has 1 drop of clear fluid discharge. No bleed seen, no swelling. No active picking/scratching seen. Animal active and readily ate treats. A: stable post cranial implants. P: c/m on c/m daily + as reported. | [redacted] |
| 12/16/18 | | G | G | N | SO: BAR c/m cranial implant. Re: head other: Noted muco/serosanguineous fluid @ (R) implant margin. (L) implant margin c/d scabbed. Inc. CDI. animal readily ate treats. NPO, no scratching/picking observed. A: muco/serosanguineous fluid @ (R) implant margin w/ mild erythema. P: Per Vet, await project response, c/m daily | [redacted] |
| 12/17/18 | | G | G | N | SO: BAR. c/m cran implant Re: head other - d/c around (R) ICHar - Noted a small amt of serous d/c @ the caudolateral aspect. Caudal aspect is clean & healing well | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 36

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 12/7/18 | | G | G | N | SO: BAR. Four out of cage overnight as well as could be expected. No deficits noted. Incision is CDI & healing well by 1° int. A: Excellent postop recovery. P: Cont supps & tx thru 12/9. Provide supportive care PRN | [redacted] |
| 12/8/18 | | E | G | N | SO: BAR, active & moving well. Incision & implant appear CDI. Appears to be using R+L arms/hands + legs: WNL PS: 0. | [redacted] |
| 12/9/18 | | F | G | N/Pelleted | SO: BAR, 7 chow left in cage, ate fruit & veggies, drank boost, bright & interactive, normal mentation, sts CDI, implant appears to be intact, no discharge or attention to implant, PS=0 | [redacted] |
| 12/10/18 | | G | G | N/Pelleted | SO: BAR, head implants: CDI, mentation: good, movement: very alert moves well on perch, reluct to move off perch. MM = Pink, PS = 0, Mild bruising @ (R) axillary, 1cm in diameter. A: Stable post cranial implants P: Discharge from post ob, CTM on MH | [redacted] |
| 12/11/18 | | G | G | N | SO: BAR, Implants CDI, mentation: good, aggressing, active. PS = 0, ate treats. MM-Pink. NEPD. | [redacted] |
| 12/12/18 | | G | G | N | SO: BAR, implant: CDI, MVMT: good | [redacted] |
| 12/13/18 | | Fast | G | N | SO: BAR, implant CDI; MVMT WNL | [redacted] |

Admit ⊘ Prob. Sheet ○

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] California National Primate Research Center Page # 35

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 12/4/18 | | | | | A: Excellent post op recovery. Id from bilat cranial implant. P: CTM closely + provide supportive care PRN. Only meds [redacted] presented | [redacted] |
| 12/4/18 | | | | | 8 pm: Animal was quiet this afternoon but when it quieted down animal resumed drinking (10's of $H_2O$) and eating. Appears calm and alert WNL observed | [redacted] |
| 12/5/18 | | F | G | N | SO: BAR. Fair amt of pellets + fruit. Animal is calm, alert, present, interactive w/ no discernable deficits. She ate dates, apples, pears, cucumber + drank 10's of $H_2O$ from her water bottle. She moves around the cage well, often [redacted] behind the feed bottles or mirror. A: Cont. excellent post op recovery. Incision healing by 1st int. P: Cont all supps + Rx. Provide supportive care PRN. Encourage intake. Monitor closely | [redacted] |
| 12/6/18 | | G | G | N | SO: BAR, VS: C+D, PS: O, ate all supps + ~ 60ml $H_2O$, normal movements around cage | [redacted] |
| 12/7/18 | | G | G | N | SO: BAR, [redacted] in place w/ no swelling, very alert and reactive, moving around cage and reaching for peanuts | [redacted] |

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted]

California National Primate Research Center

Page # 34

| Date | Weight (kg) | Appetite (G, F, P) ① | Hydration (G, F, P) ① | Stool (N, SS, L, B) ② | Observations | Initials |
|---|---|---|---|---|---|---|
| 12/3/18 (cont.) | | | | | | |

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Rice Cereal**
Dose — Total Dose
Volume — PO Rte — BID Freq — 6 Days
Start 12-03-2018 End 12-08-2018
1602-1

**Fruit + Veggies**
Dose — Total Dose
Volume — PO Rte — SID Freq — 7 Days
Start 12-03-2018 End 12-09-2018
1602-1

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Kool-Aid**
1.00 bottle(.5L)/anim Dose — 1. Bottle(.5L) Total Dose
1.00 Bottle(.5L) Volume — PO Rte — SID Freq — 3 Days
Start 12-03-2018 End 12-05-2018
1602-1

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Prunes**
Dose — Total Dose
Volume — PO Rte — SID Freq — 4 Days
Start 12-03-2018 End 12-06-2018
1602-1

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Water**
1.00 bottle(1L)/anima Dose — 1. Bottle(1L) Total Dose
1.00 Bottle(1L) Volume — PO Rte — SID Freq — 7 Days
Start 12-03-2018 End 12-09-2018
1602-1

MMU [redacted]
10yrs 6mos 5.93kg NRL02

**Boost**
1.00 bottle(.5L)/anim Dose — 1. Bottle(.5L) Total Dose
1.00 Bottle(.5L) Volume — PO Rte — SID Freq — 4 Days
Start 12-03-2018 End 12-06-2018
*BOOST SOAKED CHOW PLEASE*
1602-1

[redacted]

12/3/18

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Maropitant** 10 mg/mL
1.00 mg/kg Dose — 5.9 mg Total Dose
0.60 mLs Volume — SC Rte — SID Freq — 5 Days
Start 12-03-2018 End 12-07-2018
first dose given by [redacted] 12/3

[redacted]

12/4/18 F G N SS: BAR Animal is calm, present, alert & interactive, well. She has eaten banana, apple, cucumber, prunes, dates & a little rice cereal (though doesn't appear to care for it much). Drank H2O from the sx fruits; H2O bottle & drank kool-aid & boost. Animal moves around the cage well, no deficits - often on perch behind bottles or up in corner behind mirror (likes to hide). CPE (12/3) WNL. Chem 20 (12/3 taken mid AM) WNL & CBC T. P 5.7, Albumin 3.0 Four out of pelletty stool

[redacted]

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

Animal ID# [redacted] **California National Primate Research Center** Page # 33

| Date | Weight (kg) | Appetite (G, F, P) | Hydration (G, F, P) | Stool (N, SS, L, B) | Observations | Initials |
|---|---|---|---|---|---|---|
| 11/8/18 | | | | | SO: Transported to [redacted] for MRI, project NRL02 WO# 3431. Sedated with ketamine 0.6 mls, Animal was / was not placed in Stereotax, performed MRI per protocol, recovered fully, returned to CNPRC home cage Animal did/did not receive Ketoprofen or Buprenex IM 0.3mgs | [redacted] |

**12/3/18** MMU [redacted] / 0.6 CC KET IM / D-> SURGERY W/O 3718 NRL02 [redacted]

WT: 5.82

CAGE TIME ____ 15MIN ____ 30MIN ____ 45MIN ____ 1HR ____ 1.25HR ____ 1.5HR ____ 1.75HR ____ 2HR ____

12/3/18

SO: Rec'd in [redacted] prep wo# 3718, project NRL02
Surgically prepped, performed Cranial implants
See anesthesia log & surgery report. Recovered, returned to home cage. Monitored until fully alert.
A: Cranial implants
P: POM X 7 days, Start RX

✓Charges ✓Admit ✓RX ✓Supps ✓Move Sheet
✓Surgery Log ✓Anesthesia Log ✓Surgery Report

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Cefazolin** 330 mg/mL
25.00 mg/kg Dose — 148 mg Total Dose
0.40 mLs Volume — IM Rte — BID Freq — 7 Days
Start 12-03-2018 — End 12-09-2018
AM dose given in Sx 12/3

**Buprenorphine** .3 mg/mL
0.03 mg/kg Dose — .18 mg Total Dose
0.60 mLs Volume — IM Rte — SID Freq — 3 Days
Start 12-03-2018 — End 12-05-2018

Modified

**Hydromorphone** 10 mg/mL
0.15 mg/kg Dose — .9 mg Total Dose
0.09 mLs Volume — IM Rte — TID Freq — 3 Days
Start 12-03-2018 — End 12-05-2018
first dose given by SX 12/3 (ask for time)

5.93kg NRL02

**Famotidine** 10 mg/mL
0.50 mg/kg Dose — 3. mg Total Dose
0.30 mLs Volume — IM Rte — SID Freq — 7 Days
Start 12-02-2018 — End 12-08-2018
Have dose 12/3 AM ready for p/u by Sx

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Levetiracetam** 100 mg/mL
14.00 mg/kg Dose — 83 mg Total Dose
0.80 mLs Volume — PO Rte — BID Freq — 1 Days
Start 12-02-2018 — End 12-02-2018
Dose Ovrd

**Levetiracetam** 100 mg/mL
30.00 mg/kg Dose — 178 mg Total Dose
1.80 mLs Volume — PO Rte — BID Freq — 5 Days
Start 12-03-2018 — End 12-07-2018
Dose Ovrd | have dose ready 12/3 AM for Sx p/u

**Dexamethasone** 10 mg/mL
1.00 mg/kg Dose — 5.9 mg Total Dose
0.60 mLs Volume — IM Rte — SID Freq — 1 Days
Start 12-02-2018 — End 12-02-2018
Dose Ovrd

MMU [redacted] F
10yrs 6mos 5.93kg NRL02

**Dexamethasone** 10 mg/mL
0.75 mg/kg Dose — 4.5 mg Total Dose
0.40 mLs Volume — IM Rte — SID Freq — 3 Days
Start 12-03-2018 — End 12-05-2018
have dose ready 12/3 AM for Sx p/u

**Dexamethasone** 10 mg/mL
0.50 mg/kg Dose — 3. mg Total Dose
0.30 mLs Volume — IM Rte — SID Freq — 2 Days
Start 12-06-2018 — End 12-07-2018
Dose Ovrd

**Dexamethasone** 10 mg/mL
0.25 mg/kg Dose — 1.5 mg Total Dose
0.15 mLs Volume — IM Rte — SID Freq — 1 Days
Start 12-08-2018 — End 12-08-2018
Dose Ovrd

Obs Form 12-16-2011 G = Good, F = Fair, P= Poor, N= Normal, SS= Semi Solid, L=Liquid, B= Bloody

PC10 Standard Drug concentrations: Ketamine 100mg/ml; Dexmedetomidine 0.50mg/ml; Atipamezole 5.0 mg/ml; Diazepam 5.0mg/ml

451-457

☐ VIRAL PRECAUTION

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

NX

I.D. / PROJECT CODE: / BZ59

ANIMAL I.D.: MMU [redacted]

INVESTIGATOR / REQUESTOR: / [redacted]

DATE OF SAMPLE: 3 / 15 / 19

ANIMAL DATA: ROOM - CAGE

SEX: F AGE: YR MO WEIGHT: KG

PROCEDURE IS: X DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA Head implant

HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S)
1. left under pill box
2. left over pill box
3. left dura under IC
4. left Brain under IC
5. Right under pill box
6. Right over pill box

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☒ AEROBIC | | 3,5 |
| ☒ ANAEROBIC | 5,6,7 | 1,2,3,4 |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION
7. Right dura under IC
8. ~~Right brain under IC~~

## ORGANISMS IDENTIFIED

Aerobic:

1. (1) Isolated from thio broth: Enterococcus sp.
2. (2) Isolated from thio broth: Strep viridans
3. (4) Isolated from thio broth: Strep viridans
4. (6) 1+ Enterococcus sp.
5. (7) Isolated from thio broth: Staph coagulase negative
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 3-22-19

# CLINICAL MICROBIOLOGY

2/2014

WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

3666

☐ VIRAL PRECAUTION

B759 NRL02
I.D. PROJECT CODE

[redacted] [redacted]
INVESTIGATOR REQUESTOR

ANIMAL DATA [redacted]
ROOM CAGE

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

MMM [redacted]
ANIMAL I.D.

3, 5, 19
DATE OF SAMPLE

1= ____ YR ____ MO 6.18 KG
SEX AGE WEIGHT

PROCEDURE IS: ____ DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA
Infected on clindamycin

HOSPITALIZED NO YES ☐

PRIOR THERAPY NO ☐ YES
LIST ALL AGENTS:
X3d

SOURCE OF SPECIMEN(S) cranial implant

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| AEROBIC | | |
| ANAEROBIC | ✓ | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 3/7 lt STAPH Coagulase positive
2. 3/8 lt Enterococcus sp
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | S | S | S | | S | | S |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 3/7/19

CLINICAL MICROBIOLOGY

2/2014

WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

1084

☐ VIRAL PRECAUTION

B259, NR102
I.D. PROJECT CODE

MMM [redacted]
ANIMAL I.D.

[redacted]
INVESTIGATOR REQUESTOR

# CALIFORNIA PRIMATE RESEARCH CENTER

# MISCELLANEOUS

3, 5, 19
DATE OF SAMPLE

ANIMAL DATA [redacted]
ROOM CAGE

F ____YR ____MO 6.18 KG
SEX AGE WEIGHT

PROCEDURE IS: ✓ DIAGNOSTIC AID: _____ COLONY MANAGEMENT: _____ EXPERIMENTAL: _____

CLINICAL SIGNS / PROBLEMS:
Purulent ♂

PRIOR THERAPY ☒ NO ☐ YES
LIST ALL AGENTS:

HOSPITALIZED NO ☒ YES ☐ _____ - _____
ROOM CAGE

BLEEDING CONDITIONS: ☐ Squeezed – limb pulled ☐ Caught on run ☐ Fasted _____hrs ☒ Anesthetized ☐ Other_____

PROCEDURE(S) REQUESTED: Cytology + GRAM STAIN

SPECIMEN: Purulent.

RESULTS

Within a background of proteinaceous fluid and fibrin are moderate to large numbers of neutrophils with scattered foamy macrophages and epithelial cells, and rare eosinophils.
Gram stain reveals very rare extracellular Gm⊕ coccoid bacteria forming short chains.

Conclusion: suppurative material / inflammation

[redacted] 3-5-19

# MISCELLANEOUS

PC9 2/2014 WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

UCD 0228

336

☐ VIRAL PRECAUTION

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

B259, NRL02
I.D. PROJECT CODE

[redacted]
INVESTIGATOR REQUESTOR

MMU [redacted]
ANIMAL I.D.

3 / 1 / 19
DATE OF SAMPLE

ANIMAL DATA [redacted]
ROOM CAGE

F ____ YR ____ MO ____ KG
SEX AGE WEIGHT

PROCEDURE IS: X DIAGNOSTIC AID ____ COLONY MANAGEMENT ____ EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA

HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S) (R) Cranial Post

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☐ AEROBIC | | |
| ☐ ANAEROBIC | ✓ | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 3/5 1+ STAPH Coagulase positive
2.
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | S | S | S | | S | | S |
| | | | | | | | | | |

REPORTED BY: [redacted]

REPORT DATE: 3/5/19

# CLINICAL MICROBIOLOGY

2/2014

WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

UCD 0229

1038

☐ VIRAL PRECAUTION

B259, NRL02
I.D. PROJECT CODE

CALIFORNIA PRIMATE RESEARCH CENTER

MPUU [redacted]
ANIMAL I.D.

[redacted]
INVESTIGATOR REQUESTOR

# MISCELLANEOUS

3/1/19
DATE OF SAMPLE

ANIMAL DATA [redacted]
ROOM CAGE

F
SEX

____YR____MO ____KG
AGE WEIGHT

PROCEDURE IS: X DIAGNOSTIC AID: ____ COLONY MANAGEMENT: ____ EXPERIMENTAL: ____

CLINICAL SIGNS / PROBLEMS:
cranial implant

HOSPITALIZED NO☐ YES☐ ____ - ____
ROOM CAGE

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

BLEEDING CONDITIONS: ☐ Squeezed – limb pulled ☐ Caught on run ☐ Fasted ____hrs ☐ Anesthetized ☐ Other____

PROCEDURE(S) REQUESTED: ®Cranial Post / Cytology

SPECIMEN:

RESULTS

Cytology - large numbers of neutrophils including degenerate neutrophils and band forms. Large numbers of bacteria - mostly extracellular - small coccoid bacteria in chains.

# MISCELLANEOUS

PC9 2/2014 WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

AMENDED REPORT - CHART COPY

2045

☐ VIRAL PRECAUTION

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

B259, NZL42
I.D. PROJECT CODE

[redacted]
INVESTIGATOR REQUESTOR

MNLL[redacted]
ANIMAL I.D.

12, 17, 18
DATE OF SAMPLE

ANIMAL DATA [redacted]
ROOM CAGE

F 13 YR 7 MO 5.8 KG
SEX AGE WEIGHT

PROCEDURE IS: ____ DIAGNOSTIC AID ____ COLONY MANAGEMENT X EXPERIMENTAL [redacted] 12-27-18

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA
gram + / gram -
HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S) Head Post-Implant Cranial

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☐ AEROBIC | | |
| ☐ ANAEROBIC | ✓ | [redacted] 12-27-18 |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 12/19 4+ Staph Coagulase positive
2. 12/19 4+ Enterobacter sp.
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

| ORGANISM NUMBER | DOXYCYCLINE (DO 30) | AZITHROMYCIN (AZM 15) | CEFAZOLIN (CZ 30) | CEFTRIAXONE (CRO 30) | ENROFLOXACIN (ENO 5) | NEOMYCIN (N 30) | PENICILLIN (P 10) | SULFA/TRIMETH (SXT 25) | VANCOMYCIN (VA 30) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | S | S | S | | S | | S |
| 2 | S | R | | S | S | S | | S | |

REPORTED BY: [redacted]

REPORT DATE: 12/19/18

# CLINICAL MICROBIOLOGY

2/2014

WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

2045

☐ VIRAL PRECAUTION

B259, NRLD2
I.D. PROJECT CODE

[redacted]
INVESTIGATOR REQUESTOR

ANIMAL DATA [redacted]
ROOM CAGE

# CALIFORNIA PRIMATE RESEARCH CENTER

# MICROBIOLOGY

MMU [redacted]
ANIMAL I.D.

12, 17, 18
DATE OF SAMPLE

F 10 YR 7 MO 5.88 KG
SEX AGE WEIGHT

PROCEDURE IS: ____ DIAGNOSTIC AID ____ COLONY MANAGEMENT X EXPERIMENTAL

CLINICAL SIGNS / PROBLEMS:
☐ DIARRHEA
gram + / gram −
HOSPITALIZED NO☐ YES ☐

PRIOR THERAPY ☐ NO ☐ YES
LIST ALL AGENTS:

SOURCE OF SPECIMEN(S) Cranial Head Post-Implant

| CULTURES REQUESTED | NEGATIVE RESULT | |
|---|---|---|
| | NEGATIVE | NO GROWTH |
| ☐ ENTERIC SCREEN SHIGELLA, YERSINIA, SALMONELLA | | |
| ☐ CAMPYLOBACTER | | |
| ☐ YERSINIA (CLINICAL) | | |
| ☒ AEROBIC | | |
| ☒ ANAEROBIC | | |
| ☐ FUNGI/YEAST | | |
| ☐ LISTERIA | | |
| ☐ OTHER | | |

DIRECT MICROSCOPIC EXAMINATION

## ORGANISMS IDENTIFIED

1. 12/19 4+ Staph Coagulase positive
2. 12/19 4+ Enterobacter sp.
3.
4.
5.
6.
7.
8.

☐ SENSITIVITY TO ANTIMICROBIAL AGENTS: KIRBY- BAUER

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|---|---|---|---|---|---|---|---|---|---|
| 1 | | | S | S | S | | S | | S |
| 2 | S | R | | S | S | S | | S | |

REPORTED BY: [redacted]

REPORT DATE: 12/19/18

# CLINICAL MICROBIOLOGY

2/2014

WHITE- ANIMAL'S CHART YELLOW- LABORATORY PINK- REQUESTOR

CALIFORNIA PRIMATE RESEARCH CENTER

# INTERVENTION / SURGERY

| PROJECT: | ANIMAL SP MMU ID# | DATE OF EVENT MO DAY YR |
|---|---|---|
| NRL02 | [redacted] | 12/3/18 |

| | | |
|---|---|---|
| PROCEDURE: Cranial Implant | ROOM: [redacted] | AGE: 10y 6m |
| INVESTIGATOR: [redacted] | CAGE: [redacted] | SEX: F |
| REQUESTOR: [redacted] | W/O: 3718 | WT: 5.93kg |

| SNOMED CODES | CODED BY:cm | SNOMED TERMS |
|---|---|---|
| **Circle one: Experimental (XI) / Colony (SN)** | | |
| T-10101 | P-yy444 | Craniotomy |
| T-10101 | P-1000 | Surgical Incision |
| T-X2070, T-X2080 | P-Y8971 | L/R Recording Device Implantation |
| T-X2070, T-X2080 | P-YY041 | L/R Electrophysiology Readings |
| T-10101 | P-1640 | Surgical closure |

DESCRIPTION OF PROCEDURES PERFORMED

Procedure: Electrode insertion survivability study

Animal prepared for surgery in normal manner. Once sedated thoroughly on isoflurane, fentanyl and propofol, the animal's head was placed into the stereotaxic frame. The head was sterilely prepped. Midline incision made approximately 6cm in length. Fascia incised and temporalis muscle elevated bilaterally from temporal ridges. Fifteen millimeters anterolateral to bregma, burr holes were made bilaterally using a cranial perforator. Exposed dura was incised and reflected anteriorly. Electrode implants were placed using investigational robotics. Gelfoam and titanium plate were used to seal burr hole. This process was repeated on the right hemisphere. Two separate stab incisions were made 1.5cm off midline in the posterior portion of the exposure and transcutaneous ports were passed through the incision. The main midline incision was closed in an inverted, interrupted fashion using 3-0 vicryl in the fascia. The skin was closed using a running subcuticular stich using 4-0 monocryl. Electrophysiology was undertaken. Animal removed from stereotax and monitored.

Estimated blood loss: minimal (<2cc).

| TIME IN: 836 / TIME OUT: 208 | POST OPERATIVE CARE: |
|---|---|
| | Hydromorphone TID Q4h x3 days<br>Buprenex SID (pm dose only) x3 days<br>Dexamethasone SID x7 days<br>Cefazolin BID x7 days<br>Omeprazole SID x7 days<br>Famotidine SID x3 days Levetiracetam BID x7 days |

SURGEON: [redacted] ASSISTANT: [redacted] ANESTHETIST: [redacted]

*Animal Chart* *Data Entry* *Surgery* *Requestor Veterinarian*

11

**CNPRC Web Vitals** Search Vacant Animal On Date Submit



**Report ID: 66942** **Final Necropsy Report** **Timestamp: Sep 29, 2021 02:31 PM**

| | | | | | |
|---|---|---|---|---|---|
| Animal ID | [redacted] | Sex | F | Death Date | 03/15/2019 |
| Location | | Age (yr:mon:day) | 10 : 9 : 27 | Death Type | X |
| Investigator | | Project | NRL02 | Charge ID | BZ59 |
| Pathologist | | Clinician | | Work Performed | 2019-03-15 |
| Weight (grams) | 6520 | Pathology Condition | | Hydration | |

**Gross Observations**

| Organ | Text |
|---|---|
| BODY AS A WHOLE | IFS=3./5. There are no other significant lesions. |
| BRAIN | There is mild swelling of subcutaneous tissues adjacent to the left and right side of the implant. The left and right fibrous plugs consist of ~0.5cm thick tan material and are firmly adhered the brain. The right fibrous plug is left in place while a portion of the left fibrous plug was removed in surgery prior to submission to necropsy. |

**Gross Diagnosis** Nothing found to display.

**Gross Comments** Histopathology of the brain and fibrous plugs have been submitted as rush samples and should be available by next week. The remainder of the tissue will be trimmed shortly. Histology is pending

**Final Observations**

| Organ | Text |
|---|---|
| BODY AS A WHOLE | The following tissues are within normal limits: Cecum, colon, cervical spinal cord, jejunum, spleen, ileum, lung, duodenum with pancreas, stomach, heart |
| BRAIN | Slide 1 (right brain in region of insertion cap): The dura and fibrous plug are left intact over the brain. At the interface, there is mild cortical edema, gliosis, and satellitosis. The overlying fibrous plug is composed of dense mature fibrous connective tissue with abundant hemosiderin laden macrophages, and few perivascular lymphocytes, plasma cells, rare neutrophils, and mineralization. Slide 2 (left brain in region of pill box): A portion of the dura and fibrous plug have been removed prior to sectioning. In this region, the surface of the cortex is tattered. The brain parenchyma and intact dura have similar changes as described in the right side. In addition, the fibrous plug has numerous embedded remnant electrode threads. Slide 3 (right superficial portion of fibrous plug under insertion cap): The mature fibrous connective tissue has large numbers of neutrophils, and fewer lymphocytes and plasma cells. Slide 4 (left dura and fibrous plug under insertion cap): Similar inflammatory cells are present as described in the right side. In addition, the inflammation dissects between muscle bundles and the tissues contain large numbers of embedded remnant electrode threads. There are also moderate numbers of hemosiderin laden macrophages and acute hemorrhage. |
| CYTOLOGY | Bacteriology results (no significant bacteria isolated): Aerobic culture (left bone under pill box): Enterococcus spp. isolated from thio broth Aerobic culture (left subcutaneous tissue over pill box and left dura/fibrous plug under insertion cap): Streptococcus viridans isolated from thio broth Aerobic culture (right subcutaneous tissue over pill box): 1+ Enterococcus spp. Aerobic culture (right dura/fibrous plug under insertion cap): Staphylococcus coagulase negative isolated from thio broth Aerobic culture (left dura/fibrous plug under insertion cap, right bone under insertion cap): No growth Anaerobic culture (left and right bone under pill box, left and right dura/fibrous cap under insertion cap, left brain under insertion cap, left and right subcutaneous tissue over pill box): Negative or no growth |
| KIDNEY | There is mild medullary interstitial amyloid deposition |
| LIVER & DRAINED GB | There is mild subcapsular eosinophilic material between hepatocytes (amyloid vs fibrosis) |

**Final Diagnosis**

| Seq | Organ | Text |
|---|---|---|
| 1 | SUBCUTIS | HEAD INFLAMMATION |
| 2 | LIVER | LIVER DEPOSITION, AMYLOID |
| 3 | KIDNEY | KIDNEY DEPOSITION, AMYLOID |

**Final Comments** Overall inflammation within the subcutaneous tissues and fibrous plug over the dura is minimal to mild and did not extend to involve the dura or underlying brain. These findings in conjunction with cytology and bacteriology results are consistent with mild inflammation but no active infection at time of necropsy. Examination of main organs revealed mild amyloid within the kidney and presumably liver. Amyloid deposition is a common finding in NHP's and is often secondary to chronic inflammation. The specific cause in this case cannot be determined. The mild nature of these lesions would not have resulted in clinical signs. All other organs are within normal limits.