

Last Updated: 12/6/09

Product Design Specifications

Device for Shielding a Neurochemical Sampling Apparatus in Non-Human Primate Research

Team Members:

Mark Reagan | Team Leader | *

Anika Lohrentz | Communicator | *

David Leinweber | BSAC | *

Alison Boumeester | BWIG | *

Client:

Dr. Ei Terasawa | Department of Pediatrics | *

Advisor:

Naomi Chesler, PhD. | Department of Biomedical Engineering | *

Problem Statement:

This team's goal is to develop and produce a device that protects a micro-dialysis apparatus used during cranial sampling experiments on non-human primates. This involves minimizing device weight, tamper-proofing the assembly, and creating a "custom" fit for the different sized non-human primates.

Client Requirements

Final product must:

- Withstand repeated forceful blows and other tamper efforts from the wearer (Rhesus monkey)
- Integrate into and not interfere with researchers' data collecting processes
- Require no modification of current micro-dialysis apparatus
- Incur no limitation to wearer's limb's freedom of motion or be excessive in size/weight
- Detach readily only by researchers and staff, but not the wearer
- Either be completely reusable or includes cheaply producible disposable components

Design Requirements

1. Physical & Operational Characteristics:

- a. **Performance Requirements:** The device must be strong enough to not fracture or deform significantly when 100N (rough estimate) is applied in order to protect the expensive micro-drive unit from damage.
- b. **Safety:** The device must not contain sharp edges or other protrusions that may injure the wearer or researcher. The materials that are used must be non-toxic.
- c. **Accuracy & Reliability:** The device must accommodate various head sizes of juvenile and near-adult non-human primate wearers as well as withstand repeated 100N blows (10@1/sec) without critical damage.
- d. **Life in Service:** Remain secure and intact during a 12+ hour session, and either be sterilization compatible or include cheaply and easily replaced components.
- e. **Shelf Life:** At least 5 years.
- f. **Operating Environment:** Standard laboratory environment for non-human primate research.

- g. **Ergonomics:** The device must not restrict the wearer's limbs or infringe on their comfort beyond a temporary "desensitization" phase
- h. **Size:** The base of the device should be based on the upper and lower estimates of juvenile and adult female rhesus monkey skull size. The height of the device must accommodate the micro-drive when extended to position "28".
- i. **Weight:** Less than 0.500kg, with no lower limit. Ultimately the assembly must not be a burden for the wearer.
- j. **Materials:** Non-toxic, compatible with sterilization if reusable, cost-efficient if disposable, and sufficiently light-weight.
- k. **Appearance & Finish:** Aesthetically pleasing, ready to use "as-is" without obvious reason to have concern for wearer or researcher health or safety.

2. *Production Characteristics:*

- a. **Quantity:** 1 reproducible device. Smaller and larger sizes may be pursued in future development and construction.
- b. **Budget:** Up to \$1000 for materials and any other incurred costs.

3. *Miscellaneous:*

- a. **Standards & Specifications:** The design and construction of the device must comply with USDA regulations and NIH guidelines, subject to approval from the attending veterinarian.
- b. **Customers:** Primarily for research with Dr. Terasawa, but potentially other medical professionals dealing with delicate brain/head cases.
- c. **Patient-Related Concerns:** It should create significantly less stress for the wearer than the current method (primate chair) and allow for better mobility.

Competition:

No currently known products specifically address the need to protect the micro-drive unit during cranial micro-dialysis studies on non-human primates.

**Email and phone contact information has been removed. Please reference contact information available on project site, or contact the UW BME department or Primate Center.*