Project Design Specifications—Drug Pump for Rats
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Problem Statement:

In a study aimed to lower chronic neuropathic pain associated with spinal cord injury in rats, a mini-osmotic pump is used to deliver medication directly to the injury site. However, the current drug delivery system is leading to unknown medical complications, causing the rats to die. Our goal is to alter the current pump or to develop an alternative delivery system so that the drug can be administered successfully, without harming the rats. This device must be able to continuously deliver the drug for one week, during which it must not obstruct the rat's mobility.

Client Requirements:

Device must be secure and not inhibit normal rat behavior
Drug must be delivered at a rate of 0.5 microliters per hour for one week

Design Requirements:

1) Design Requirements
   a) *Performance requirements:* See Client Requirements above
   b) Safety: The device must cause no physical harm to the rats
   c) *Accuracy and Reliability*: The drug must be administered at a rate of 0.5 microliters per hour for one week
   d) *Life in Service*: The device must be able to effectively function for one week
   e) *Shelf Life*: Not specified for prototype
   f) *Operating Environment*: The device must be able to operate reliably on or within the rats and be unaffected by their daily activity.
   g) *Ergonomics*: The drug delivery system must be designed in a way that does not harm the rat
   h) *Size*: The device must be small enough to effectively deliver the drug without affecting the behavior of the rat
   i) *Weight*: See Size Requirement
   j) *Materials*: The device must not comprise of any materials that have adverse effects on the rats
   k) *Aesthetics*, *Appearance, and Finish*: Not specified for prototype
2) Product Characteristics
   a) *Quantity*: One working prototype
   b) *Target Product Cost*: No cost specification has been given

3) Miscellaneous
    a) *Standards and Specifications*: See Client Requirements Above
    b) *Customer*: See Client Requirements Above
    c) *Patient Related Concerns*: None
    d) *Competition*: None currently known