Video Article

# Erratum: Construction and Implantation of a Microinfusion System for Sustained Delivery of Neuroactive Agents.

URL: http://www.jove.com/video/4405
DOI: doi:10.3791/4405

Keywords: Errata, Issue 62

Date Published: 4/1/2012

Citation: Erratum: Construction and Implantation of a Microinfusion System for Sustained Delivery of Neuroactive Agents.. *J. Vis. Exp.* (62), e4405, doi:10.3791/4405 (2012).

## Abstract

A correction was made to: Construction and Implantation of a Microinfusion System for Sustained Delivery of Neuroactive Agents. A key reference was excluded and a revised abstract was republished.

Additional Reference:

22. Cunningham, M.G., Ames, H.M., Donalds, R.A., & Benes, F.M. Construction and implantation of a microinfusion system for sustained delivery of neuroactive agents. Journal of Neuroscience Methods 167, 213-220, doi:10.1016/j.jneumeth.2007.08.016 (2008).

Revised Abstract:

Sustained delivery of neuroactive agents is widely used in neuroscience, but poses many technical challenges. It is necessary to deliver the agent with high precision while minimizing localized trauma and inflammation. Also, the ability to customize the system to accommodate animals of different species and sizes is desirable. This video presentation demonstrates the construction of an infusion system that can be fitted to any particular research animal. The delivery microcannula diameter is approximately 10-fold smaller than most infusion cannulas presently used. This translates into enhanced accuracy and reduced trauma to the brain region under study. The delivery cannula can also be sculpted to fit the contour of the surface of the animal's skull, thereby allowing closure of the scalp incision neatly over the infusion system, precluding the need for a skull-mounted pedestal, reducing risk of infection, and ensuring a greater level of comfort to the animal. The system is assembled in an air-free environment and requires the researcher to fashion glass micropipettes with a heat source. These construction methods require special skills that are best acquired, if not in person, using video instruction. (This article is based on work first reported in J Neurosci Methods. 2008 Jan 30;167(2):213-20. Epub 2007 Aug 28.).

Original Abstract:

Experimental protocols used for chronic infusion of neuroactive agents within regions of the brain often utilize a mini-osmotic pump system. Agents are commonly delivered via a stainless steel cannula with a diameter of 0.30 mm or greater. Systems utilizing a cannula of this caliber may impose trauma to the area of interest resulting in architectural damage, thereby compromising structural integrity and normal functioning. As neuroscience inquiry becomes more sophisticated, investigation of brain structures and circuitry requires improved levels of accuracy and higher resolution. We have developed a method for the preparation and implantation of a chronic infusion system within the brain utilizing a borosilicate microcannula with a tip diameter of 50 microns. This technique reduces damage to the local environment and diminishes reactive gliosis at the site of infusion. The configuration of the microinfusion system is also able to conform to the surface of the animal's skull, precluding the need for large cranial pedestals, thus facilitating closure of the scalp incision and reducing the risk of infection. We demonstrate reliable sustained delivery of a dye having a representative molecular weight using an in vitro model and in vivo studies in rats.

## Protocol

A correction was made to: Construction and Implantation of a Microinfusion System for Sustained Delivery of Neuroactive Agents. A key reference was excluded and a revised abstract was republished.

Additional Reference:

22. Cunningham, M.G., Ames, H.M., Donalds, R.A., & Benes, F.M. Construction and implantation of a microinfusion system for sustained delivery of neuroactive agents. Journal of Neuroscience Methods 167, 213-220, doi:10.1016/j.jneumeth.2007.08.016 (2008).

Revised Abstract:

Sustained delivery of neuroactive agents is widely used in neuroscience, but poses many technical challenges. It is necessary to deliver the agent with high precision while minimizing localized trauma and inflammation. Also, the ability to customize the system to accommodate animals of different species and sizes is desirable. This video presentation demonstrates the construction of an infusion system that can be fitted to any particular research animal. The delivery microcannula diameter is approximately 10-fold smaller than most infusion cannulas presently used. This translates into enhanced accuracy and reduced trauma to the brain region under study. The delivery cannula can also be sculpted to fit the contour of the surface of the animal's skull, thereby allowing closure of the scalp incision neatly over the infusion system, precluding the need for a skull-mounted pedestal, reducing risk of infection, and ensuring a greater level of comfort to the animal. The system is assembled in an air-free environment and requires the researcher to fashion glass micropipettes with a heat source. These construction methods require special

 

skills that are best acquired, if not in person, using video instruction. (This article is based on work first reported in J Neurosci Methods. 2008 Jan 30;167(2):213-20. Epub 2007 Aug 28.).

Original Abstract:

Experimental protocols used for chronic infusion of neuroactive agents within regions of the brain often utilize a mini-osmotic pump system. Agents are commonly delivered via a stainless steel cannula with a diameter of 0.30 mm or greater. Systems utilizing a cannula of this caliber may impose trauma to the area of interest resulting in architectural damage, thereby compromising structural integrity and normal functioning. As neuroscience inquiry becomes more sophisticated, investigation of brain structures and circuitry requires improved levels of accuracy and higher resolution. We have developed a method for the preparation and implantation of a chronic infusion system within the brain utilizing a borosilicate microcannula with a tip diameter of 50 microns. This technique reduces damage to the local environment and diminishes reactive gliosis at the site of infusion. The configuration of the microinfusion system is also able to conform to the surface of the animal's skull, precluding the need for large cranial pedestals, thus facilitating closure of the scalp incision and reducing the risk of infection. We demonstrate reliable sustained delivery of a dye having a representative molecular weight using an in vitro model and in vivo studies in rats.

## Disclosures

No conflicts of interest declared.

 