

The Use of Cyanoacrylate Gel as a Suitable Replacement for Dental Cement In Murine Model CNS studies.

By Kurt Kemling

Infusing test agents into the CNS of rodents has led to exciting new research findings in medicine. By using the ALZET Brain Infusion Kits with the low flow rate ALZET Osmotic Pumps; you create an effective means of CNS infusion in rodents. One of the most widely used methods to secure the brain infusion cannula, is by using small stay screws followed by a two-part dental cement application to secure the assembly. One problem with using the latter product is it requires more of the surgeon's valuable time to prepare the cement. In addition, using dental cement requires a substantial amount of product, particularly since you have to combine two parts in order to have an activated substance. This large volume of cement often makes the product very difficult to work with in mice, which have considerably smaller skulls; skulls that are also at times too thin to support stay screws.

Alternatively, using cyanoacrylate adhesive gel to secure the cannula in place to the skull has gained popularity in rodent studies. The widely available cyanoacrylate gel is a clear ethyl cyanoacrylate, single component, fast curing, adhesive gel. The gel's consistency prevents adhesive flow even on vertical surfaces and it bonds to uneven surfaces quite well (1). The gel sets very quickly, mitigating the risk of critical cannula movement during the vital setting period. The fact that the gel is a single component product saves the surgeon valuable time. The Cyanoacrylate gel also requires less quantity to achieve a similar result as the commonly used dental cement. These features allow the gel to be an effective adhesive for both rats and mice, curtailing the need for multiple adhesive products in the lab.

One research group specifically studied the use of cyanoacrylate gel as a substitute for dental cement in ICV cannulations. Ana Criado, who led this study, discussed one advantage being the reduction of stay screws needed, resulting in less trauma to the skull (2). Also noted was a 30% reduced surgical time for the preparation of ICV implants in rats, when the surgeons were experienced. This time reduction would clearly have a welfare benefit to the animals by reducing time under anesthesia and would increase the output of surgically prepared animals (2). In addition, the gel method did not show signs of adverse effects on the postoperative period when compared with the current technique of using dental cement.

With the advent of more transgenic and "knock out mice" being bred for pre-clinical research, the accessibility of an adhesive product that can be used more effectively with both mice and rats should prove to be very advantageous in animal studies. One resource for obtaining a Cyanoacrylate Gel Adhesive is DURECT Corporation. Their product (Loctite Prism 454) can be found through their contact info listed below (3). For additional information contact ALZET Technical Support at 800-692-2990.

References:

1.

Loctite Corporation, 1001 Trout Brook Crossing
Rocky Hill, CT 06067-3910
(860) 571-5100, (860) 571-5465 *fax*

2.

Criado A. Use of Cyanoacrylate Gel as a Substitute for Dental Cement in Intracerebroventricular Cannulations in Rats. *American Association for Laboratory Animal Science*. 2003; 42.3: 13-16.

3.

DURECT Corporation, 10240 Bubb Rd.
Cupertino, CA 95014
800-692-2990 or alzet@direct.com