

Implanting Multiple Pumps

There are many reasons why researchers choose to implant multiple ALZET pumps in a single animal. These reasons may include:

- Administration of multiple compound solutions that cannot be mixed
- Need for a higher infusion rate than that allowed by a single pump
- Administration of compounds to multiple targets via catheter
- Administration of compounds with poor solubility

Implanting more than one ALZET pump is only feasible in animals large enough to accommodate the additional size and weight of multiple pumps. The table below summarizes the minimum animal weight for implantation of two ALZET pumps:

Animal Size* For Implanting Two ALZET Pumps			
Pump Model	1003D, 1007D, 1002, 1004	2001D, 2001, 2002, 2004, 2006	2ML1, 2ML2, 2ML4
Subcutaneous	20g	40g	300g
Intraperitoneal	40g	300g	N/A

*These values are based on the size of animals used in published ALZET pump studies where two pumps were implanted.

The table below contains research citations in which multiple ALZET pumps were used in various animal models:

Animal	Pump Model	# of Pumps	Reference
Mice	1003D	3	<i>P5997</i> Kuroiwa M, et al. Continuous versus intermittent administration of human endostatin in xenografted human neuroblastoma. <i>J Pediatr Surg</i> 2003; 38(10):1499–1505. "The set of 3 osmotic pumps was retained successfully in the subcutaneous tissue of the treated and control animals throughout the experiment, no decrease in body weight was observed in either group." (p. 1501)
Rat	2002	4	<i>P0432</i> Khan SR, et al. Experimental induction of crystalluria in rats using mini-osmotic pumps. <i>Urol Res</i> 1983; 11(5):199–205
Dog	2ML1	4	<i>P7118</i> Gilberto DB, et al. Use of four infusion pumps for postoperative administration of buprenorphine or morphine in dogs. <i>JAVMA</i> 2002; 220(11):1655–1660
Monkey	2ML4	4	<i>P2211</i> Tarantal AF, et al. Pre and postnatal treatment of the rhesus macaque (<i>Macaca mulatta</i>) with azidothymidine: I. fetal studies. <i>Pediatr Aids HIV Infection: Fetus to Adolescent</i> 1994; 5(1):10–19
Rabbit	2ML1	4	<i>P7178</i> Cellini C, et al. Effect of epidermal growth factor infusion on fetal rabbit intrauterine growth retardation and small intestinal development. <i>J Pediatr Surg</i> 2004; 39(6):891–897

All surgical procedures, including implanting multiple ALZET pumps, must be approved by the local ethical or legal authority (IACUC, Ethics Committee, Home Office, etc.). Visit the following URL to see the minimum animal size estimates for single pump implantations:

http://www.alzet.com/products/guide_to_use/pump_selection.html#animalsize

Contact ALZET Technical Services for a complete list of citations using multiple ALZET pumps in your specific animal model.