

Guidelines on administration of substances and blood collection in RABBITS

Procedure	Maximum volume range ^a	Needle size ^a	Sites ^b	Anaesthesia ^{c,d}
ADMINISTRATION OF SUBSTANCES (Adults)				
Intradermal	0.05 - 0.1 mL/site Maximum of 6 sites	27-30G x 13mm	Shaved skin over dorsal thorax, back	Yes
Intramuscular	0.25 ^{c,e} - 1.0 mL ^f /site No more than 2 sites per day ^c	25-30G x 13-25mm	Quadriceps muscles / Posterior thigh; lumbar muscle ^g	No/Yes
Intraperitoneal	5 ^c - 20 ^{c,d} mL/kg Maximum bolus volume is 1% of BW	21-26 x 25-28mm	Lower right abdominal quadrant	No
Intravenous	2 - 5 ^{c,d,h} mL/kg bolus (injected in 1min)	21-26G x 13-25mm	Marginal Ear vein, Cephalic vein	Topical (No/Yes) Sedation (No/Yes)
Oral Gavage	10 - 15 ^{c,d} mL/kg	Rubber infant feeding tube (8-French), lubricated, may use oral speculum to prevent chewing ⁱ ; consider voluntary intake/syringe feeding	Oral (may be necessary to restrict food intake before dosing of larger volumes) ^c	No/Yes
Topical - dermal		NA	Apply test substances uniformly covering no more than 10% of body surface (e.g. 12 cm x 14 cm). Prepare site 24 h previously to allow recovery ^{j*}	No/ Yes
Subcutaneous	1 -5 ^{c,d,h,j} mL/kg; 30 - 50 ml/ rabbit ^f Maximum of 4 sites per session ^e	21-25 x 25-28mm	Loose skin over the intrascapular (scruff), neck, shoulder, back, flank	No
BLOOD COLLECTION (Adults)				
Intravenous – single bleed	up to 7% of TBV weekly	21-26G x 13-25mm: Marginal ear vein, Central ear artery		Topical (No/Yes) Sedation (No/Yes)
	10% of TBV Every 2 weeks			
	15% of TBV Every 3 weeks			
Intravenous – daily bleed	0.05% of BW every 24 hours	21G: Jugular vein (may use butterfly needle) ^k		No/Yes
Intra-cardiac	Once, terminal bleed	18G x 38mm ^f	Cardiac puncture	Yes, terminal

General Considerations:

- * Skin area of application for highly toxic substances should be reduced. Avoid eyes and genital areas. Potential welfare impact of tight or adhesive dressings.
- Consider absorption time for non-aqueous or irritating substances before re-dosing.
- Divide large doses and inject into multiple sites.

Abbreviations: TBV = total blood volume; BW = body weight; NA = Not Applicable; min = minute

Techniques: Examples of tutorials

blood collection <https://www.nc3rs.org.uk/3rs-resources/blood-sampling>

Normative data for the rabbit^{i,l}

Heart Rate	200 - 300 beats/min
Respiratory rate	32 - 60 breaths/min
Body temperature	38.5 ^o - 39.5 ^o C
Food Consumption	50 gm /kg BW / day
Water Consumption	50 - 100 ml /kg BW / day
Urine Volume	50 - 75 ml /kg BW / day
Total blood volume	55 - 70 ml/kg BW ^{a,l}
GI transit time	4 - 5 hr
Faecal output	15 - 60 g / day

References:

- National Health and Medical Research Council, 2008. *Guidelines to promote the wellbeing of animals used for scientific purposes: The assessment and alleviation of pain and distress in research animals*. National Health and Medical Research Council, Canberra, Australia.
- Pekow, C.A. and Baumans, V., 2021. 'Common Nonsurgical Techniques and Procedures', in Hau, J., & Schapiro, S.J. (Eds.). *Handbook of Laboratory Animal Science: Essential Principles and Practices* (4th ed.). CRC Press.
- Diehl, K.H., Hull, R., Morton, D., Pfister, R., Rabemampianina, Y., Smith, D., Vidal, J.M. and Vorstenbosch, C.V.D., 2001. A good practice guide to the administration of substances and removal of blood, including routes and volumes. *Journal of Applied Toxicology*, 21(1), pp.15-23.
- Hawk, C.T., Leary, S. and Morris, T.H., 2005. *Formulary for Laboratory Animals*, 3rd edn, Blackwell Publishing, Ames.
- Wolfensohn, S., and Lloyd, M., 2013. *Handbook of Laboratory Animal Management and Welfare*, 4th edn, Wiley-Blackwell, West Sussex, pp. 97-109.
- Adams, R.J., 2002. 'Techniques of Experimentation', in Fox, J.G., Anderson, L.C., Loew, F.M. and Quimby, F.W. (eds), *Laboratory Animal Medicine*, 2nd edn, Elsevier, San Diego, pp. 1008-11.
- Talcott, M.R., Akers, W. and Marini, R.P., 2015. 'Techniques of experimentation', in Fox, J.G., Anderson, L.C., Otto, G.M., Pritchett-Corning, K.R. and Whary, M.T. (eds.), *Laboratory Animal Medicine*, 3rd edn, Elsevier, San Diego, pp. 1201-1262.
- Turner, P.V., Brabb, T., Pekow, C. and Vasbinder, M.A., 2011. Administration of substances to laboratory animals: routes of administration and factors to consider. *Journal of the American Association for Laboratory Animal Science*, 50(5), pp.600-613.
- Suckow, M.A., and Schroeder, V., 2012. *The Laboratory Rabbit*, 2nd edn, CRC Press, Boca Raton.

- j. Morton, D.B., Jennings, M., Buckwell, A., Ewbank, R., Godfrey, C., Holgate, B., Inglis, I., James, R., Page, C., Sharman, I. and Verschoyle, R., 2001. Refining procedures for the administration of substances. *Laboratory Animals*, 35(1), pp.1-41.
- k. Nelson, E.A., Keller, G.L., Mitchell, T.W., Pennypacker, B., Rebbeck, P. and Rogers, I.T., 2010. A jugular bleeding technique in rabbits. *Lab animal*, 39(1), pp.17-22.
- l. Nowland, M.H., Brammer, D.W., Garcia, A., and Rush, H.G. 2015. 'Biology and Diseases of Rabbits', in Fox, J.G., Anderson, L.C., Otto, G.M., Pritchett-Corning, K.R., and Whary, M.T. (eds), *Laboratory Animal Medicine*, 3rd edn, Elsevier, San Diego, pp. 411-461.