Taking Blood Samples

From Rabbits
With the popularity of rabbits as pets increasing dramatically over the last few decades, rabbit owners now tend to expect, and indeed rabbits deserve, the same levels of diagnostic work-up as for other species. This article aims to provide information on how to take blood samples confidently and safely in rabbits.

Blood samples, as with other species, can give useful information for patients presenting with a disease process, or as part of a health exam. Biochemistry parameters can be run usually with serum or heparinised blood (it is best to check the requirements of the individual laboratory or in-house analyser), whilst haematology will require blood to be taken into EDTA. Fresh blood smears can be used to provide a differential white cell count, whilst PCVs (packed cell volume) can be performed as for other species. More rarely, blood samples can be taken for coagulation screens or even for blood culture.

In the past, ‘normal’ blood parameter reference ranges used by laboratories tended to be based on laboratory rabbit research. However, most laboratories now have extensive databases of results which better reflect the general pet population, giving better scope for interpretation and thus diagnosis. There are a few rabbit-specific blood tests which are commonly run (there are others, but rarely run in practice) eg. *Encephalitozoon cuniculi* serology (IgG and IgM) and *Treponema cuniculi* (rabbit syphilis) serology. Both can be run on serum samples.

Even a small volume of blood can be extremely useful, for example using a portable monitor to check blood glucose levels. Blood glucose levels can be used to evaluate the severity of a rabbit’s clinical condition, in particular when differentiating between gut stasis (usually normoglycaemic) or intestinal obstruction (often hyperglycaemic) (Harcourt-Brown and Harcourt-Brown 2012). Together with electrolytes, PCV and a blood smear for a differential, glucose levels can give a very useful baseline for assessing an emergency rabbit patient.
**How much blood to take?**

There is often a perception that only very small volumes of blood can be safely taken from rabbits. This is not the case (obviously the clinical condition of an individual patient must always be taken into account). A general rule of thumb is that it is safe to take up to a maximum of 1ml per 100g bodyweight (Paul-Murphy J and Ramer JC 1999), ie. 1% of bodyweight.

**How to take a blood sample**

It is important to use a quiet, well-lit area for blood sampling, and that nursing staff are trained in handling rabbits. It is important to minimise stress, for obvious welfare reasons, but also as this can affect certain blood parameters, eg. glucose, aspartate transferase (AST) and creatine kinase (CK) levels (Varga 2014a). Generally venepuncture is performed in conscious rabbits (indeed anaesthesia or sedation may affect the parameters being measured), although sedation can be considered for particularly stressed individuals.
There are a few rabbit-specific factors to take into account when performing venepuncture:

- Rabbits may jump as the clinician attempts to take a blood sample. Nursing staff should be trained to handle them gently and confidently, and in such a way as to reduce the risk of spinal damage with kicking out. EMLA cream (Astra), a combination of lidocaine and prilocaine, can be useful to try and minimise the jumping associated with the sensation of needle entry, especially with sites such as the marginal ear vein. It can be applied to the skin and covered with a dressing or clingfilm for 45-60 minutes whilst it takes effect (Flecknell 2000).

- Their veins are fragile and prone to haematoma formation, so careful pressure is required after removing the needle. Insufficient pressure after using the lateral saphenous vein in particular often leads to haematoma formation.

- Rabbit veins are prone to collapse when excess negative pressure is applied. Using smaller syringes, eg. 1ml, especially when sampling the smaller veins can be helpful. Small gauge needles (eg 25g) are useful.

- Rabbit blood clots relatively quickly at room temperature, so will need to be transferred quickly from the syringe into EDTA to avoid clots which may affect any haematology results. It is important to consider the volume of blood required for an EDTA tube. If the blood volume taken is small, it may be best to use a smaller volume EDTA tube, or at least to shake out the liquid EDTA before adding the blood sample. Some clinicians prefer to heparinise the needle and syringe (indeed this is mandatory for some analysers).

- If serum is needed, a clot is usually formed after 30-40 minutes.

- Clipping or plucking the fur will aid visualisation of the vein. Rabbit skin is fragile so care should be taken with clipping. Preparation of the skin with isopropl alcohol is as for other species. It can be useful to try to sample a distal part of the vein, so that a second attempt can be made more proximally if required.
Sites for blood sampling:

A variety of superficial venepuncture sites can be used, each with advantages and disadvantages. Often the clinician will develop a preference for a particular site. Those used most often are the lateral saphenous veins, jugular veins, cephalic veins and marginal ear veins.

The central ear artery may give a relatively large volume of blood, but is not recommended due to the risk of subsequent thrombosis, avascular necrosis and skin sloughing (sometimes of the entire pinna), particularly in dwarf breeds.

Cardiocentesis is described in the laboratory rabbit literature, but is obviously not ideal for pet rabbits (nor indeed palatable to their owners!)

Lateral saphenous vein

This vein is easy to access as it is very superficial, although it can be quite tortuous and mobile. Gentle suction is required as it is liable to collapse (using a 1ml syringe can help), and firm pressure is advised after sampling as it is very prone to haematoma formation. The assistant holds the rabbit in lateral or sternal recumbency with one hindlimb over the edge of the table. The leg is extended and the vein raised just proximal to the stifle joint (it courses diagonally across the tibia). The skin should be kept taut to immobilise the vein. EMLA cream can be useful at this site.
Figure 4  
Taking blood from the lateral saphenous vein.

Figure 5  
Positioning for sampling the jugular vein in a conscious rabbit.

Figure 6  
Positioning to allow sampling from the jugular vein in a conscious rabbit.
Jugular vein

This site is useful for obtaining larger blood samples (up to 10ml can be safely collected from any rabbit from this site (Varga 2014b). Sampling can be performed either with the rabbit conscious, or under sedation or anaesthesia for more stressed or jumpy individuals. If performing in the conscious patient, positioning is as for cats. The rabbit is held over edge of the table with the head extended upwards and the forelimbs held down over edge of table. Some clinicians prefer to wrap the rabbit in a towel. The vein lies in the jugular furrow and can be raised at the thoracic inlet. Avoid overextension of the neck as this tends to flatten the vein. Large dewlaps can hinder visualisation of the jugular vein, in which case the thumb can be used to press down over the dewlap to push it out of the way. There are some risks with restraint when using this, for example with rabbits with respiratory disease, and also some difficulties with some individuals, eg. short-nosed breeds such as the Netherland dwarf. It is difficult to maintain an intravenous cannula in this site. If the rabbit is sedated or anaesthetised, it should be positioned in dorsal recumbency, with the forelimbs pulled caudally and the head over edge of the table, tipped slightly to the floor. The vein is quite superficial, but often hidden under fat if the rabbit is obese.
Cephalic vein

This site is useful for intravenous cannula placement, but it is difficult to obtain larger volumes of blood from this site. Positioning is as for dogs and cats. The rabbit is held in sternal recumbency and the vein raised just in front of the elbow, with the assistant holding the head away from the extended limb. As the antebrachium is short, it can be difficult to raise the vein.

Marginal ear vein

This vein is easy to see and a very good site for intravenous cannula placement, but only suitable for obtaining very small volumes of blood. It is obviously more difficult to access in dwarf breeds. The rabbit should be restrained in sternal recumbency and the ear held out by the assistant. The pinna can be warmed with the hand to help dilate the vessel, and the vein raised at the pinna base on the lateral margin. Rabbits tend to jump when this vein is entered, so EMLA cream applied beforehand can be extremely useful. Pressure should be applied after sampling to reduce the chance of haematoma formation. There is a small risk of thrombosis, as with the central ear artery, with catheterisation.
Figure 10
Intravenous cannula placement within the marginal ear vein

Figure 11
Securing an intravenous cannula within the marginal ear vein

Figure 12
Rabbit under general anaesthesia with marginal ear vein cannula in place
References


