

Technical Report

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An alternative method for rat fixation when giving subcutaneous, intramuscular and intraperitoneal injections ("Camilla's method")

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Introduction

The usual way of fixing rats is by taking them in the scruff of the neck or around the front quarters, as described in several handbooks (Svendson & Hau 1994, Van Zutphen et al. 1993). One of our animal technicians has developed another method, which is considered less stressful for the people executing them, thereby leading to more secure applications. The method may also be less stressful for the rats, as the head of the rat remains in the dark while performing the injections. This may be of advantage when premedication for the induction of anaesthesia is given, because a more quiet induction will give a stronger effect, thereby reducing the amount of anaesthetics needed. Also, when people are less stressed when performing the procedures, it is likely that rats will be less stressed. Furthermore, it is easy to perform the method when one does not have any assistance at hand.

For all methods described it is essential to prepare well, so that the injections can be performed quickly and smoothly, with the least distress for people and animals. The techniques that are described in the following, are written for a right-handed person, i.e. uses the right hand for injecting. For all three methods described, a 1 ml syringe is used with a 25 Gauge needle (0.5 mm external diameter) of 1.5 cm length. A relatively small and short needle is necessary when applying intramuscular and intraperitoneal injections.

Subcutaneous (sc) injection

The method for subcutaneous injection is executed as follows.

The rat is put onto a cloth or a towel, so that there is a length of about 15 cm cranially of the head of the rat.

[Picture 1](#)

The cloth is folded over the head of the rat and the first half of the body and pressed gently, but firmly over the rat with the left hand.

[Picture 2](#)

The thumb and index-finger of the left hand can now grasp a skin fold, while this same hand keeps the rat in a fixed position by gentle and firm pressure. The right hand can be used to pull softly on the tail, so that the hind body stretches out. When the rat has become quiet, the right hand can be used to inject.

Picture 3

The right hand can now be used to give the sc injection in between the 2 fingers of the left hand. It is essential to stick the needle parallel to the body, so that the injection remains subcutaneously.

After one has given the injection, the rat can be put back into the cage. One has to be careful that one does not damage the toe nails while doing this: often the rats have grasped onto the cloth, so one has to remove the cloth carefully from the rat.

Intramuscular (im) injection

Picture 4

When fixing the rat for an intramuscular injection, the fixation in the cloth is done in the same way as before, only the cloth is slid further caudally, only leaving the hind quarters free. The rat is slightly tipped over to one side (e.g. rat's left side) and fixed firmly but gently. Do not lay the rat entirely onto the side, as the rat will strongly oppose to this. One can then grasp the right upper hind leg with the index and middle finger of the left hand. The index-finger is placed on the muscles lying caudally from the femur, the middle finger is pressed on the muscles cranially from the femur. The right hind leg is then fixed.

Picture 5

The right hand can now inject intramuscularly.

It is the least painful if one injects slowly. It goes without saying that one does not inject more than the maximally allowed volume for sc and im injections as given in handbooks (Svendsen & Hau 1994, Van Zutphen et al. 1993).

Intraperitoneal (ip) injection

Picture 6

The rat is fixed in the cloth like described before, but now the cloth covers the entire body until the tail. The thumb is placed on the caudal side of the tail base and the rest of the hand is placed cranially from the tail, which fixes the rat firmly and gently.

Picture 7

The hind part of the body is now lifted carefully, until the abdomen becomes visible. If not one bends the rat's back carefully, it may give damage, pain and resistance, which is to be avoided.

Picture 8

The intraperitoneal injection can now be performed with the right hand. The injection must be given lateral from the linea alba at a horizontal level between the knees.

Conclusions

In our experience, these 3 described methods function well in practice, especially with relatively inexperienced researchers. It calms people down and our subjective impression is that rats behave calmer as well.

It would need more research to prove whether rats indeed would be less stressed by using this alternative fixation method.

References

Svendsen P & J Hau (eds.): Handbook of Laboratory Animal Science, volume I, Selection and handling of animals in biomedical research. CRC Press, 1994.

Van Zutphen LFM, V Baumans & AC Beynen (eds.): Principles of Laboratory Animal Science. Elsevier, 1993.