

TECHNIQUES TRAINING: RAT



A VISUAL GUIDE TO RESEARCH TECHNIQUES



AMERICAN ASSOCIATION FOR LABORATORY ANIMAL SCIENCE

— Table of Contents —

Introduction	5
Section 1: Age Identification of Neonatal to Prewearing Rats	7
Day 0	7
Day 1	8
Day 2	9
Day 3	10
Day 4	11
Day 5	12
Day 6	13
Day 7	14
Day 8	15
Day 9	16
Day 10	17
Day 11	18
Day 12	19
Day 13	20
Day 14	21
Day 21	22
Section 2: Sex Identification	23
Neonates	23
Adults	24
Section 3: Handling and Restraint	25
Manual (Tail)	26
Manual (Scruffing)	27
Manual (Crossover)	28
Manual (V-Hold)	29
Mechanical Device	30
Flexible Film Tube	32
Stockinette	33
Section 4: Animal Identification	35
Ear Punch/Notch	36
Ear Tag	37
Transponder (Microchip)	39
Tattoo	41
Section 5: Blood Collection	43
Table 1. Approximate Blood Sample Volume Ranges Guide for Mice and Rats	43
Abdominal Aorta	44
Facial Vein/Maxillary Vein	46
Dorsal Foot	47
Cardiac Puncture–Ventral Approach	48
Cardiac Puncture–Lateral Approach	49
Jugular Vein	50
Retroorbital	52
Saphenous Vein	53
Lingual Vein	54
Tail Artery	55
Tail Nick	57
Tail Snip	58
Toenail Clip	59
Section 6: Compound Administration	61
Table 2. Recommended Needle Sizes, Injection Volumes, and Anatomical Sites	61
Table 3. Recommended Needle Sizes for Oral Gavage	61
Intravenous–Tail Vein	62
Intravenous–Penile Vein	64
Intravenous–Retroorbital	65
Intraperitoneal	66
Intramuscular	68
Subcutaneous	69
Footpad	70
Intradermal	71
Oral Gavage	72
Intranasal	74
Intratracheal	75
Tracheotomy	77
References	79

— Introduction —

This book was created for trainers and trainees as a pictorial, step-by-step guide to perform basic techniques in rats. This book is intended to be an adjunct resource for the training that personnel need to become competent and qualified for performing the basic procedures presented here. **It is not intended to replace a formal training program or guidance by trainers.**

In the development of this book, the rats undergoing any minor procedure not typically requiring anesthesia were anesthetized to facilitate photography. For the nonsurgical procedures demonstrated, recommendations are included to guide the reader regarding the need for anesthesia. In these and other locations, readers are referred to their institutional policies for specific requirements. Please refer to your institution's standard operating procedures (SOPs) and guidelines for anesthesia and analgesia requirements as well as dosing volumes, route of blood collection, and needle size, etc. Other AALAS references that support training include the *Laboratory Animal Technician Training Manual*¹ and various bi methodology courses on the AALAS Learning Library (www.aalaslearninglibrary.org).

Generally only one method for a given technique is shown in this publication; however, other acceptable variations may be used at your institution. Where appropriate, adaptations or alternative materials are mentioned.

Before attempting the procedures illustrated here, please ensure that they comply with your institution's SOPs and policies and are part of an approved protocol.

A procedure is any activity carried out on the animal, such as applying an ear tag, blood collection, or a surgery. All of the federal laws, regulations, policies, and guidelines applicable to animal research have a core requirement for the humane treatment of the animals involved in a study. Accordingly, your IACUC will have requirements for the proper care of your animals prior to, during, and after a research procedure (peri-procedural care).

Peri-procedural care covers:

- properly preparing the animal to humanely undergo the procedure,
- supporting the animal's physiological function during the procedure, and
- providing additional supportive care to aid the animal in recovering from the procedure.

Before performing any procedures on live animals, personnel must have the appropriate training. This training should include how to do the procedure itself, as well as how to provide appropriate peri-procedural care to the animal. Training may be obtained from a variety of sources, such as the veterinary, training, or research staff.

The following directional terms in veterinary anatomy are used in this book and are included here as a reference for describing technical procedures.

Directional Terms^{2,5}

Caudal.....Closer to the tail; used on the head, neck, trunk, and limbs proximal to the carpus and tarsus.

CranialCloser to the cranium; used on the neck, trunk, and limbs proximal to the carpus and tarsus.

DistalToward the periphery, away from the origin of the limbs and tail, the free end of them.

DorsalCloser to the dorsum. This term refers to the back or dorsum of the neck, trunk, and tail, to the corresponding surface of the head, the dorsum of the feet.

LateralMore distant to, or away from, the median plane.

MedialCloser to the median plane.

PalmarRefers to the inner (caudal) surface of the palm (of the forefoot).

PlantarRefers to the inner (caudal) surface of the planta (of the hindfoot).

ProximalToward the trunk, near the origin of the limbs and tail.

RostralCloser to the tip of the nose or the orifice of the mouth; used on the head.

VentralCloser to the ground in the standing position of a quadruped.