

# *Color Atlas of* **SMALL ANIMAL ANATOMY**

*The Essentials*



**Thomas O. McCracken**  
*and Robert A. Kainer*  
with David Carlson

 **WILEY-BLACKWELL**

**Revised Edition**



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Small Animal Anatomy:

*The Essentials*



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# Small Animal Anatomy: *The Essentials*

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Blackwell Publishing Professional  
2121 State Avenue, Ames, Iowa 50014, USA

**Orders:** 1-800-862-6657  
**Office:** 1-515-292-0140  
**Fax:** 1-515-292-3348  
**Web site:** [www.blackwellprofessional.com](http://www.blackwellprofessional.com)

Blackwell Publishing Ltd  
9600 Garsington Road, Oxford OX4 2DQ, UK  
Tel.: +44 (0)1865 776868

Blackwell Publishing Asia  
550 Swanston Street, Carlton, Victoria 3053, Australia  
Tel.: +61 (0)3 8359 1011

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First edition, 2008

Library of Congress Cataloging-in-Publication Data

McCracken, Thomas.

Color atlas of small animal anatomy : the essentials / Thomas O. McCracken, Robert A. Kainer.

p. ; cm.

Includes index.

ISBN-13: 978-0-7817-4391-4 (alk. paper)

ISBN-10: 0-7817-4391-5 (alk. paper)

1. Veterinary anatomy—Atlases. 2. Cats—Anatomy—Atlases. 3. Dogs—Anatomy—Atlases. I. Kainer, Robert A. II. Title.  
[DNLM: 1. Anatomy, Veterinary—Atlases. 2. Cats—anatomy & histology—Atlases. 3. Dogs—anatomy & histology—  
Atlases. 4. Guinea Pigs—anatomy & histology—Atlases. 5. Rabbits—anatomy & histology—Atlases. 6. Rats—anatomy &  
histology—Atlases. SF 761 M478c 2008]

SF751.M33 2008

636.089'1—dc22

2007029634

The last digit is the print number: 9 8 7 6 5 4 3 2 1

# ACKNOWLEDGMENTS



The authors express their gratitude to Dennis Madden, diener at Colorado State University College of Veterinary Medicine, for assistance with specimens for dissection. Special thanks to David Carlson on his accurate and artistic interpretation of the original black & white line drawings into beautiful color plates.

The patience and counsel of the staff at Blackwell Publishing is gratefully acknowledged.

Several illustrations were redrawn from the following sources:

Evans, H.E. (ed.): *Miller's Anatomy of the Dog*, 3rd ed., Philadelphia, W.B. Saunders, 1993. Figure 9-7  
Hudson, L.C., Hamilton W.P.: *Atlas of Feline Anatomy for Veterinarians*, W.B. Saunders, 1993

The following publications were used for general reference:

Boyd, J.S.: *A Color Atlas of Clinical Anatomy of the Dog and Cat*, London, Mosby-Wolfe, 1991  
Budras, K-D, Fricke, W., McCarthy, P.H.: *Anatomy of the Dog—An Illustrated Text*, 3rd Ed., London, Mosby-Wolfe, 1994  
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# INTRODUCTION

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he Color Atlas of Small Animal Anatomy: *The Essentials* is not a complete, detailed anatomic atlas. Instead it presents topographic relationships of the major organs of the dog, cat, rabbit, rat, and guinea pig in a simple yet technically accurate format. Throughout most of the *Atlas*, a male and a female of a given species are on facing pages. The majority of the plates contain information on the entire body. Some plates are confined to a region; a few contain organs isolated from the rest of the body. Whereas most systems (e.g., digestive and reproductive) are presented for each animal, other systems are included only for some species to illustrate general anatomic patterns. Structures common to the various animals are labeled several times; other structures are labeled on only one or two species, usually emphasizing specific anatomy (the anatomy peculiar to a certain species).

Small animal specialists and researchers have advised the authors on special plates for individual animals.

The *Atlas* is intended for use by individuals at different stages of their education, serving as a survey of the specific anatomy of the different small animals. Advanced 4-H club members, high school vocational agriculture students, and college students studying veterinary medical technology, veterinary medicine, animal science, and wildlife biology can use this *Atlas* as an introduction to the anatomy of common small / laboratory animals. The *Atlas* can also serve as a reference for dog and cat breeders and trainers, as well as laboratory technicians and researchers. It will provide a quick review for persons with previous training in anatomy and will be an invaluable aid for the professional—e. g., a veterinarian or animal scientist—in explaining to a client some aspect of anatomy that pertains to an animal's condition and needs.

The following introductory pages provide the reader with a background in nomenclature and anatomic orientation.

# NOMENCLATURE AND ANATOMIC ORIENTATION

## ANIMAL CLASSIFICATION

**Dog (*Canis lupus familiaris*).** The dog (*Order Carnivora*) is a domesticated wolf in the family Canidae, to which the jackal and fox also belong. Two characteristics distinguish the dog from other canids and, indeed, from all other animal species. The first is its worldwide distribution in close association with humans. The second is the enormous amount of variability found within the subspecies.

The anatomy of dogs varies tremendously from breed to breed. Some basic physical characteristics are identical among all dogs, from the smallest to the largest; most but not all dogs have long muzzles, large canine teeth, and long tails. Like most predatory mammals, the dog has powerful muscles, a cardiovascular system that supports both sprinting and endurance, and teeth for catching, holding, and tearing. Dogs have disconnected shoulder bones (no collar bone) that allow a greater stride length for running and leaping. They walk on four toes, front and back, and have vestigial dewclaws (dog thumbs) on their forelimbs and hind limbs. Dogs exhibit a diverse array of fur coats; they range from different coat textures, colors, markings, and patterns.

**Cat (*Felis catus*).** Cat is the name applied broadly to the mammals in the order Carnivora, family Felidae, and specifically to the domestic cat. All cats have rounded heads, short muzzles, large eyes, sensitive tactile hairs around the mouth, and erect pointed ears. They have short, wide jaws equipped with long canine teeth and strong cheek teeth with sharp cutting edges. Their tongues are coated with sharp backward-facing papillae that aid in drinking and grooming. The ends of the toes bear strong, sharp, curved claws. The claws are completely retractile, being withdrawn into protective cutaneous sheaths when not in use, a distinguishing feature of the cat family. Cats have long tails which they use for balance. The musculo-skeletal system is extremely flexible, allowing cats to arch and twist their bodies in a variety of ways. Most cats have good vision and are able to see well in very dim light; their color vision is weak. Their sense of hearing is excellent; their sense of smell

is not as acute as that in dogs. Cats may be solid-colored or have patches or shadings of a second color; some common patterns are: tabby, tortoiseshell, and calico, among others.

**Rabbit.** The European rabbit (*Oryctolagus cuniculus*) is in the order Lagomorpha which also includes the hare and the pika. These animals have two large upper first incisor teeth with two small second incisors behind them. This immediately distinguishes lagomorphs from rodents. Other distinguishing features are short tails and large hind limbs and feet adapted for running or jumping. In most, the length of the ears is considerably greater than the width. The rabbit skeleton is light, making up only 7-8% of body weight. The forelimbs are short and fine, in contrast to the long and powerful hind limbs. The plantar surface of the hind limb from the tarsus distad is in contact with the ground at rest. The spine is naturally curved.

The upper lip of the rabbit is cleft (hare lip). Rabbits have a total of 6 incisors (the teeth you see in the front), two sets upper and one set lower, and no canine teeth. The cheek teeth consist of three upper premolars and three upper molars, and two lower premolars and two lower molars on each side.

Although usage varies, the term rabbit generally refers to small, running animals which give birth to altricial (naked and blind) young, while hare refers to larger, hopping forms, with longer ears and limbs whose young are precocious (born furred and open-eyed). They have acute senses of smell and hearing.

**Rat.** Rats are rodents with stout bodies, usually having a pointed muzzle, a long, slender, naked tail, and dexterous forepaws. Rat refers particularly to the two species of house rat—the brown, or Norway, rat (*Rattus norvegicus*) and *Rattus rattus*, the black, roof, or Alexandrine, rat. Besides the house rats, the genus *Rattus* contains several hundred wild-living species.

The brown rat is the larger of the two, growing up to 10 in. (25 cm) long excluding the naked, scaly tail, and sometimes weighing more than a pound (.5 kg). It is commonly brown with whitish underparts and pink ears, feet, and tail. The laboratory white rat is an albino strain of the brown rat. The black rat is commonly dark gray. It reaches a maximum length of 8 in. (20 cm) and has a longer tail and larger ears than the brown rat. As with the rabbit, the rat's teeth grow continually during its life.

**Guinea pig.** The guinea pig (*cavy*, *Cavia porcellus*). It is a South American rodent unrelated to the pig; the name may refer to its shrill squeal. The guinea pig is a small, burrowing rodent that has a compact body. They have rounded bodies, large heads, and blunt noses and reach a length of 6 to

10 in. (15-25 cm) and a weight of 1 to 2 lb (450-900 grams). The guinea pig's rapid reproductive rate and high resistance to disease make it a valuable laboratory animal. It has small ears and eyes, a small snout with sensory tactile hairs on each side, and no tail. Like most rodents, it has two upper and lower teeth at the front of the mouth which continue to grow throughout its life. It has short limbs and small feet with claws; the forefeet have four toes/claws, but the hind feet have only three.

There are a number of varieties of guinea pig; their coats can have short or long smooth hair with a great variety of color combinations, mainly mixtures of black and white and many shades of brown.