

# Atlas of the Spinal Cord of the Rat, Mouse, Marmoset, Rhesus and Human

by Gulgun Sengul, Charles Watson, Ikuko Tanaka and George Paxinos

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Many hundreds of thousands suffer spinal cord injuries leading to loss of sensation and motor function in the body below the injury site. Regeneration studies in the spinal cord and spinal cord degenerative diseases such as amyotrophic lateral sclerosis (ALS) have increasingly been on the forefront of biomedical research in the past years throughout many laboratories world-wide. Although there have been some significant strides towards new treatment methods and research on the involvement of the spinal cord in pain and the ability of spinal cord to regenerate, there is yet no cure for these overwhelming spinal cord diseases. Mammalian spinal cord research requires reliable atlases to correctly plan and interpret spinal cord studies by knowing the detailed anatomy, and to localize anatomical structures in radiological imaging and gene expression studies.

Atlas of the Spinal Cord of the Rat, Mouse, Marmoset, Rhesus and Human by Sengul, Watson, Tanaka and Paxinos has been launched at the Society for Neuroscience Meeting in New Orleans on October 12, 2012. The authors of this first comprehensive atlas of rodent and primate spinal cords are Gulgun Sengul from Ege University, School of Medicine, Izmir, Turkey, George Paxinos and Charles Watson from Neuroscience Research Australia, Randwick NSW, Australia, and Ikukuo Tanaka from Metropolitan Institute for Neuroscience, Tokyo, Japan. The atlas covers more than 500 photographic images of sections of the spinal cord of five mammals. Following an Introduction the atlas contains Nomenclature and the construction of abbreviations, References, Index of structures, Index of abbreviations before the chapters of detailed spinal cord diagrams of five mammals. It includes also helpful staining protocols for relevant readers. Nissl-stained section images and matching drawings for each segment are supplemented by up to four histochemical or immunohistochemical images on a facing page. The neuron groups supplying major limb muscles are identified in each species. For each spinal cord segment in each species, there is a half-page photograph of a Nissl section and a half page line

diagram, plus a group of up to 4 photographs of sections from the same segment stained with a variety of markers such as acetylcholinesterase (AChE), calbindin, calretinin, choline acetyltransferase, neurofilament protein (SMI 32), enkephalin, calcitonin gene-related peptide (CGRP), and neuronal nuclear protein (NeuN) are also presented. In these diagrams, laminae in the spinal cord gray matter according to the schema developed by Rexed (1952, 1954), based on the cytoarchitecture of spinal cord neurons and nuclei (e.g., the central cervical nucleus, lateral spinal and lateral cervical nuclei, dorsal nucleus of Clarke, lumbar and sacral dorsal commissural nuclei, lumbar and sacral precerebellar nuclei and the intermediomedial and intermediolateral nuclei) have been identified.

The first comprehensive spinal cord book 'The Spinal Cord: A Christopher and Dana Reeve Foundation Text and Atlas' had also been published by the same authors (Watson, Paxinos, Kayalioglu, Academic Press Elsevier, 2009)<sup>(1)</sup> and contained the rat and mouse atlases and also 12 chapters on the spinal cord reviewing the complete spinal cord research, including the cytoarchitecture, chemoarchitecture, spinal nerves, connections of the spinal cord. This book also provides a significant platform on which further spinal cord research can be built.

This new atlas will rank as a significant contribution to spinal cord research in 21st century.

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## Reference

1. Sargon MF. Book Review: The Spinal Cord: A Christopher and Dana Reeve Foundation Text and Atlas by Charles Watson, George Paxinos and Gülğün Kayalıoğlu. *Anatomy* 2009; 3:75.

