

CROSSROADS: WHERE MEDICINE AND THE HUMANITIES MEET

The Brain Atlas: A Visual Guide to the Human Central Nervous System, 3rd ed.

Thomas A. Woolsey, Joseph Hanaway, Mokhtar H. Gado.

A Review for Medical Students

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The study of neuroanatomy represents one of the great challenges of medical school. The enormous complexity of the nervous system initially masks its magnificent order. Before the nervous system's patterns are grasped, the elements that make it up appear like a jumble of unrelated facts, with the links between them fuzzy at best. If it is taught with poor coordination between its parts, the work of the medical student becomes even more frustrating. To some extent, the nervous system must be understood as a whole before the true meaning of its different elements becomes clear, so that as a new concept is learned it can immediately be integrated into the whole. A student who tries to gain a global understanding of the nervous system through a collection of unrelated vignettes is akin to an entomologist studying a colony of ants by randomly chasing its members down a hundred different anthills; the meaning of what he sees will disappear with each ant and the profound organization beneath will remain undiscovered.

This is when the value of a good atlas is most keenly felt. The disparate facts taught in class are laid out in a systematic and organized way. They can be seen in their full context, the relationships between them reinforced at a glance. Although not designed specifically for medical students, *The Brain Atlas: A Visual Guide to the Human Central Nervous System* by Thomas A. Woolsey, Joseph Hanaway and Mokhtar H. Gado has much to offer. A thin, lightweight, spiral-bound volume of approximately 250 pages, it is comprised of hundreds of images of atomic specimens, brain slices, histological sections, cerebral angiograms, magnetic

resonance angiography images, magnetic resonance images and diagrams, each illustrating important views of the CNS.

The Atlas is made up of five parts. Part I consists of a brief overview of the nervous system and a guide to the use of the Atlas. Part II depicts the anatomy of the major anatomical divisions of the CNS together with their vasculature, primarily through gross specimens and angiograms. Part III, the Atlas's largest section, presents the brain in dozens of coronal, sagittal and axial sections. Each brain section is presented with an extensively labelled gross specimen slice on the left page, with the right page displaying either the same specimen with its vascular territories highlighted in colour, or an MRI image of the same section. Part IV offers histological sections of various CNS structures, including the classic images of the brain stem and spinal cord so attentively studied in medical school. For many of the images, vascular territories are also displayed below the main image. Finally, Part V presents over thirty CNS pathways, using multiple slices linked by coloured diagrammatic lines to illustrate the organization and connections of the CNS. Each pathway is accompanied by a brief text summarizing its functions and connections. Among the pathways illustrated are those of the brain stem, the sensory system, the motor system, the cerebellum and the autonomic systems. Medical-school staples such as the visual pathway and the spinothalamic tract are of course included, as are many that go far beyond the needs of a medical student, such as detailed representations of hippocampus and amygdala nuclei and their connections.

The quality of most images and the clarity and organization of each page is nearly faultless. The gross and histological slices are beautifully prepared and photographed. The pages are densely packed with

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information yet never crowded, and the system of labelling is both logical and unobtrusive. On a basic background of black and white, colour is judiciously used to highlight essential elements such as arteries, vascular territories, nuclei, and pathways. Approaching it with a question, a student will quickly and efficiently find virtually any answer on the anatomy of the CNS that he or she is likely to require. If faced with a head CT or MRI during clerkship, the Atlas will immediately help orient the medical student, although it will offer no clue as to pathology. Simply browsing the Atlas will also be fruitful; its clarity of exposition allows key concepts to be reinforced with every viewing. This is particularly true of the pathways, which taken together are a succinct yet rich guide to the organization of the CNS. Overall, The Brain Atlas is a powerful and flexible tool, and this is reflected in the fact that it has received strong recommendations by reviewers from such diverse fields as neuroradiology (2004) (review of 2nd edition), neuropsychology (3) and psychoneuroendocrinology (2).

The Atlas is not without certain weaknesses, however. Chief among them is the depictions of the vasculature anatomy of the brain. The presentation of the arteries is limited to photos of gross specimens with the arteries coloured in red as well as radiological imaging, which can be difficult to interpret for the beginning student. There is not, in the whole Atlas, a single clear conceptual image of the Circle of Willis, for example, as the specimens intended to show it inevitably suffer from the natural asymmetries and individual variations of their owners. A simple diagram would have been helpful, as is used to great effect on page 48 for the representation of the arteries to the spinal cord.

Not being designed for it, the Atlas does have limitations as a tool for medical school. Unlike many

other atlases, it contains no anatomy besides that of the brain and spinal cord; students hoping to see how they fit within the cranium and spinal column will have to look elsewhere. Even the ventricles are given short shrift, being seen only once in their totality in Part I. There is also no discussion or images of pathology, so students will not be helped in their understanding of the relationship between neuroanatomical lesions and dysfunction. Finally, as its full title states, The Brain Atlas is a guide to the central nervous system only. Since neuroanatomy courses inevitably cover the peripheral nervous system as well, other references will be needed to complete them.

The clarity and organization of The Brain Atlas does justice to its subject, and would be an excellent adjunct text for medical students beginning their study of neuroanatomy. For students who have no intention of studying neuroanatomy more than once in their careers, other texts more focused on the needs of medical students are available. But for those with an interest in the neurosciences, however, The Brain Atlas will not only be helpful in guiding them through their introductory courses, it will continue to serve as a valuable resource for years to come.

REFERENCES

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