

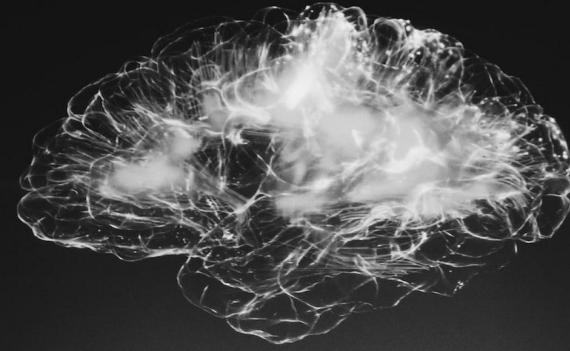


Understanding Neurology

An Overview of the Brain and Nervous System

Introduction to Neurology

- Study of the nervous system
- Structure of the brain and spinal cord
- Function of neurons and synapses



seeing the beautiful brain today

Santiago Ramón y Cajal employed the art of drawing to depict his observations and to convey scientific arguments. He understood the persuasive power of images, and his drawings helped convince other neuroscientists of his theories. The aesthetic appeal and subtle emotional qualities in Cajal's images underscore their scientific content. Today neuroscientists have access to vastly more complex visualization tools than Cajal did. Modern scientists use digital images, not drawings, to share their observations and put forth their hypotheses. As this section of the exhibition shows, their images convey a different kind of beauty. As with Cajal's drawings, these contemporary images were chosen by neuroscientists and art historians for both their scientific significance and their aesthetic impact.

Cajal focused on cellular structures that make up the nervous system, magnifying cells that were about the width of a human hair. Since the invention of the electron microscope in 1931, first used in neuroscience in the 1940s, brain cells can be examined at increasingly greater magnification levels. Through Magnetic Resonance Imaging (MRI) techniques, in use since the late 1970s, scientists can examine the entire human brain. Cajal was limited to dead tissue fixed on slides that he viewed through his ocular microscope; MRI technology allows scientists to visualize the living brain.

Today, we can see much more of the brain than Cajal could. We can understand in detail how the neurons he identified send signals across space to distant brain regions. But we still do not fully understand how the brain creates the mind. Cajal wrote: "Like the entomologist in search of colorful butterflies, my attention has chased, in the gardens of gray matter, cells with delicate and elegant shapes, the mysterious butterflies of the soul, whose beating of wings may one day reveal to us the secrets of the mind." Current scientific questions and goals remain much the same as Cajal's.

Please note that in all contemporary experiments that produced images in this exhibition, scientists treated animals humanely in compliance with international standards for animal use and care. Animals were fully anesthetized prior to sacrifice and tissue harvesting. Experiments on human volunteers complied with international standards for consent and research participation.

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Types of Neurological Disorders

- Degenerative diseases (Alzheimer's, Huntington's)
- Movement disorders (Parkinson's, ALS)
- Stroke and traumatic brain injuries



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Neuroimaging Techniques

- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)
- Positron Emission Tomography (PET)



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The Brain and Behavior

- Emotions and limbic system
- Language and Broca's area
- Memory and hippocampus



Clinical Neurology

- Patient assessment and evaluation
- Diagnosis and treatment of neurological disorders
- Collaboration with other healthcare professionals



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Neuroplasticity and Brain Development

- The ability of the brain to change and adapt
- Effects of environmental factors and experiences
- Critical periods of brain development



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Neuropharmacology

- Study of drugs and their effects on the nervous system
- Treatment of neurological and psychiatric disorders
- Neurotransmitters and their pathways