

Studying the morphological basis of neuronal function

Modern neuroscience is oriented heavily in the direction of molecular and cellular biology. Therefore, the need for continued contribution of high-quality neuroanatomy is often overlooked. As more and more genes related to normal and pathological neural functioning are uncovered, their significance can only be elucidated if there is an accurate understanding of the anatomical regions and neuronal cell types in which they are expressed. To this end, modern neuroanatomical techniques provide the necessary means for scientific progress in the field.

With regard to clinical neuroanatomy, powerful methods are applied for imaging the human brain. However, currently available machines rarely provide sufficient spatial detail as to the cytoarchitectonic brain regions in which the activations occur. Hence, advanced neuromorphological techniques are required for linking functional human studies to cellular and molecular results obtained in various laboratory animals.

The **Division of Neuroanatomy** at the Medical University Innsbruck contributes to these objectives by offering lectures and seminars in functional and comparative Neuroanatomy as well as neuronal imaging workshops. The major field of interest in research relates to the morphological aspects of axon growth and neuroplasticity in response to axon injury.

The molecular basis of neurite outgrowth and axonal regeneration in the nervous system is still largely unknown. A variety of cell lines as well as primary neurons are used to study this phenomenon in vitro. Peripheral neurons of neonatal and adult age survive and regenerate readily in culture providing valuable tools for the study of intrinsic neuronal mechanisms leading to neurite initiation and axonal elongation. Receptor tyrosine kinases and their signaling pathways are in the focus of our current projects.