Advanced morphology: imaging and microscopy

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Being a member of the Euro-BioImaging Facility in IBBC, my interest is mainly to image processes of life at the cellular level with imaging methods and to develop novel methods for visualization. I am especially interested in live-cell imaging using cell permeant fluorescent dyes compatible with life and genetically encoded fluorescent tags. My principal role in BioImaing Facility is to assist the investigators of the Institute with the latest imaging technologies, such as wide-field, fluorescence and confocal microscopy, live imaging, image acquisition, digital image analysis as basic and advanced applications (deconvolution, 3D rendering), electron microscopy and correlative light-electron microscopy.

In addition, I am belong to a cell biology research group that works in the area of intracellular membrane transport to understand the organization and function of the mammalian secretory pathway. The Golgi apparatus is a compartment with well-differentiated molecular and structural zones but it is a dynamic organelle changing its structural and functional characteristics in different physiological (mitosis, apoptosis and migration) and pathological (cancer, neurological and vascular diseases) conditions. We would like to understand how this organization contributes to the transport and processing (glycosylation) functions of the organelle developing cellular models and technologies (including imaging) to identify pharmacological targets for cancer and other diseases related to membrane transport.

The basic functions of the Golgi are conserved throughout evolution but its structural organization varies between species and tissues. I am involved in a study that we are starting to understand the tissue specific architecture of Golgi apparatus and later to understand its molecular basis. Our knowledge of the cells that make up the human body, how they vary throughout development and in health or disease, is still quite limited. Understanding the details of each cell type will be useful to develop a comprehensive reference map of all human cells to provide a basis for understanding human health in addition to diagnosing and treating diseases. In this context, the differentiation of Golgi apparatus morphology and function between tissues could contribute to understand tissue specific mechanisms controlling organelle architecture and function.

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