Brief resume of Prof. T. Hökfelt.

The research of the Thomas´s group is focused on chemical messengers in the nervous and endocrine systems, mainly based on histochemical techniques: Immunohistochemistry and in situ hybridization.

They also use molecular biological approaches including RT-PCR and have created some transgenic animals. They are interested in the concept that a neuron produces and releases more than one transmitter molecule. In particular, their work has focused on the role of neuropeptides in the central and peripheral nervous system, including substance P, galanin and NPY, three peptides that have been discovered by Swedish scientists/at Karolinska Institutet. These peptides may be involved in numerous functions as well as in various diseases, for example pain and depression.

Selected Publications

- Hökfelt T, Elfvin LG, Elde R, Schultzberg M, Goldstein M, Luft R “Occurrence of somatostatin-like immunoreactivity in some peripheral sympathetic noradrenergic neurons.” Proceedings of the National Academy of Sciences of the USA 74: 3587-3591, 1977.

- Hökfelt T, Johansson O, Ljungdahl A, Lundberg JM, Schultzberg M “Peptidergic neurones.” Nature 284, 515-521, 1980.
- Hökfelt T “Neuropeptides in perspective: the last ten years” Neuron 7: 867-879, 1991
- Kokaia M, Holmberg K, Nanobashvili A, Xu ZQ, Kokaia Z, Lendahl U, Hilke S, Theodorsson E, Kahl U, Bartfai T, Lindvall O, Hökfelt T. “Suppressed kindling epileptogenesis in mice with ectopic overexpression of galanin” Proceedings of the National Academy of Sciences of the USA 98, 14006-14011, 2001.
- Stanic D, Paratcha G, Ledda F, Herzog H, Kopin AS, Hökfelt T “Peptidergic influences on proliferation, migration, and placement of neural progenitors in the adult mouse forbrain.” Proceedings of the National Academy of Sciences of the USA 105: 3610-3615, 2008.

Summary of seminar in IBMC:

Neuropeptides represent the largest group of messenger molecules in the nervous system - more than hundred and there are even more receptors. The peptide systems are also represented in the pain pathways, including dorsal root ganglia (DRGs) and spinal dorsal horn, and are putative targets for drug development. Our initial studies concerned substance P and CGRP and their possible involvement in pain. More recent studies have focused on galanin and NPY, two peptides that are strongly upregulated in DRGs after peripheral nerve injury. Both have pro- as well as antinociceptive effects. With regard to galanin the former are mediated via GalR2 receptors, whereas activation of GalR1 is associated with an increased pain threshold. In addition to neuropathic pain models we have also, for comparison, analysed diabetic peripheral neuropathy (DPN), in the db/db mouse, confirming other studies that this type of pain show completely different types of phenotypic changes. Possible treatment strategies for DPN will also be discussed. Finally, we have studied the expression of a new Ca2+-binding protein, secretagogin, in DRGs and spinal cord.