

## **Project WikiKI**

### ***Kjell Fuxe: Research in the period 1960-1965***

Kjell Fuxe defended his thesis with the title: **Evidence for the existence of monoamine neurons in the central nervous system** on April 25, 1965. The first opponent was Theodor Blackstad from Norway. The thesis was built on four papers, the first published in 1964. His teacher was Prof. Nils-Åke Hillarp, an outstanding pioneer in the monoamine field, who became professor of Histology in 1962. Fuxe became his first doctoral student at Karolinska Institutet the same year and began to set up with the help of Hillarp the formaldehyde fluorescence method for the cellular localization of monoamines, developed by Falck and Hillarp in 1961-1962. Fuxe chose to use their method to study the cellular localization and pharmacology of the monoamines in the central nervous system. His first publications with the Falck-Hillarp technique in this field appeared in 1963 and 1964 obtaining indications for the existence of tubero-infundibular DA neurons in a number of mammals (Fuxe 1963, 1964). In these papers also unpublished findings on the existence of monoamine cell bodies in regions of the brain stem were mentioned. This represented the beginning of the first thesis paper published in 1964 together with medical student Annica Dahlström on demonstration of differentially expressed DA, NA and 5-HT in groups of cell bodies of brain stem neurons (Dahlström and Fuxe 1964). In two other thesis papers Fuxe characterized the global distribution pattern of the varicose monoamine nerve terminal networks formed from the ascending and descending pathways of brain stem monoamine neurons (Fuxe 1965 a,b). The fluorescent varicosities appeared specialized for synthesis, storage and release of monoamines and appeared to have a significant role in CNS communication. In fact, through a collaboration with Dr.K.Larsson in 1964 it became possible to perform lesions of the substantia nigra which produced a disappearance of DA and DA nerve terminals in the neostriatum (Anden et al.1964). Thus, nigro-neostriatal DA pathways exist in which DA transmission can have a major role in modulating neostriatal function. Instead the NA and 5-HT nerve terminal networks of the ventral, dorsal and lateral horn of the spinal cord originating from bulbo-spinal NA and 5-HT pathways descending in the funiculi of the spinal cord (Dahlström and Fuxe 1965, part II of Fuxe thesis).

The first publication of Kjell Fuxe appeared in 1960. He was a coauthor of a paper together with B.Fredricsson, B.Holmstedt and F. Sjöqvist on preservation of cholinesterase and its histochemical demonstration after freeze drying and polyethylene glycol embedding (Fredriksson et al.1960). In 1961 Fuxe as a medical student worked with Dr. Ove Nilsson at Department of Anatomy. Fuxe published a number of papers with Dr.Nilsson on the histochemistry of the uterine epithelium and its hormonal regulation. It involved the use of inter alia fluorescence microscopy and electron microscopy (Fuxe and Nilsson 1963).

#### ***Selected Fuxe References 1960-1965***

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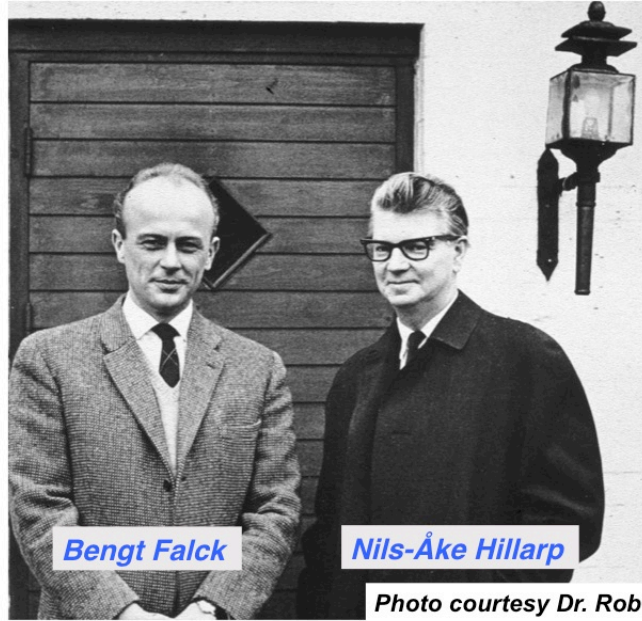
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*Bengt Falck*

*Nils-Åke Hillarp*

*Photo courtesy Dr. Robert Moore*