Foreword

Iron is an important component of the enzymes necessary for the oxidative respiration and as brain has a high rate of oxidative metabolism it would require important amounts of iron. Iron is also required for the synthesis of several brain specific enzymes and neurotransmitters such as dopamine, serotonin and gamma amino butyric acid.

The major proteins of iron metabolism are expressed in the CNS, however the mechanism by which iron is transported and distributed throughout the nervous tissue are not well understood yet. Iron accumulation in the different regions of the brain is observed in several neurodegenerative diseases and it is likely that misregulation of iron metabolism is an important event in the pathophysiology of several human neurodegenerative diseases such as in the neuritic plaques of Alzheimer's disease. In Parkinson's disease, iron accumulation is a common finding and iron metabolism also seems to be related to Multiple Sclerosis.

The process of myelination seems to be particularly dependent on the availability of iron, but iron also can be neurotoxic due to the Fenton reaction which produces free radicals that can attack different cellular components.

Ferritin is a high molecular weight protein containing a heavy chain and a light chain which interact to form the mature protein. The source of ferritin for the brain is uncertain at this time, as is the site of local synthesis of ferritin within the CNS. Ferritin receptors have been

identified on a number of systemic cells and cell lines and recently in mouse and human brains. Oligodendrocytes seem to selectively express ferritin receptors. This is an area for future investigation.

Transferrin, the iron transport protein, is produced mainly by the liver. However, during the past several years there has been increasing interest in transferrin gene expression in the mammalian brain. The role of transferrin and transferrin gene expression has become of particular interest in oligodendroglial cell differentiation and in myelination since transferrin is expressed during early oligodendrocyte development. Central nervous system complexity develops and is maintained as a result of permanent genetic regulation. It is now clear that the transferrin gene plays a central role in one important neural developmental event, i.e. myelin formation, but its role in other developmentally regulated events in the brain is largely unknown.

This special issue of *Developmental Neuroscience* contains papers dealing with the last news on the biological significance of transferrin, ferritin and iron in the central and peripheral nervous systems and their participation in brain development. As Guest Editor of this Special Issue I would like to thank all the participants for their excellent contributions, giving all the readers the opportunity to have an update on the field. Additional thanks to Dr. Anthony Campagnoni and Karger Publishers for the opportunity to publish this issue.

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