

The perivascular neuron type and the blood brain barrier

Paolo Flace

Università degli Studi di Bari 'Aldo Moro', Dipartimento di Scienze Mediche di Base, Neuroscienze e Organi di Senso, Bari, Italia

The blood brain barrier (BBB) is involved in the transport mechanisms between the blood and the central nervous system (CNS). The BBB protect the CNS from injurious agents and modulates selectively the passage of pharmacological agents. The BBB is composed by a layer of endothelial cells, incompletely covered by pericytes surrounded by the extracellular matrix sheathed by endfeet astrocyte processes. The endfeet astrocytes are the mainly target of neuronal processes, the exact neuronal control on the BBB and the neuronal role in the neurovascular unit it is not completely know [1]. Studies revealed the presence of perivascular neuronal processes involved in the modulation of the BBB and few studies demonstrate in the CNS the presence of neuronal cell bodies in close relationship with the wall of vessels [2-6]. The goal of this study of chemical neuroanatomy is to investigate on the presence of monoaminergic and peptidergic perivascular neuronal elements in the human cerebellum.

The study was carried out on autoptoc fragments of human cerebellum fixed in an aldehyde picric acid solution, embedded in paraffin, cut into 5 μ m sections and subjected to light microscopic immunohistochemistry with rabbit polyclonal antibodies for serotonin (5-HT), dopamine transporter (DAT), dopamine type 2 receptor (DRD2), neurotensin (NT), neurotensin receptor type 1 (NTR1). The immunoreaction revealed in the molecular layer, in the three zones of the granular layer of the cerebellar cortex, in the dentate nucleus the presence of neuronal cell bodies and processes in close relationship with the wall of microvessels positive for 5-HT, DAT, DRD2, NT and NTR1.

Although, this data provides further insights, we suggest that the perivascular neuron may be considered a new specific neuron type of the neurovascular unit involved in the permeability control mechanisms of the BBB.

References

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Key words

Cerebellum, perivascular neuron, blood brain barrier, microvessels, immunohistochemistry.