

ENDOGENOUS MORPHINE

Khan Furqan Ali, Kurbat Mikhail

Grodno State Medical University, Belarus

Department of Biochemistry

A morphine-like material in animal tissues was originally demonstrated by immunological recognition. Subsequently, endogenous morphine-like compounds have been identified in mouse and calf brain. The molecular structure of the HPLC purified compound was confirmed as morphine

by liquid and gas chromatographic retention times and mass spectrometry in various tissues such as bovine brain, rat and mouse brain, hypothalamus and adrenal glands, mammalian lung, invertebrate and human tissues, human cerebrospinal fluid and human plasma. Morphine precursors, reticuline, thebaine and codeine are some of the main intermediates of morphine biosynthesis in the poppy plant and have been found in mammals. The pathway for morphine biosynthesis has been established in the opium poppy and animal tissue. In this regard, radiolabeled reticuline was transformed into salutaridine by rat liver microsomes *in vitro* and a similar conversion has been observed *in vivo*. The conversion of salutaridine, thebaine and codeine into morphine has been demonstrated in several rat tissues, including the brain, providing evidence for the biosynthetic pathway of endogenous morphine in mammals. Incubation of human neural cancer cell lines with L-tyrosine leads to the formation of morphine as well. Addition of reticuline to intact invertebrate ganglia *in vivo* leads to the formation of morphine. *Ascaris suum*, a mammalian parasite produces morphine in mammalian hosts and *in vitro*, a phenomenon that may dull the host discomfort so that the parasite can escape host surveillance.

Morphine-like immunoreactivity has been demonstrated in cell bodies, fibers and terminals of neurons in different brain areas of the rat, mouse and man. The antisera revealed numerous nerve cell bodies with variable morphology, dendrites and nerve fibers throughout the cerebral cortex. In the caudate putamen numerous medium size immunoreactive perikarya were visible. Nerve cell body and fibers were stained in the hippocampal formation; dot-like immunoreactivity was visible around granule cells of dentate gyrus and dorsal hippocampus; immunoreactive nerve cell bodies were also revealed throughout the brainstem. In the cerebellum numerous granule cells in the granular layer and small neurons and fibers in the molecular layer are immunoreactive. In human brain tissue, morphine-like immunoreactivity was identified in cerebral and cerebellar cortex. Morphine positive terminals were observed in rat hippocampal formation sometimes forming synaptic contact with the soma of unlabeled cells. In different regions of the brainstem positive morphine-like nerve fibers apposed to μ opiate receptor immunoreactive cell bodies were observed. These literature findings indicate that endogenous morphine might function as neuromodulator/neurotransmitter agent in the CNS.

A compelling body of evidence now supports the existence of a *de novo* biosynthetic pathway for endogenous morphine in mammalian and invertebrate cells, with remarkable similarities to the well-characterised enzymatic pathway described in *Papaver somniferum*. Elucidation of the potential biological significance of evolutionarily conserved opiate alkaloid plant products in animal cells awaits further investigation.

References:

1. Kream, R. M. De novo biosynthesis of morphine in animal cells: An evidence-based model / Kream R. M., Stefano G. B. // Medical Science Monitor. - 2006. – Vol. 12. – N. 10. – P. RA 207-219.
2. Kream, R. M. Morphine synthesis in animals // Kream R. M., Stefano G. B. // Medical Science Monitor. - 2006. – Vol. 12. – N. 10. – P. ED1-2.

3. Poeaknapo, C. Endogenous formation of morphine in human cells / C. Poeaknapo et al. // Proc. Natl. Acad. Sci. USA . - 2004. – Vol. 101. – P. 14091–14096.
4. Zhu, W. Human White Blood Cells Synthesize Morphine: CYP2D6 Modulation / W. Zhu et al. // The Journal of Immunology. - 2005. – Vol. 175. – P. 7357–7362.

ANATOMICAL FEATURES OF BRANCHES OF FEMORAL ARTERY (LITERARY REVIEW)

Gorustovich O., Volchkevich D.

The Grodno State Medical University, Belarus

The basic branch of femoral artery is the deep artery of hip. Numerous researches have shown significant variation of origin and branching of given vessel.

In literature, variation of topographical relations between origin of deep artery of hip and inguinal ligament is described. Most often the artery originates 5-6 cm below inguinal ligament, rarely – just under it, and the rarest variant – at the level of inguinal ligament.

Many authors describe lower origin of the artery – 10-11 cm from inguinal ligament.

Also known is origin of the deep artery of hip from medial semicircle of the femoral artery and external iliac artery above inguinal ligament.

At beginning of the a. profunda femoris from postero-external edge of the femoral artery, it goes downwards and laterally. If the vessel originates from back semicircle, it goes along posterior wall, then passes under its external edge and goes laterally. If the artery arises from postero-internal edges of the femoral artery it passes between femoral artery and vein.

Many variants of origin of branches of the deep artery of hip are described in literature. One or both circumflex arteries depart directly from the femoral artery. In such cases only perforating arteries whose quantity can vary, originate from deep artery of hip. If the deep artery is absent, all branches inherent in it depart from the femoral artery.

A. circumflexa femoris lateralis more often departs from 1,5-2 cm below the beginning of deep artery of hip.

When a. circumflexa femoris lateralis divides on ascending and descending branches, the later also can be accepted as additional deep artery of hip.

A. circumflexa femoris medialis more often originates 1-1,5 cm from deep artery of hip beginning. Adachi (1928) describes the variant at which the a. circumflexa femoris medialis originates from the femoral artery on 16 cm below inguinal ligament.

So, it's visible that sharp problem of variability of arteries of hip. Further research is required on this question.

CORRELATION OF PARAMETERS OF A. UTERINA WITH SOME ARTERIES OF THE PELVIS OF MAN

Gorustovich O., Volchkevich D.

The Grodno state medical university, Belarus

Diagnostic of human vascular system is actual problem in medicine. Angiography of a. uterina with the purpose of diagnostics of pathological conditions is used in gynecology and surgery. However sometimes is not possible to study a structure of a. uterina, therefore we have made attempt to establish the correlation of parameters of the artery with another arteries of pelvis.

Methods of research: macromicropreparation, angiography, morphometry, statistical.

Material of research: 27 preparations of pelvic arteries of female in two age groups: newborns and in the age of 50-65 years.