

Acid-sensing ion channel 2 (asic 2) and trkb interrelationships within the intervertebral disc

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The cells of the intervertebral disc (IVD) have an unusual acidic and hyperosmotic microenvironment. They express acid-sensing ion channels (ASICs), gated by extracellular protons and mechanical forces, as well as neurotrophins and their signalling receptors. In the nervous tissues some neurotrophins regulate the expression of ASICs. The expression of ASIC2 and TrkB in human normal and degenerated IVD was assessed using quantitative-PCR, Western blot, and immunohistochemistry. Moreover, we investigated immunohistochemically the expression of ASIC2 in the IVD of TrkB-deficient mice. ASIC2 and TrkB mRNAs were found in normal human IVD and both increased significantly in degenerated IVD. ASIC2 and TrkB proteins were also found co-localized in a variable percentage of cells, being significantly higher in degenerated IVD than in controls. The murine IVD displayed ASIC2 immunoreactivity which was absent in the IVD of TrkB-deficient mice. Present results demonstrate the occurrence of ASIC2 and TrkB in the human IVD, and the increased expression of both in pathological IVD suggest their involvement in IVD degeneration. These data also suggest that TrkB-ligands might be involved in the regulation of ASIC2 expression, and therefore in mechanisms by which the IVD cells accommodate to low pH and hypertonicity.

Acid-sensing ion channel 2

Degenerate intervertebral disc

Human intervertebral disc

Neurotrophin receptor TrkB

TrkB-deficient mice

acid sensing ion channel

ASIC2 protein, human

membrane protein

protein tyrosine kinase

tropomyosin-related kinase-B, human

aged

animal

female

genetics

human

intervertebral disk

intervertebral disk degeneration

knockout mouse

male

metabolism

middle aged

mouse

pathology

Acid Sensing Ion Channels

Aged

Animals

Female

Humans

Intervertebral Disc

Intervertebral Disc Degeneration

Male

Membrane Glycoproteins

Mice

Mice, Knockout

Middle Aged

Protein-Tyrosine Kinases