a2-macroglobulin

To clarify if a2-macroglobulin (α2M) has an antioxidative effect during the progression of the intervertebral disc degeneration (IVDD).

Methods: The content of α2M and reactive oxygen species (ROS) were measured to compare mildly and severely degenerated human nucleus pulposus (NP) tissue by immunohistochemistry, mass spectrometry, and enzyme-linked immunosorbent assay (ELISA). Additionally, exogenic α2M was used to culture severely degenerated NP tissue in vitro. The effects of α2M on hypochlorite (HOCl)-treated NP cells were evaluated, containing antioxidative enzymes, ROS level, collagen II, and aggrecan expression, MMP3/13, and ADAMTS4/5.

Results: ROS level increased in severely degenerated NP, accompanying with a decreased α2M content. Supplement of α2M could decrease the ROS level of cultured NP in vitro, meanwhile, the MMP13 and ADAMTS4 expression were also reduced. It was found that treatment of HOCl resulted in oxidative damage to NP cells and decreased α2M expression in a dose and time-dependent manner. Furthermore, exogenic α2M stimulation reversed the HOCl-triggered ROS accumulation. The promotion of SOD1/2, CAT, GPX1, collagen II, and aggrecan, and suppression of MMP3/13, ADAMTS4/5 expression caused by α2M were also observed. The study indicates that α2M has an antioxidative ability in degenerated NP cells by promoting the antioxidative enzyme production [1)]

1)
Chen Y, Wei H, Xu F. Antioxidative behavior of a2-macroglobulin in intervertebral disc degeneration. J Med Biochem. 2023 Mar 15;42(2):206-213. doi: 10.5937/jomb0-39557. PMID: 36987418; PMCID: PMC10040188.