High MMP-1, MMP-2, and MMP-9 protein levels in osteoarthritis


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ABSTRACT. Our study examined the relationship between the expression of matrix metalloproteinases (MMP)-1, MMP-2, and MMP-9 proteins and the pathogenesis of osteoarthritis (OA). We employed rigorous inclusion and exclusion criteria in computer-based bibliographic databases to extract published studies relevant to this investigation. The STATA 12.0 software was used for the statistical analyses. A total of 1408 studies were initially searched, and 10 studies with 458 OA patients and 295 healthy controls were included in this meta-analysis. The meta-analysis results suggested that the protein levels of MMP-1, MMP-2, and MMP-9 were higher in patients with OA than in the control group. A subgroup analysis according to ethnicity showed that the protein levels of MMP-1 and MMP-2 were higher in Asian patients with OA than in controls. Caucasians showed no statistically significant differences in protein expression of MMP-1 and MMP-2 between the OA patient group and the control group. Interestingly, the protein levels of MMP-9 in patients with OA were higher than those in the control group in both Asians and Caucasians. A sample-source analysis suggested that the serum levels of MMP-2 and MMP-9 proteins were higher in patients with OA than in controls, while MMP-1 and MMP-9 protein expressions were higher in the
synovial joint fluid of patients with OA than in controls. In conclusion, our meta-analysis results suggested that the increased expression of MMP-1, MMP-2, and MMP-9 proteins might be associated with the pathogenesis of OA.

**Key words:** Osteoarthritis; MMP-1; MMP-2; MMP-9; Gelatinase; Matrix metalloproteinases