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Expression of MMP-9 (Matrix Metalloproteinase-9)

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Glioblastoma multiforma is considered the most aggressive brain tumour. It has been shown, that the malignancy of glioblastoma and several other tumours is linked to overexpression of Matrix Metalloproteinase-9 (MMP-9). The physiological function of this 92 kDa enzyme is to cleave surrounding tissue, ensuring angiogenesis. With this property, it pathophysiologically promotes tumour growth. Specific inhibition of MMP-9 has become a challenge due to similarities within the MMP family. Recently, the focus has switched from inhibition of MMP-9 towards using it as an activating factor of an enzymatic drug delivery system. A peptide, which is specifically cleaved by MMP-9, is linked to a cytostatic drug. This will have the
advantage of specific activation in MMP-9 expressing tissues, hoping to reduce systemic side effects. For conducting activity essays, MMP-9 is needed in larger quantities, which leads to high costs. In this thesis, the expression of MMP-9 through different established systems, namely cell transfection and expression in E. coli and alternatively cell-free expression system, was investigated. Western Blot and zymography were used to detect MMP-9. No MMP- 9 could be proven in lysate and supernatant of transfected HEK293 cells. Active MMP-9 was expressed in transformed BL21(DE3)pLysS E. coli, but was lost during purification. Protein with affinity to MMP-9 antibodies was detected after His-tag purification of the cell-free expression
system, but not after cleavage by HRV 3c protease.

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