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Exploring the role of myeloperoxidase in non-small cell lung cancer

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Background/Aims: Despite the recent increase in number of treatments, Lung cancer remains the leading cause of cancer related deaths worldwide. Non-small cell lung cancer (NSCLC) is a very heterogeneous disease and represents ~85% of all lung cancer cases. It has been reported that NSCLC tumors have a high immune infiltration, where neutrophils represent an abundant immune cell type with an immunosuppressive function. Some of the cytoplasmic granule components of neutrophils, such as myeloperoxidase (MPO), are considered to contribute to tumor development. MPO is a heme containing peroxidase enzyme known for its host defence function against microbes. Some reports suggest that MPO might be able to influence cancer or immune cells and that way contribute to cancer development. We aim to investigate whether MPO can influence lung cancer cells in-vitro and tumor growth in-vivo.

Results: In-vivo data in our lab showed that MPO^{-/-} mice developed smaller tumors and had prolonged survival when compared to MPO WT. Analysis of the TME revealed increased number of different T-cell populations as well as improved function (by measuring INF γ) of T-cells in MPO KO mice vs WT. MPO was able to increase proliferation of human lung adenocarcinoma cells (A549 cells) in-vitro. Furthermore, MPO treated cells revealed a decreased number of apoptotic cells, suggesting a protective function of MPO towards apoptotic cell death. Besides the cytoplasmic uptake of MPO, for the first time we report a nuclear internalization of MPO in A549 cells.

Conclusion: MPO is able to regulate cancer cells and influence T-cells. Therefore, MPO may play a role in development of lung cancer.