Anti-cancer role of Deflamin in colorectal cancer

Ana Rita Durão[1], Ana Lima[2,3], Ricardo Ferreira[4], Marta Martins[1,5]

[1]Institute of Molecular Medicine-João Lobo Antunes, Faculty of Medicine, University of Lisbon, Lisbon, Portugal.
[2]Research in Veterinary Medicine (I-MVET), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.
[3]Veterinary and Animal Research Centre (CECAV), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.
[4]LEAF—Linking Landscape, Environment, Agriculture and Food, Higher Institute of Agronomy, University of Lisboa, Lisbon, Portugal.
[5]Polytechnic Institute of Lusofonia (IPLUSO), Faculty of Veterinary Medicine, Lusófona University, Lisbon, Portugal.

Objectives: We have previously identified deflamin, an oligomeric protein isolated from the white lupine seeds (*Lupinus albus*), with anti-MMPs and anti-inflammatory properties. Given the involvement of MMPs and inflammation in the carcinogenesis process, in this work we sought to explore deflamin's role in colorectal cancer development and progression.

Material and Methods: In this work, we made use of colorectal cancer cell lines HT-29, HCT116, and SW480 to perform proliferation, apoptosis, migration and invasion assays. Zebrafish xenotransplant models were further used as a *in vivo* model of tumorigenesis.

Results: We found that deflamin exerts an inhibitory effect on tumor growth and metastasis formation, contributing to increased tumor apoptosis in the xenotransplanted zebrafish larvae model. Furthermore, deflamin resulted not only in a significant reduction in MMP-2 and MMP-9 activity but also in impaired cancer cell migration and invasion *in vitro*. Using the xenograft zebrafish model, we observed that deflamin inhibits collagen degradation and angiogenesis in the tumor microenvironment *in vivo*.

Conclusion: Overall, our results unravel the nutraceutical potential of deflamin in colorectal cancer treatment.

Keywords: Deflamin, Colorectal cancer, MMP-2, MMP-9.