Instituto de Medicina Molecular João Lobo Antunes

Master Project Proposal

Title: Expression and Production of Recombinant Proteins and Antibodies as therapeutic agents in cancer

Synopsis:

The selective modification of proteins and antibodies is a rapidly expanding field of research, with applications ranging from therapeutics and diagnostics to determining structure function relationships. To date, the most widely used strategies for protein labelling target naturally occurring amino acids with nucleophilic side chains (cysteine or lysine). While numerous modification methods have been reported, strategies which offer absolute regiochemical control whilst allowing access to a broad selection of modifications under physiological conditions remain in high demand.

Cancer remains the second leading cause of death and morbidity worldwide. Metastasis is the major contributor to cancer mortality and morbidity. Despite the advances in chemotherapy, the risks associated with current therapies still carry severe side effects and offer limited benefit to the patient. One of the top challenges in fighting cancer is the need to find tissue specific targeting drugs, to prevent from severe side effects. Thus, there is a critical ***need for innovative drugs capable of modulating new cancer-relevant targets*.** In this research proposal, we seek to establish a new platform to tackle metastasis, addressing iron-dependent pathways.

This project involves highly interdisciplinary work from starting to ending. It is located at the interface of chemistry, immunology and cancer biology and combines bioconjugation chemistry, molecular and cellular biology to enhance the functional properties of therapeutically relevant molecules. The combined expertise of our team covers these key areas which are key to achieve the ambitious goals of the project. Our team at iMM-JLA provides key experience in protein design and synthesis, site-selective antibody modification and cancer targeting.

This MsC plan intends to explore nanobodies and bispecific antibodies, which ***represent an emerging therapeutic modality in cancer*** and elucidate the binding mode of these inhibitors to the target protein(s). Hopefully, this may also represent a major advance in future cancer therapy.

Supervisor: *Marta C. Marques, Gonçalo Bernardes Lab*
Co-Supervisor (if applicable): *Pedro Matias, ITQB NOVA, Oeiras*

Bibliography (facultative):

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