

Chemistry Department

Malaria BioNanoDiagnosis

Requimte / Bionano@REQUIMTE

Collaborations: Malaria Unit, Instituto de Medicina Molecular (UL) and Chemistry and Biochemistry Department, Faculdade de Ciências (UP)



Inês Gomes

Pos-doc Research

PhD in Inorganic Chemistry by Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa

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Objectives

Design and development of a gold nanoparticle (AuNP)-based rapid diagnostic test using monoclonal antibodies to detect *Plasmodium falciparum* (malaria parasite) specific antigens in clinical samples.

Co-advisor of Mariana Romão, dissertation student, Master in Biochemistry.

Methodology

- ❖ Synthesis and functionalization of AuNPs
- ❖ Selection of antibodies based on *Plasmodium falciparum* antigen screening
- ❖ Preparation of bionanoconjugates of functionalized AuNPs / antibodies
- ❖ Evaluation of bionanoconjugates in an assay format: lateral flow strip immunoassay and fluorescence quenching immunoassay

Expected Results

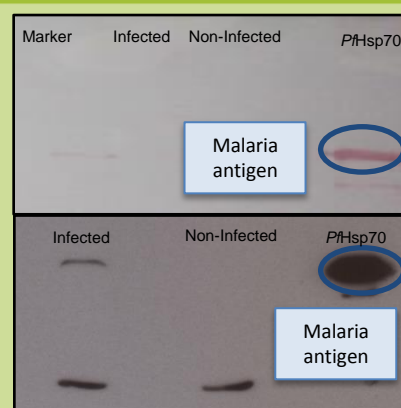
Proof of bionanoconjugates formation by agarose gel electrophoresis, dynamic light scattering and zeta potencial measurements.

Identification of antibodies according to the *Plasmodium falciparum* antigens most abundant in the blood/plasma infected with malaria. Antigens will be identified by mass spectrometry (collaboration with Prof. Alexandra Fernandes, DCV, FCT-UNL, Dr. Ana Coelho, ITQB-UNL and Dr. Hugo Osório, IPATIMUP, Porto).

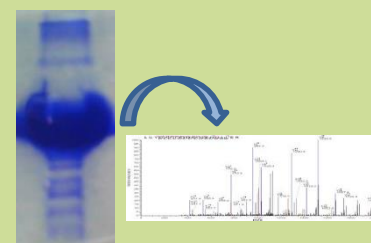
Development of a simple lateral flow test, also using lab-on-paper technology (collaboration with Prof. Elvira Fortunato, CENIMAT-I3N, FCT-UNL) and fluorescence quenching competitive immunoassay for malaria antigens detection.

Funding:

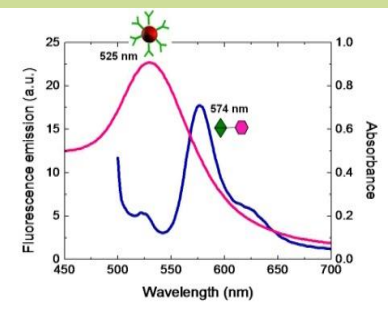
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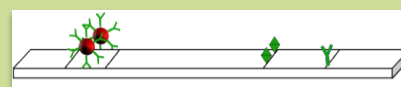
Western blot analysis



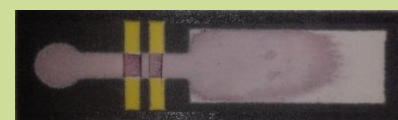
Searching for antigens in malaria-infected blood



Fluorescence immunoassay



Lateral flow strip immunoassay



Lab-on-paper technology