IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Functional properties and arrangement of apicomplexan tubulin and the action of anti-tubulin compounds as chemotherapeutic agents

Project number: IMURA0084

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Research Academy theme/s

Biotechnology and stem cell research

The research problem

Plasmodium falciparum and *Babesia bovis* are protozoan parasites that cause significant morbidity and mortality in humans and animals respectively. Development of novel anti-parasitic drugs against these organisms is of great interest due to increased incidence of drug resistance to the present regimen of therapeutics. This research proposes to test the anti-parasitic activity and mechanisms of action of compounds that target the cytoskeletal protein tubulin with the overall aim of identifying novel and urgently required therapeutics.

Project aims

1. To understand the functional role of tubulins and to measure parasite microtubule dynamics by visualisation of parasite tubulins by genetic tagging or by fluorescent compounds.
2. To model the 3D structure of parasite tubulins leading to rational drug design.
3. To test novel compounds that target tubulin in *Plasmodium falciparum* and *Babesia bovis.*
4. To understand the mechanism of action of these compounds by visualization of parasite microtubules using immunofluorescence

Expected outcomes

The project will lead to a better understanding of microtubule function and dynamics in these two important apicomplexan parasites and may lead to the discovery of lead compounds for anti-parasitic drugs against two important protozoal diseases.

Which of the above Theme does this project address?

The project will address the theme of Biotechnology.

How will the project address the Goals of the above Themes?

The project will provide advanced training in a number of areas of biotechnology. As the project progresses, there will be opportunity to learn the techniques of drug discovery which will ultimately lead to collaborations with biotech and/or pharmaceutical partners.