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राष्ट्रीय कोशिका विज्ञान केन्द्र
National Centre For Cell Science
जैवप्रौद्योगिकी विभाग, भारत सरकार का स्वायत्त संस्थान
(An Autonomous Institution of the Department of Biotechnology, Government of India)

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TO WHOM IT MAY CONCERN

Dr. Shailza Singh's lab works in synergistic studies involving computation, systems and synthetic biology in the area of infection and inflammation, towards achieving drug design as well as delivery. Evolutionary Network analysis of lipid metabolism of the parasite led to the identification of an important enzyme crucial for the survival of the parasite that further paved the way for screening novel compounds. One of these is a coumarin derivative (termed as C2), which could be a potent molecule since its effects were well validated in in vitro and in vivo studies. In further studies with protozoan cell cultures of leishmania, Dr. Singh used lipid-based drug carriers to deliver C2 inside the leishmania cells, and successfully demonstrated that a sustained release of C2 within these leishmania cells triggered them to commit cellular suicide, which was characterized by an observable decrease in the integrity of mitochondrial membranes and quantified using mitochondrial dyes. Dr. Shailza has also designed novel peptides through machine learning that could potentially be effective in the treatment of leishmaniasis. Through system guided design of synthetic circuits, a positive effect on the generation of pro inflammatory mediator NO was demonstrated with altered cytokine synthesis including pro inflammatory cytokines like IL12B, IFN and iNOS production. This work is the first of its kind in the leishmanial infection system, for which Indian Patent has been granted recently on 23rd July 2024 (Indian Patent No.: 545589). In a nutshell, long-term vision of the lab is to develop paradigms for the design, construction and validation of robust synthetic circuits which may act as implantable therapeutic devices.

I strongly recommend the candidature of Dr. Shailza Singh for SUN PHARMA Research Fellowship under Pharmaceutical Sciences.

With best regards,

Sabapat
23/08/2024

Sharmila A. Bapat

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