



# SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY  
(DEEMED TO BE UNIVERSITY)

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## Attestation by the Proposed Research Supervisor

The candidate **Kamarajan Rajagopalan M-Tech., PhD Scholar**. He has 5 years of research experience in regeneration and stem cell biology. has analysed the survivability and regeneration potential of worms were augmented upon in vitro maintenance. Notably, the amputated segments (1<sup>st</sup>–10<sup>th</sup> segments) and posterior segments of similar length, which usually die within the 4<sup>th</sup> day *in vivo*, survived for more than 60 days *in vitro* but lacked the regeneration ability. On the other hand, the amputated posterior segments (30<sup>th</sup> to 37<sup>th</sup> segments) from juvenile worms, maintained in *in vitro* condition, survived and initiated blastema with multiple buds but lacked the ability to regenerate. Interestingly, the equal half of adult worm blastema that is maintained in *in vitro* conditions were able to form the blastema-like structure with the help of a unique stick. The anterior blastema failed to retain the regenerative structure but the posterior portion of the amputated blastema, which is also associated with a small portion of the body segment, showed the ability to retain the regenerative structure. His results conclude that the survivability is enhanced upon in vitro maintenance and this condition favours the adult dedifferentiated blastema and stem cell-enriched juvenile posterior segments to form a regenerative blastema. It has published in the *Journal of In Vitro Cellular & Developmental Biology - Animal* (IF: 2.723), DOI Number: <https://doi.org/10.1007/s11626-022-00706-6>. Apoptosis Induced Compensatory Proliferation is a process that maintain tissue homeostasis is followed by many regenerative animals such as *Hydra vulgaris*, *Xenopus*, *Drosophila* and mice. He hypothesized that AICP study helps to comprehend the molecular links of regeneration and cancer mechanisms in a better way. He made a review article describes the current updates of AICP pathways in regenerative animal models (lower to higher) and their research gaps. Substantially, effector caspase 3 is the centre of attention for AICP, but in that review he reveals the hidden rulers TCTP/p53 behind the complete process of AICP because both can regulate effector caspase 3 in many contexts. But, the study on TCTP/p53 on caspase 3 regulation during regeneration is a lack. Therefore, analyzing the role of TCTP/p53 will ameliorate the betterment of the AICP study. According to his hypothesizes, he found primary view of AICP in earthworm that was published in the International e-Conference on Bioengineering for Health & Environment (ICBHE 2021), Organized by Sathyabama Institute of Science and Technology, Chennai, India in association with MAHSA University, Selangor, Malaysia. (ISBN Number: 978-93-83409-66-2). Following that, he found AICP in earthworm that research article is being under the review process in the *Journal of In Vitro Cellular & Developmental Biology - Animal* (IF: 2.723) – Manuscript Number: IVAN-D-23-00169. He also found the role the TCTP behind the regeneration principle. In brief, arresting cell cycle at the G1/S boundary using 2mM Thymidine confirms that *P. excavatus* execute both epimorphosis and morphallaxis regeneration mode. The pharmacological suppression of TCTP using bucizine results in regeneration suppression. Following the combinatorial injection of 2mM Thymidine and bucizine, the earthworm regeneration is completely blocked, which suggests a critical functional role of TCTP in morphallaxis. The pharmacological inhibition of TCTP also suppresses the key proteins involved in regeneration: Wnt3a (stem cell marker), PCNA (cell proliferation) and YAP1 (Hippo signalling) but augments the expression of cellular stress protein p53. His collective results indicate that TCTP synchronously is involved in the process of stem cell activation, cell proliferation, morphallaxis, and organ development in the regeneration event. These findings recently accepted in the *Journal of Tissue Engineering and Regenerative Medicine* (Impact Factor: 3.62). As an application point, he believes that activating the key regenerative proteins will aid to regain the regeneration capacity back. As a primary step, he successfully activated the key regenerative proteins in mouse cell lines by tissue extracts of earthworm clitellum. This research is being the under the review process in the *Journal of Wound Repair and Regeneration* (Impact Factor: 2.9) Manuscript Number: WRR-23-08-0298. Overall He has nine publications in total (five research papers, four reviews, three book chapters and one conference proceeding), 892 citations, H-index of Seven and i10-index of Six.

(Google Scholar link: <https://scholar.google.com/citations?user=ZHzzmmWMAAAAJ&hl=en>).

I certify that the information given by the candidate has been checked by me and found correct. I strongly recommend the candidate for the **Sun Pharma Science Scholars Awards-2023**.

Place: Chennai

Date: 30.08.2023

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Signature of Supervisor  
(Name, Designation, Official address of the Supervisor)