MARINE BIOLOGY ALUMNI ASSOCIATION

Monthly Talk in Marine Biology

Extracellular-vesicle mediated cell-cell communication is required for planarian tissue maintenance.

On 19th February 2024, 11 A. M.

At School of Marine Sciences Auditorium

Faculty Co-ordinators

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Jointly Organized By

Dept of Marine Biology, Microbiology and Biochemistry,
Marine Biology Alumni Association, (MBAA).
Society of Marine Biologists, (SOMB).
Lake Side Campus, CUSAT.

Speaker

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Area of Research: Regeneration biology of invertebrates, Cell-cell communication in whole-body regeneration, Stem-cell biology, Small RNA biology, Developmental biology.

Abstract:

After amputation, planarians exhibit a body-wide stem cell proliferation followed by migration and localized neoblast proliferation near the wound. These steps are critical in blastema formation, making intercellular communication imperative during wound healing and tissue regeneration. One key factor missing in this situation is the primary informants or cues attracting the stem cells to the plane of amputation/ injury. Extracellular Vesicles (EVs) are bi-layered structures recognized as the leading player in cell-cell communication. EVs carry a wide variety of biomolecules, such as proteins, mRNAs, small RNAs, lipids, metabolites, surface molecules, etc., from their cell of origin, reflecting the nature of the cells. This property of the EVs has been used to elucidate the molecular mechanisms of various health conditions such as cancer, metabolic disorders, neurological disorders, etc. EVs were isolated from regenerating planarians by following the MISEV protocols and subjected to proteomics and small RNA sequencing to understand the cargo inside them. RNAi screen was performed on the genes packaged inside the EVs to understand their biological function. Small RNA sequencing revealed that planarians use EVs as a mode of transportation for dsRNA-derived siRNAs. We transplanted EVs isolated from dsRNA-fed animals to healthy animals to test this hypothesis. EV transplanted animals exhibited gene-specific RNAi phenotype. This suggests that the planarians meticulously use EVs to pack dicer-processed siRNAs from dsRNA and transport them within the animals. Thus, studying EV biology could help us further understand cell-cell communication and its functions in regenerating model systems.