

In order of Importance, list of 10 best papers of the applicant highlighting the important discoveries/contributions described in them briefly: (with illustrations)

1. Rajagopalan, Kamarajan, Jackson Durairaj Selvan Christyraj*, Karthikeyan Subbiahanadar Chelladurai, Puja Das, Karthikeyan Mahendran, Logeshwari Nagarajan, and Saritha Gunalan. "Understanding the multi-functional role of TCTP in the regeneration process of Earthworm, *Perionyx excavatus*." *Tissue Engineering and Regenerative Medicine* 21, no. 2 (2024): 353-366.

This study explores the multi-functional role of TCTP (Tumor Protein p53) in the regeneration process of the earthworm *Perionyx excavatus*. The research highlights how TCTP influences various aspects of tissue regeneration in earthworms, suggesting its potential as a therapeutic target in regenerative medicine.

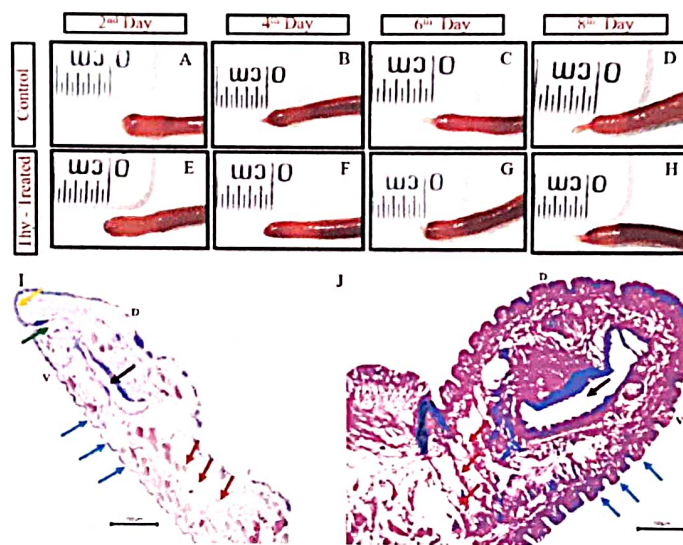


Fig. 2 Regeneration following 2 mM Thymidine (cell cycle inhibitor) injection: A Control worm heals wound on 2nd day of post-amputation. B Blastema size of 0.2 mm was observed on the 4th day after post-amputation. C regenerative bud elongated to 0.3 mm on the 6th day. D blastemal size almost doubled (0.5 mm) on the 8th day upon restoration. (E) wound healing was adequately executed in Thymidine treated worm on the 2nd day of post-amputation. F blastemal growth is restricted and shows only 0.1 mm size following the 4th day of post-amputation. G unmeasurable very little blastemal growth progress was observed until the 6th day of post-amputation. H blastemal size is slightly elongated to 0.2 mm size

following the 8th day of post-amputation. I histology of 8th day control blastemal tissue shows well-differentiated prostomium, mouth, septum, and elongated segments. J histology of 2 mM Thymidine injected 8th day regenerative blastema with less developed structures lacking prostomium, mouth, and with truncated regenerative body segments. Arrows (red represents septum; blue represents newly regenerated segments; yellow indicates prostomium; green represents functional mouth; purple represents intestinal tract). "D" represents the dorsal side of the earthworm, and "V" specifies the ventral surface of the earthworm

2. Subbiahanadar Chelladurai, Karthikeyan, Jackson Durairaj Selvan Christyraj*, Ananthaselvam Azhagesan, Vennila Devi Paulraj, Muralidharan Jothimani, Beryl Vedha Yesudhasan, Niranjan Chellathurai Vasantha et al. "Exploring the effect of UV-C radiation on earthworm and understanding its genomic integrity in the context of H2AX expression." *Scientific Reports* 10, no. 1 (2020): 21005.

The paper investigates the impact of UV-C radiation on earthworms and its effects on genomic integrity, specifically focusing on H2AX expression. This study provides insights into how UV-C radiation affects earthworm DNA and cellular mechanisms involved in repair and maintenance.

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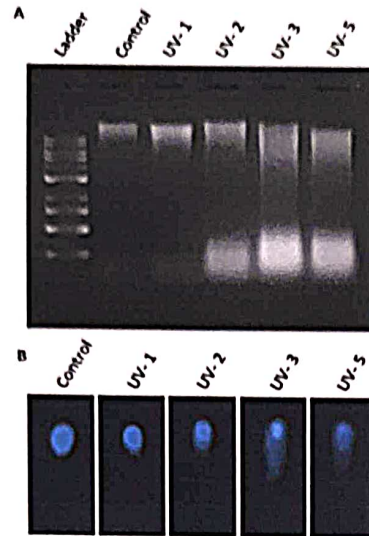


Figure 7. DNA fragmentation assay and Comet Assay (A) DNA fragmentation assay—ladder (1 kb), Control group DNA with a single clear band and from 1, 2, 3, and 5 min UV-C-exposed earthworms, DNA are fragmented and come with dragged structure. The DNA fragmentation dragged is high in UV-C 3 and 5 min-treated groups. (B) Comet assay—in control group, the DNA appears in a proper round structure whereas in 1–5 min UV-C-treated group, it shows increased tail movement.

3. Rossan Mathews, Melinda Grace, Ravichandran Subramaniam, Saravanakumar Venkatachalam, Johnson Retnaraj Samuel Selvan Christyraj, Beryl Vedha Yesudhasan, Kalishwaralal Kalimuthu, Manikandan Mohan, and **Jackson Durairaj Selvan Christyraj***. "Biochemical and functional characterization of heat-inactivated coelomic fluid from earthworms as a potential alternative for fetal bovine serum in animal cell culture." *Scientific Reports* 14, no. 1 (2024): 5606.
This research characterizes heat-inactivated coelomic fluid from earthworms, evaluating its potential as an alternative to Fetal Bovine Serum in animal cell cultures. The study demonstrates that earthworm coelomic fluid can support cell growth, making it a promising candidate for use in cell culture applications.

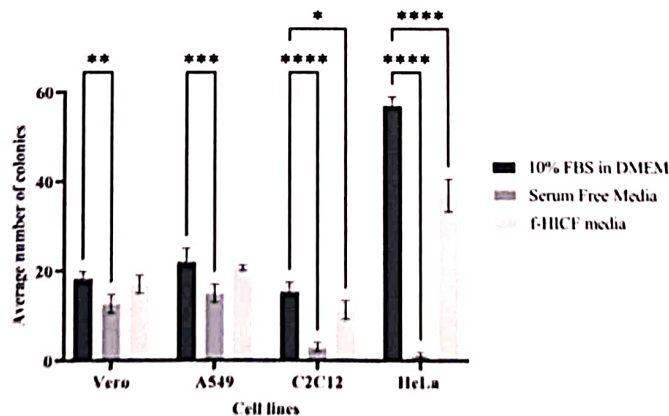


Figure 6. Plating efficiency of cell lines (Vero, A549, C2C12 and HeLa) cultured in 10% fetal bovine serum (FBS) containing DMEM media, commercially available serum free media and formulated heat inactivated coelomic fluid (F-HICF) serum free media. Data indicate the average value of triplicates (mean \pm SD). *Significant difference from control ($p < 0.05$), **Significant difference from control ($p < 0.01$), ***Significant difference from control ($p < 0.001$) and ****Significant difference from control ($p < 0.0001$).

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4. Vivekanandam, Reethu, Kamarajan Rajagopalan, Madesh Jeevanandam, Harsha Ganesan, Vaishnavi Jagannathan, **Jackson Durairaj Selvan Christyraj**, Kalishwaralal Kalimuthu, Johnson Retnaraj Samuel Selvan Christyraj, and Manikandan Mohan. "Designing of cytotoxic T lymphocyte-based multi-epitope vaccine against SARS-CoV2: A reverse vaccinology approach." *Journal of Biomolecular Structure and Dynamics* 40, no. 24 (2022): 13711-13726.

This paper presents the design of a multi-epitope vaccine against SARS-CoV-2 using cytotoxic T lymphocytes, employing a reverse vaccinology approach. The study contributes to vaccine development strategies by exploring new methods for eliciting immune responses against COVID-19.

5. Paul, Sayan, Subburathinam Balakrishnan, Arun Arumugaperumal, Saranya Lathakumari, Sandhya Soman Syamala, Vijithkumar Vijayan, **Selvan Christyraj Jackson Durairaj**, Vaithilingaraja Arumugaswami, and Sudhakar Sivasubramaniam. "Importance of clitellar tissue in the regeneration ability of earthworm *Eudrilus eugeniae*." *Functional & Integrative Genomics* 22, no. 4 (2022): 1-32.

The research emphasizes the role of clitellar tissue in the regeneration capacity of the earthworm *Eudrilus eugeniae*. The study demonstrates the critical importance of clitellar tissue for successful regeneration, enhancing understanding of earthworm regenerative biology.

6. **Jackson Durairaj Selvan Christyraj***, Ananthaselvam Azhagesan, Mijithra Ganesan, Karthikeyan Subbiah Nadar Chelladurai, Vennila Devi Paulraj, and Johnson Retnaraj Samuel Selvan Christyraj. "Understanding the role of the clitellum in the regeneration events of the earthworm *Eudrilus eugeniae*." *Cells Tissues Organs* 208, no. 3-4 (2020): 134-141.

This study examines the role of the clitellum in regeneration processes of the earthworm *Eudrilus eugeniae*. It provides valuable insights into how the clitellum contributes to regeneration events, furthering knowledge on earthworm tissue repair mechanisms.

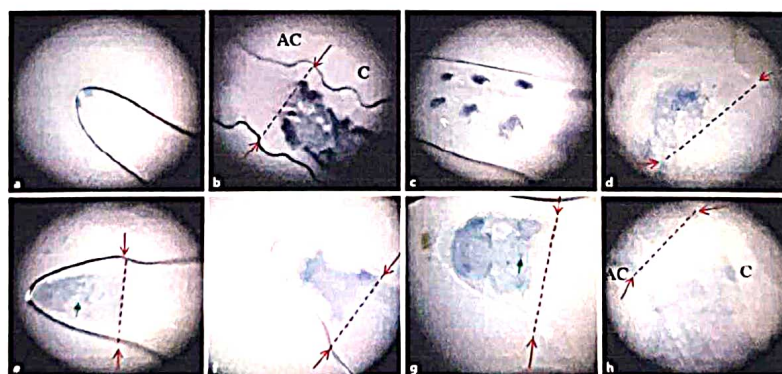


Fig. 5. ALP signals in the control group of regenerating *E. eugeniae* earthworms (segment 10 to anus) at different time points. **a** Control worm showing ALP signals at the anterior tip. **b** Clitellum of a control worm showing enriched ALP activity, which is absent in the clitellum before the segments. **c** Posterior part of each segment of a control worm showing a uniform pattern of ALP expression. **d** Amputated worm shows ALP signals at the amputation site and the wound healing site 24 h after amputation. **e** Movement of ALP positive cells from adjacent segments towards the amputation site and regenerative blastema 48 h after amputation. Forma-

tion of a row of small setae in blastemal segments. **f** Three days after amputation, bud shows ALP signals in blastema and at the amputation site but lacks signals in the anterior blastemal tip. **g** Uniform blastemal cells start to differentiate 4 days after amputation but lack signal from the anterior bud tip and the adjacent segments. **h** Clitellum of a regenerating worm showing diminished and dispersed ALP signals, which move towards the amputation site. C, clitellum segments; AC, body segments anterior to the clitellum segments. Red arrows indicate the amputation site, and green arrows represent seta formation. $\times 140$.

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7. Subramaniam, Ravichandran, Johnson Retnaraj Samuel Selvan Christyraj, **Jackson Durairaj Selvan Christyraj**, Saravanakumar Venkatachalam, Melinda Grace Rossan Mathews, Kesavamoorthy Venkatachalam, Kalishwaralal Kalimuthu, and Beryl Vedha Yesudhasan. "Profiling microRNAs of earthworm, *Perionyx excavatus* and deciphering the expression of distinct novel miRNAs regulating epimorphosis regeneration." *Gene* (2024): 148636.

The paper profiles microRNAs in the earthworm *Perionyx excavatus* and identifies novel miRNAs that regulate epimorphic regeneration. This study contributes to the understanding of gene regulation during earthworm regeneration and highlights specific miRNAs involved in the process.

8. Rajagopalan, Kamarajan, **Jackson Durairaj Selvan Christyraj***, Karthikeyan Subbiahanadar Chelladurai, Jemima Kamalapriya John Samuel Gnanaraja, and Johnson Retnaraj Samuel Selvan Christyraj. "Comparative analysis of the survival and regeneration potential of juvenile and mature earthworm, *Eudrilus eugeniae*, upon in vivo and in vitro maintenance." *In Vitro Cellular & Developmental Biology-Animal* 58, no. 7 (2022): 587-598.

This comparative study analyzes survival and regeneration potential of juvenile versus mature earthworms *Eudrilus eugeniae*, both in vivo and in vitro. It provides insights into how developmental stage affects regeneration capabilities and survival in different conditions.

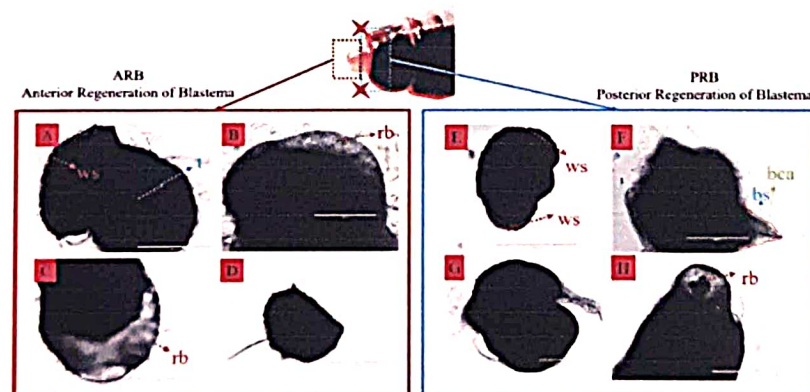


Figure 5. In vitro maintenance of adult 4th d blastema and their regeneration potential. The 4th d in vivo regenerated blastema was further amputated into two half and categorized into ARB (Anterior Regeneration of Blastema—only blastema region) and PRB (Posterior Regeneration of Blastema—blastema region with one body segment). In ARB: (A) 2nd d after amputation; (B) from the amputation site, the new blastema was formed on 10th d; (C) blastemal size was enormously increased on 18th d after amputation; (D) loss of regenerated portion of ARB on 30th d after amputation. In PRB: (E) 2nd

d after amputation; (F) 10th d after amputation, the blastema regeneration was initiated with defined manner by the support of stick-like structure called blastema stick (bs) and cells are captured with their support; (G) elongation of blastema was observed on 18th d; (H) observation of reformed structure of blastema (similar to in vivo regeneration) observed on 30th d. (ws, wound site; rb, regeneration of blastema; bs, blastema stick-like structure; bca, cells attached in blastema).

9. Rajagopalan, Kamarajan, **Jackson Durairaj Selvan Christyraj***, Karthikeyan Subbiahanadar Chelladurai, Johnson Retnaraj Samuel Selvan Christyraj, Puja Das, Apoorva Roy, Chaughule Vrushi, and Nehla Siraj M. Chemmet. "The molecular mechanisms underlying the regeneration process in the earthworm, *Perionyx excavatus* exhibit indications of apoptosis-induced compensatory proliferation (AICP)." *In Vitro Cellular & Developmental Biology-Animal* 60, no. 3 (2024): 222-235.

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The research explores the molecular mechanisms of regeneration in *Perionyx excavatus*, specifically focusing on apoptosis-induced compensatory proliferation (AICP). The study reveals how AICP contributes to the regenerative process, offering a deeper understanding of the underlying molecular dynamics.

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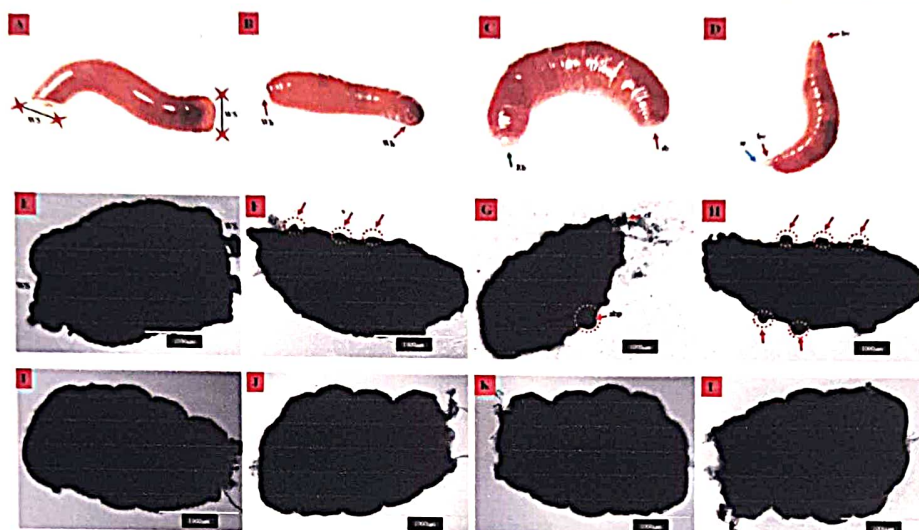


Figure 4. Survival and regeneration potential of amputated segments that are maintained in in vivo and in vitro conditions. (A) Worms are amputated in between the 22nd and 36th segments (15 segments) and observed on the 0th hour with wound site. (B) Wound healing observed after the 1st day of post-amputation (24 h). (C) On the 4th day, blastema forms in both the amputated site. (D) On the 6th day of post-amputation bud size elongation. (E) Amputated 33rd to 37th body segments under in vitro condition (L15 medium with 10% FBS) at the 0th hour of observation. (F) Initiation of abnormal projections in the body segments was observed following 24 h. The wound

started to heal which is evident with the formation of curvature at the wound site. (G, H) Wound healing and multi-bud formation was observed after 36 and 48 h respectively. (I-L) amputated 33rd to 37th body segments that are maintained in in vitro condition in serum-free L15 medium and observed on the 0th hour, 24 h, 36 h, and 48 h respectively. Even though the worm survives, it is not able to heal the wound and unable to initiate abnormal bud formation. w.s, wound site; wh, wound healing; rb, pre-stage regeneration of blastema; Rb, regeneration of blastema; bw, blood vessel formation; sr, segment restoration; abp, abnormal patterning.

10. SC, Johnson Retnaraj Samuel, K. Amutha, S. M. Dinesh, Jackson Durairaj SC, R. M. Kalidas, V. Tharmaraj, K. Pitchumani, and S. Sudhakar. "Autofluorescence in BrdU-positive cells and augmentation of regeneration kinetics by riboflavin." *Stem cells and development* 21, no. 11 (2012): 2071-2083.

This study investigates autofluorescence in BrdU-positive cells and the effects of riboflavin on regeneration kinetics. The findings suggest that riboflavin enhances regeneration by influencing cell proliferation and repair mechanisms, contributing to the broader understanding of factors that affect regenerative processes.

The above publications summaries the essential contributions of each paper to the fields of regenerative medicine, molecular biology, and cellular research.

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