

Device for Long Term Monitoring of Cells and Tissues

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The need for **monitoring of growth patterns of cells over long hours** on desired substrates and the functionality of an explant-tissue in a non-vivo environment in their laboratory triggered a team from **Jawaharlal Nehru Centre for Advanced Scientific Research(JNCASR) an autonomous institute under the Department of Science & Technology (DST)**, Government of India to come up with a suitable device.

A device for long-term monitoring of cells & tissues and study drug delivery effects, tissue repair and regeneration

Preservation of secondary cell lines, primary cells, and primary tissue explants outside the incubator environment for long hours and continuous monitoring of the growth and electrophysiology recording for controlled drug delivery is a major requirement. The researchers implemented a **3D-Fluidic device (3D-FD), which has an auto bubble guidance geometry** which allows controlled medium exchange to maintain the metabolites without a trace of fluid leakage and bubble formation. The auto bubble guidance geometry (Helical pathway) and controlled delivery of the medium make it **efficient as a drug screening platform** and unique in the current scenario of neuro-technology.

The JNCASR team designed and fabricated a **hand-held bench-top micro incubator technology** and demonstrated the ability to introduce and deliver drug reagents (channel blockers) in a controlled manner and see their effects. The studies partially funded by DST and JNCASR-DBT partnership program comprises innovative models for in vitro and in vivo efficacy testing

and selection of therapeutic compounds with long-term continuous monitoring possibilities providing valuable information on the biocompatibility and functioning. More specifically, the **possibility of obtaining electrophysiological time-series recordings from active cells** and tissues at high spatial resolution juxtaposed with microscopy imaging has wide implications for development studies.

The availability of 3D-FD by the JNCASR team offers a testbed to explore various elements and their effects. This system has **broad applications for the research community in biomedical engineering** to understand how the tissue grows and the physiology development of cell cultures. Also, this device implementation will help in exploring the intricate tissue/cellular environment and dynamic behaviour of cells.