جامعة
حمد بن خليفة
HAMAD BIN KHALIFA
UNIVERSITY
عضو في مؤسسة قطر
Member of Qatar Foundation

HBKU Thematic Research Grant 3rd Cycle– Project Highlight

Project Title: A Technology to Model Brain Neural Tube Folding *In Vitro* for Precision Medicine.

Noor Ali Al-Maslamani

This project develops a mechanobiology-driven anterior brain organoid platform that integrates controlled surfaces with AI-powered imaging analysis to non-invasively track morphogenesis, maturation, and disease phenotypes. Current organoid models often lack physiologically relevant mechanical cues and rely on endpoint assays, limiting their ability to capture real-time developmental dynamics. By engineering mechanical environment linked to live morphological readouts, this project addresses that critical gap.

Scientifically, the work aims to uncover how different surfaces regulates brain development; technologically, it introduces a scalable imaging-analysis pipeline; and translationally, it offers a foundation for modeling neurodevelopmental disorders such as autism, microcephaly, and lissencephaly, hence advancing precision medicine, biomedical engineering, and neuroscience.

Expected Outcome (limit to 100 words)

The project is expected to generate broad outcomes, including peer-reviewed publications, conference presentations, and invention disclosures leading to potential IP filings. A commercialization pathway will be pursued through a planned spin-out, CoreMimic, which will serve as the vehicle for translating the technology from research to application. This approach bridges fundamental discovery with real-world application, advancing HBKU's mission to drive innovation and translational research in Qatar.

Collaborating HBKU entities:

The collaborating entities on this project include Dr. Mohammed Shaker from the Qatar Biomedical Research Institute (QBRI), Dr. Atef Zekri from the Qatar Environment and Energy Research Institute (QEERI), and Dr. Jens Schneider from the College of Science and Engineering (CSE), HBKU.

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