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Patient derived micro tumor systems: Future trends towards improved testing systems, realizing the potential of HTS/HCS towards precision medicine

Giridharan Periyasamy
Genome Institute of Singapore, Singapore

With increasing breadth and depth of genomics studies across a range of cancers, it is now apparent that there exists significant inter and intra-tumoral heterogeneity, with complex genotypes comprising of multiple co-existing genetic and epigenetic alterations. Current efforts are at genomic characterization of individual cancers however, has several limitations: A significant proportion of patients invariably develop resistance to current targeted therapies, for which the mechanisms are not fully unraveled and there remain a lack of treatment options. In this project, we plan to propagate patient derived cell lines in order to allow functional studies that may expand therapeutic opportunities beyond genomic-based markers. Functional studies comprise both chemical and genetic tools that perturb the signaling networks in the primary cell cultures, in order to unravel complex signaling networks that interact through crosstalk and feedback loops, which modify therapeutic vulnerability. Such screens can therefore provide insights into mediators of resistance and sensitivities, yielding predictive biomarkers as well as novel drug combinations to circumvent drug resistance. Two crucial components include an efficient scalable system to explore therapeutic combinations and the development of representative preclinical models: Patient-derived cells in 3D culture models reflect an integration of genetic, epigenetic and environmental influences and may closely mimic the chemotherapeutic (or pathway specific inhibitor)-response of the actual tumor in patients. Thus we aim to exploit the relevance and scalability of patient-derived cell lines to perform HTS/HCS based screens.

Biography

Giridharan Periyasamy studied at Centre for Biotechnology at Anna University, India where he obtained his PhD in Biotechnology. He is the Head of Centre for High Throughput Phenomics (CHiP-GIS) at the Genome Institute of Singapore. His research focus is on the cancer biology, drug resistance and signaling pathway networks of human diseases. Prior to his current position, he has worked as a Scientific Director of HTS/HCS Screening Core Facility at C-CAMP, NCBS, India and a Group Leader at Piramal Life Sciences Ltd., in Mumbai, India. He has more than 15 significant publications and 8 patents to his credit.

periyasamyg@gis.a-star.edu.sg

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