

Biomedical Engineering

Wallace H. Coulter Foundation Lecture Series

Challenges in Stem Cell Bioprocessing for Regenerative Biomedical Applications



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Engineering at
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Lecture: Friday, January 18, 2019
9:00AM-10:00AM
Room EC 2300
10555 West Flagler Street
Miami, FL 33174

Biography

Raj R. Rao, Ph.D. is Professor and Department Head, Biomedical Engineering and is the holder of the George M. and Boyce W. Billingsley Endowed Chair in Engineering in the College of Engineering, University of Arkansas, Fayetteville. He previously served on the faculty in the Department of Chemical and Life Science Engineering in the VCU School of Engineering with an affiliate appointment in the Department of Human and Molecular Genetics in the VCU School of Medicine. Rao received a dual degree in Chemical Engineering [BE(Hons)] and Biology [MSc(Hons)] from the Birla Institute of Technology and Sciences, Pilani, India (1993), earned an MS in Biotechnology from the University of Texas, San Antonio (1996) and a Ph.D. in Biological Engineering from the University of Georgia (2001). Following completion of his graduate studies, he conducted postdoctoral research at the Regenerative Bioscience Center, The University of Georgia & joined the faculty at VCU in the Fall of 2005. His research interests are in the broad area of cellular engineering that utilize interdisciplinary approaches towards development of enabling technologies for regenerative biomedical therapies. With primary support from NIH, NSF and DoD, his research and educational programs have contributed to 50+ journal articles, book chapters and conference proceedings; 80+ conference abstracts; and 70+ invited lectures. He is committed to integration of research and education and is actively involved in the dissemination of scientific expertise through organization of training workshops and development of educational modules for K-12 students and the public. He currently serves as the Editor-in-Chief of the Journal of Biological Engineering, a BioMed Central-Springer Nature publication, and holds memberships in AAAS, AHA, BMES, IBE, ASEE and AICHE. Awards and Honors include the NSF-CAREER, Qimonda Professorship, Billingsley Professorship, VCU Engineering Student Council Outstanding Professor Award & IBE Presidential Citation for Distinguished Service.

Abstract

Human pluripotent stem cells (hPSCs) have generated a lot of interest in the scientific community based on their potential applications in regenerative medicine. Over the past decade, there has been enormous progress in developing propagation conditions for maintaining hPSCs in their undifferentiated state; and differentiation strategies for generating specialized cell types. However, challenges related to scalability and genomic stability need to be addressed prior to use in clinical applications. Work from our laboratory and others have demonstrated that amplification of chromosomal regions is correlated with increased gene expression. This talk will focus on selection models for studying culture conditions that reduce the appearance of genomically altered hPSCs, that aids in elucidation of a mechanism that act as a molecular switch during culture adaptation.