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2021 CBME Young Innovators

The 2021 Young Innovators of Cellular and Molecular Bioengineering

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We are pleased to present to you this year's nine Young Innovators of Cellular and Molecular Bioengineering, whose original research is featured in this October issue. It is now the eighth year of the Young Innovators competition, and we continue to receive a remarkable number of compelling nominations. All potential authors who hold the rank of Assistant Professor (or equivalent) at the time of nomination are eligible for selection, and while many of the authors are active members of the Biomedical Engineering Society (BMES), membership in BMES is not a requirement for inclusion. The awardees will present the papers in this issue in either a live, invited plenary session at the Annual Meeting of BMES, or in a virtual webinar session on Friday, October 15, 2021. The articles in this issue represent some of the most innovative and impactful bioengineering studies carried out by junior faculty in our field. This year's Young Innovators are all clearly recognized as rising stars in their field, and significantly, have demonstrated true grit in their ability to complete impactful research studies under challenges of a global pandemic.

Five of this year's Young Innovator papers focus on elements of mechanobiology, how cells sense mechanical signals from their surroundings, or how the surrounding matrix can be engineered to control cell function and phenotype. Brendon Baker and coworkers examined the mechanism of fibroblast mechanosensing and migration in 3-D hydrogels representative of interstitial extracellular matrix, providing new insights into the wound healing process. Evangelia Bellas and colleagues showed the differentiation of adipose derived stem cells driven by changes in substrate stiffness, identifying the role of nesprin-2 in this response. Nathaniel Huebsch and coworkers examined the mechanobiology of differentiated cardiomyocytes, and how the cell phenotype is affected by a mutation in myosin binding protein C, which is associated with hypertrophic cardiomyopathy. Steven Caliari et al. developed hyaluronic acid hydrogels in which the matrix viscoelasticity and integrin ligand density can be independently controlled to mimic normal vs. fibrotic lung tissue, and used this to examine the molecular mechanisms of fibroblast behaviors in this disease state. Kareen Coulombe et al. developed a 3D model of atrial microtissue derived from human induced pluripotent stem cells, and studied how the spontaneous beating rate of cells depends on different drug treatments.

Four other papers in this special issue involve nanotechnology or unique materials developed for therapeutic applications. Neha Kamat and team developed a vesicle-based sensor to measure local potassium ion concentrations, and used it to examine how this concentration changes in bacterial culture as a function of cell density. Joshua Doloff and coworkers crystallized the tyrosine kinase inhibitor sorafebib, showing controlled, sustained release of drug in vitro and in an orthotopic mouse model of triple negative breast cancer. Aaron Anselmo and colleagues describe a polymer-encapsulated live biotherapeutic product, i.e., therapeutic microbe, testing the performance of lactobacillus casei as a function of polymer crosslinking. Jonathan Rivnay et al. developed an absorbable collagen sponge with an integrated conducting polymer, and showed that it supports rat bone marrow mesenchymal stem cell culture and enhanced glycosaminoglycan production.

We hope that you will enjoy reading this impressive collection of research articles as much as the reviewers and editors and encourage your eligible colleagues to nominate themselves for next year's CMBE Young Innovator competition. Self-nominations are due by November 12, 2021, with selected authors notified by December 17, 2021, and full manuscripts due by February 18, 2022. Interested researchers who hold a position at the rank of Assistant Professor (or equivalent) are invited to submit a 250-word structured abstract and an NIH-style biosketch to Editor-in-Chief Michael King at mike.king@vanderbilt.edu. You are invited to engage with us via social media on Twitter (www.twitter.com/CMBEjournal) and Facebook (www.facebook.com/CMBEjournal). We hope to see you at the 2021 BMES Annual Meeting, at the 2022 CMBE Conference in Indian Wells, California, and online!

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