Transcript

Sound Engineering: Spreading the benefits of stem-cell advances

Jasmine Sola: As stem-cell technology advances, Kris Saha and Randolph Ashton, both assistant professors of biomedical engineering at the University of Wisconsin-Madison and part of a tissue engineering research group at the Wisconsin Institute for Discovery, feel they have an obligation to make these discoveries beneficial to everyone. Saha explains that the two are working to create standards for stem-cell therapies and disease screenings, which then informs regulatory agencies like the Food and Drug Administration.

Kris Saha: What we're hoping to do is integrate these technologies into the stem cell platform to allow various labs across the country to come up with the same type of model, same type of screening platform, in a relatively cheap and accessible way.

Jasmine Sola: With support from a Burroughs Wellcome Fund regulatory science grant, Ashton and Saha are researching methods for creating stem cell-derived models of spine and hindbrain tissues.

Randolph Ashton: The overall aim of the grant was actually to create a very standardized platform for the central nervous system, particularly the hindbrain and spinal-cord tissues of the central nervous system, such that we could reproduce that in a very standardized manner, in a high-throughput screening manner, that would essentially be a tool for regulatory sciences to use to test and clinically evaluate different therapeutics, drugs, and stuff like that.

Jasmine Sola: While some may see this as a task for biologists, Ashton says engineers play a crucial role in the process.

Randolph Ashton: One thing that has been lacking is really an engineering analysis of the technology, and what I mean by that is, yes, you can make all these different tissue types, but is there a way to constantly get the same types of tissues? I keep going back to the word "standardization" because it's a word that you see in regulatory science literature a lot. Is there a way to make the process of generating these tissues highly reproducible so that you can have standard results? And not only that, but things that you can't do in a petri dish that biologists generally use, actually make 3D organized tissues that look mimetic of what you have in your body. One of the important roles of engineers in general, and particularly chemical engineers, biomedical engineers, is to make scientific technology useful, in the sense that we essentially take something that's almost a natural product—pseudo-natural, in our case—and convert it or present it in a platform that allows it to be implemented at its highest efficiency.

Jasmine Sola: The researchers believe engineers also have the responsibility to spread the benefits of their discoveries.

Kris Saha: I think on top of being a top-notch researcher and adhering to the highest ethical rules in science and research, is a push to distribute both the technology, cell lines, knowledge, widely, and do some of the hard work of standardizing and working through issues that other labs may have. There's an extra responsibility to try to ensure that any discoveries that you have here in our labs get distributed and communicated as quickly and efficiently as possible.

Jasmine Sola: Saha and Ashton's current research on a standardized platform for stem cells is just the tip of the iceberg.

Kris Saha: There are people on campus that are thinking about air quality, and adding mixtures of air samples to lung epithelia that almost anyone will be exposed to. All sorts of toxins, all sorts of perturbations, in all [areas of the body].

Jasmine Sola: For more information on stem-cell research at UW-Madison, visit stemcells.wisc.edu.