

SAGE CROSSROADS
Interview with Raju Kucherlapati
Personalized Medicine

KYLE JENSEN: Welcome to SAGE Crossroads, the premier online forum on the issues of human aging. These podcasts feature lively discussion with the experts on the ethical, political, economic, scientific, and societal implications of aging-related science. Thank you for listening.

I'm joined now with Dr. Raju Kucherlapati. He is the scientific director of the Harvard Medical School's Partners Health Care Center for Genetics and Genomics. So to start off Dr. Kucherlapati, what exactly does the Partners Health Care Center for Genetics and Genomics do to move the science behind personalized medicine forward?

RAJU KUCHERLAPATI: The Harvard Partners Center for Genetics and Genomics was created with the vision of transforming the practice of medicine by bringing genetics and genomics to the clinic. To accomplish that goal, we have a number of different units. One unit is a research unit in which people are making continuously new discoveries about the role of genes in common diseases. The second unit is in which the knowledge that is generated at Harvard or at other institutions is translated to the clinic. The third unit is a clinical genetics unit in which we take care of patients with genetic disorders that come to Brigham and Women's Hospital or Massachusetts General Hospital. The fourth unit is the training of new generations of physicians and scientists who will take the knowledge from genetics and who will make personalized medicine possible.

KYLE JENSEN: In your opinion, what are the key genomic tests that you all run that are the backbone of personalized medicine and how it is going to move forward?

RAJU KUCHERLAPATI: There are a variety of genetic tests that are offered by many different laboratories throughout the world. One of the new kinds of testing that is becoming available is the ability to conduct very complicated types of genetic tests where you need to completely sequence many different types of genes to make a diagnosis or to be able to make a determination of what is the right drug or what the right dose of drug is to give patients.

KYLE JENSEN: Given that science truly is the back-bone of the personalized medicine movement, what is the current funding like for genetic research?

RAJU KUCHERLAPATI: Excellent. The NIH and many different organizations within NIH have many different types of programs that provide support for discovery and translation. There is also great amount of interest in genomic and genetic research by private foundations that are capable of providing a tremendous amount of support. There are also commercial entities who would like to have collaborations with accurate medical centers who provide support.

KYLE JENSEN: Given that funding isn't really a challenge that you all face, what are some of the major challenges presented to genomic researchers?

RAJU KUCHERLAPATI: One of the major challenges for genomic researchers is to have well annotated patient populations and a mechanism by which you will be able to obtain patient material, such as blood or other types of body fluids, and have mechanisms for those types of materials. This requires a significant amount of coordination and appropriate IRB reviews of the strategies and to insure that all of the privacy issues are appropriately dealt with. It is those aspects that are most challenging at the present time.

KYLE JENSEN: So have you all worked on a policy solution or practical solution to overcome that or are you still trying to figure that out as a research body?

RAJU KUCHERLAPATI: Much of the institutional review boards or IRBs consider each proposal one at a time. We work with the IRBs to solve all of those types of problems as they arise. Although it takes a lot of time and energy to put together IRB proposals and get approvals from the appropriate committees there are no basic difficulties in doing it. It takes time to do it, but there are no intrinsic problems.

KYLE JENSEN: Genomic research in general, is it a popular field for younger people who are finishing their PhDs and going into research?

RAJU KUCHERLAPATI: I believe it is tremendously exciting. One of the big revolutions towards the end of the last century is recognition that virtually all aspects of human health and disease has a genetic basis for it. The human genome project that was started in 1990 that culminated in the availability of the complete sequence of the human genome and many of the technologies that are spawned by the development of the genome sequencing provides great opportunities to understand the biology, and this is a very exciting area for young people to get into.

KYLE JENSEN: In the next five years do foresee any major progressions made towards personalized medicine or any breakthroughs in the genetic field that you're anticipating in the next five years? If not, is there a specific timeline you are looking towards?

RAJU KUCHERLAPATI: There is already very significant amount of movement. One of the future aspects that we are all looking forward to is the ability to sequence the complete human genome for a reasonable cost. Within the next five years, there is a very high likelihood that we will be able to sequence the entire human genome for somewhere in the neighborhood of \$10,000 or so. That is really going to change the way that we will be able to obtain information about human patients. Another revolution that has to occur is the way that the information will be utilized by physicians in order to make decisions.

KYLE JENSEN: The audience of SAGE Crossroads is made up of scientists, policy makers, and curious consumers. If there is one statement that you could make to them about personalized medicine, what would it be?

RAJU KUCHERLAPATI: I would say that there is a potential that personalized medicine or personalized health care has the ability to improve the quality of lives for all people in the United States and indeed the world in a cost efficient manner, so the implementation of personalized medicine has the potential to truly revolutionize the practice of medicine.

KYLE JENSEN: Thank you. On behalf of SAGE Crossroads, I'm Kyle Jensen.