CARMEN TERZIC: We are at the fourth annual Symposium of Regenerative Medicine. And we are now joined by Dr. Thomas Rando, Director of Rehabilitation Research and professor of Neurology at Stanford University. And we just witness a wonderful presentation by Dr. Rando where he described his research in regeneration of a skeletal muscle. And not only regeneration of the tissue, but the function of the tissue, which is very important and is a key. And I'd like to ask Dr. Rando he can give us a summary of his wonderful presentation.

THOMAS RANDO: Well, thank you Carmen. It's a pleasure to be here. A lot of the work that we've been doing have been using stem cells to repair tissues. And the particular challenge that we've been trying to address is basically patients and soldiers who have had war injuries resulting in a loss of a lot of muscle tissue.

At this point there's nothing we do for those patients other than rehabilitation. And it doesn't really work to restore function. So our goal is to introduce stem cells, muscle stem cells, into the tissues to try and rebuild that tissue and regain function.

This has been a field that's been active for a long time. The successes have been limited, and we've been making kind of incremental advances in how to use stem cells to build tissues. Some of that is bio-physical, how we handle the cells, how we introduce them into the area of injury. But we've really become very interested recently in this idea that not only the cells themselves, but the physical activity of the animals, we're using, mouse models, in this case really makes a difference in the outcome. So we see that if we introduce these stem cells they make some new muscle in these areas of injury.

But if we exercise the mice, if are able to run freely on these running wheels, we see much better improvement. In terms of both the structure of the muscle and the function of the muscle. So that's been very gratifying because we can see this translate into humans where if there's a time were able to use stem cells to treat patients, we can then introduce in addition, specific kinds of physical therapy, physical activity, working with physical therapists, that we're now quite confident will make a big difference in terms of the outcome. So it's really come from being a fairly basic cell biology study and looking at tissue repair, to a really clinical translational focus of combining basic stem cell biology with aspects of rehabilitative medicine in the form of physical activity and physical movement in the case of the animals.

And a lot of what we're doing also looks at how new muscle becomes innervated by the nerve. And that obviously is critically important for functional muscle. So we're also looking at how physical activity can improve nerve regeneration and innervation and functional recovery of the muscle, and other aspects that we think are important in humans of functional recovery. And that's been ongoing focus of the work that we would love to think would move from the animal model into the humans in the coming years.

CARMEN TERZIC: Dr. Rando, thank you very much for joining us in the four annual Symposium of Regenerative Medicine here at the Mayo Clinic. Thank you.

THOMAS RANDO: My pleasure.