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Media Contacts: Dr. Tushar Ghosh, 919/515-6568 or tghosh@tx.ncsu.edu
Dr. John Muth, 919/513-2982 or muth@unity.ncsu.edu
Chad Austin, News Services, 919/515-3470 or
chad_austin@ncsu.edu

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NC State Researchers Produce Fibers that Mimic Human Muscle

FOR IMMEDIATE RELEASE

Two researchers at North Carolina State University have found that certain strands of fibers that resemble human muscle can exhibit muscle-like capabilities when electrical currents are applied, paving the way for advancements and potential applications in several different fields including robotics, "smart textiles," prosthetics and biomedicine.

Scientists have demonstrated previously that certain plastics known as electroactive polymers can expand and contract when a current is applied, but Drs. Tushar Ghosh, an NC State textiles professor, and John Muth, associate professor of engineering, have shown for the first time that plastic tube structures in the shape of human muscle strands can be manipulated with electricity.

Ghosh and Muth used polyurethane and silicone tubes in their experiments. When an electric current was applied, the tubes exhibited movements and produce forces similar to that of human muscle. The tubes are the first artificial muscle-like fibers produced in a lab. The prototypes used in the experiment were roughly the size of a pencil lead, significantly larger than an actual human muscle fiber. The results are important, Ghosh and Muth say, because the experiment shows that certain polymers can perform like muscle tissue. The goal now is to work on scaling the fibers down to the size of muscle fibers.

"We have developed a fiber at a large scale and demonstrated that you can generate significant levels of force," Ghosh says. "The muscles in our bodies are made of fibers, and if we can mimic those fibers, get them down to scale and bundle them in the same way, we believe we can make very useful devices with them."

"We've been interested in these ideas of being able to control the shapes of fabrics using electricity or some other forces for some time," Muth says. "There are a wide variety of potential uses for these types of fibers. A good next step would be to reduce the size of these fibers to a smaller scale."

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Ghosh and Muth's work was funded by a three-year grant from the National Textiles Center. Their results were published in the journal *Sensors and Actuators*.

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