

# Scientists identify which genes are active in muscles of men and women

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If you want your doctor to know what goes wrong with your muscles because of age, disease or injury, it's a good idea to know what "normal" actually is. That's where a new research report published in the October 2014 issue of the *FASEB Journal* comes in. In the report, a team of scientists produce a complete transcriptome—a key set of molecules that can help scientists "see" which genes are active in an organ at a particular time. What's more, they found never-before-detected gene activity and that men have approximately 400 more active genes in their skeletal muscle than women have.

"I hope that the [gene activity](#) results from this study will become a reference for human [skeletal muscle](#) and provide the basis for many new studies investigating skeletal muscle in different diseases and dysfunctions," said Maléne Lindholm, a researcher involved in the work from the Department of Physiology and Pharmacology at the Karolinska Institutet in Stockholm, Sweden. "In that way, we can understand our muscles better and possibly develop more optimal treatments and a more personalized health care."

To make this advance, Lindholm and colleagues recruited nine male and nine female volunteers. Under local anesthesia, researchers extracted small pieces of skeletal muscle from both legs of each study participant. Gene transcripts were isolated from the muscle pieces and then sequenced, so that the code for all transcripts could be used for comparing samples within a muscle, between individual legs and between men and women. Results from this study produced the whole

transcriptome (all transcripts present in the muscles at one time point) of human skeletal muscle in both men and women.

"This report is another important step toward developing treatments based on genome and gender," said Gerald Weissmann, M.D., Editor-in-Chief of the *FASEB Journal*. "Each gene that has been identified as being active in skeletal muscle is a potential drug target for a variety of muscle diseases, disorders and conditions."

**More information:** Malene E. Lindholm, Mikael Huss, Beata W. Solnestam, Sanela Kjellqvist, Joakim Lundberg, and Carl J. Sundberg. The human skeletal muscle transcriptome: sex differences, alternative splicing, and tissue homogeneity assessed with RNA sequencing. *FASEB J.* fj.14-255000; [DOI: 10.1096/fj.14-255000](https://doi.org/10.1096/fj.14-255000)

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