RSNA Press Release

Shape of Your Behind May Signal Diabetes

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At A Glance

- Changes in the shape of the gluteus maximus muscle in the buttocks are significantly associated with type-2 diabetes.
- Men with diabetes showed muscle shrinkage, while women with diabetes showed enlarged muscles, likely due to fat infiltration.
- MRI 3D mapping showed people with higher fitness had a greater gluteus maximus shape, while aging, frailty and long sitting times were linked to muscle thinning.

CHICAGO – The shape of the gluteus maximus muscle in the buttocks changes in different ways with aging, lifestyle, frailty, osteoporosis and type 2 diabetes, and these changes differ between women and men, according to new research being presented next week at the annual meeting of the Radiological Society of North America (RSNA).



Marjola Thanaj, Ph.D.



E. Louise Thomas, Ph.D.

The researchers used MRI 3D mapping, a technique that processes a series of MRI images to create a detailed 3D anatomical model, allowing for improved visualization. The 3D mapping revealed distinct, sex-specific patterns in the gluteus maximus that were associated with type 2 diabetes, suggesting that the shape—not the size—of the muscle may reflect underlying metabolic differences.

“Unlike past studies that mainly looked at muscle size or fat, we used 3D shape mapping to pinpoint exactly where the muscle changes, giving a much more

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detailed picture," said study coauthor Marjola Thanaj, Ph.D., a senior research fellow at the University of Westminster's Research Centre for Optimal Health.

The gluteus maximus is one of the largest muscles in the human body, and it plays a key role in metabolic health, explained study lead author E. Louise Thomas, Ph.D., professor of metabolic imaging at the University of Westminster's School of Life Sciences.

Using data from 61,290 MRI exams housed in the UK Biobank database, the research team explored how MRI analysis can characterize the muscle's structural features and composition.

In addition to medical images, UK Biobank data includes volunteers' physical measurements, demographics, disease biomarkers, medical history and answers to lifestyle questionnaires. The researchers used these data to analyze 86 different variables and map how they're associated with changes in muscle shape over time.

"People with higher fitness, as measured by vigorous physical activity and hand grip strength, had a greater gluteus maximus shape, while aging, frailty and long sitting times were linked to muscle thinning," Dr. Thanaj said.

In participants with type 2 diabetes, men showed muscle shrinkage, while women showed enlarged muscle that was likely due to infiltration of fat within the muscle, the researchers found. Men categorized as "frail" had more general shrinkage across the gluteus maximus, whereas the effect of frailty was limited to smaller areas in women.

Dr. Thanaj said the results suggest that men and women have very different biological responses to the same disease.

Shape changes in the gluteus maximus may indicate early functional decline and metabolic compromise in people with type 2 diabetes—reflecting sex-specific differences in response to insulin tolerance that require further study, the team noted.

Other co-authors are Brandon Whitcher, Ph.D., Camilo Bell-Bradford, Hamzah Raza, Dimitri Amiras, M.B.B.S., B.Sc., Marili Niglas, Ph.D., and Professor Jimmy Bell.

Note: Copies of RSNA 2025 news releases and electronic images will be available online at *RSNA.org/press25*.

RSNA is an association of radiologists, radiation oncologists, medical physicists and related scientists promoting excel-lence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Illinois. (*RSNA.org*)

Editor's note: The data in these releases may differ from those in the published abstract and those presented at the meeting, as researchers continue to update their data right up until the meeting. To ensure you are using the most up-to-date information, please call the RSNA Newsroom at 1-312-791-6610.

For patient-friendly information on MRI and musculoskeletal imaging, visit *RadiologyInfo.org*.

Video (MP4):



Video. Marjola Thanaj, Ph.D., discusses her research that found that certain changes to the shape of the gluteus maximus muscle in the buttocks can be an indicator of type 2 diabetes, and these changes differ between women and men.
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Images (JPG, TIF):

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Infographic

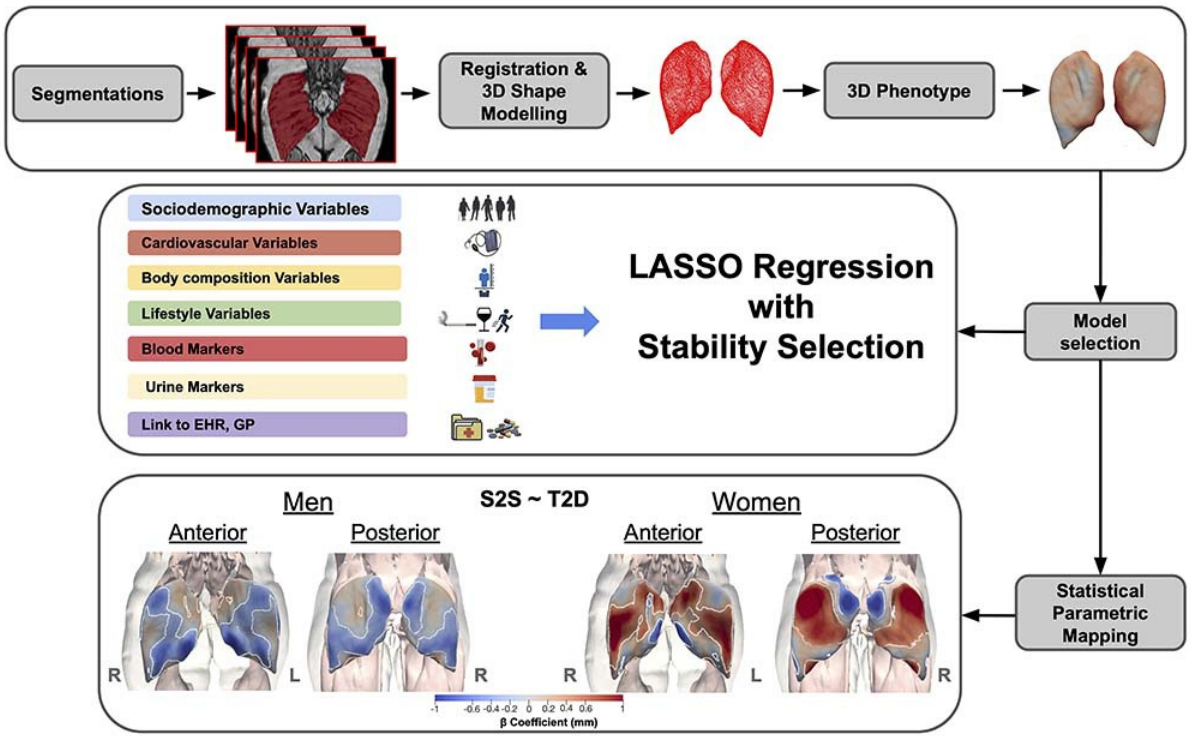


Figure 1. Research flowchart.

Resources:

Abstract

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