

Duchenne Protein Mapping Project

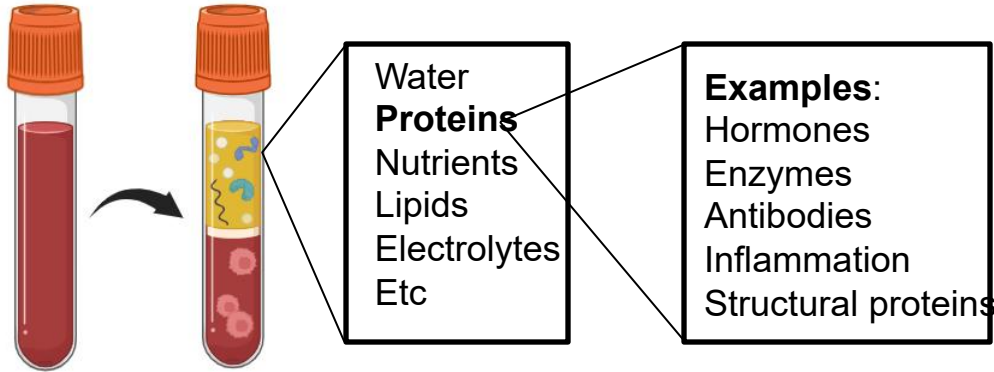
Alison Barnard, DPT, PhD
PPMD Annual Conference
June 25th, 2026

**Parent
Project
Muscular
Dystrophy**

Duchenne Protein Mapping Project

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What are serum proteins?

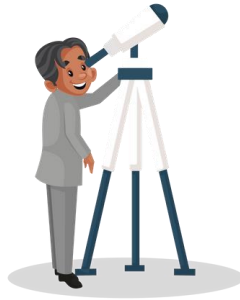


Not all proteins end up circulating in the blood. Many stay within cells or attached to other cells

Example: Creatine kinase vs dystrophin

What is a serum proteomics study?

A **proteomics** study is a way of measuring many different proteins in a small blood sample all at once. By looking at the pattern of proteins, researchers can learn what is happening inside the body.



Discovery study

Look at thousands of proteins and see what you find



Targeted study

Look at a small number of pre-specified proteins

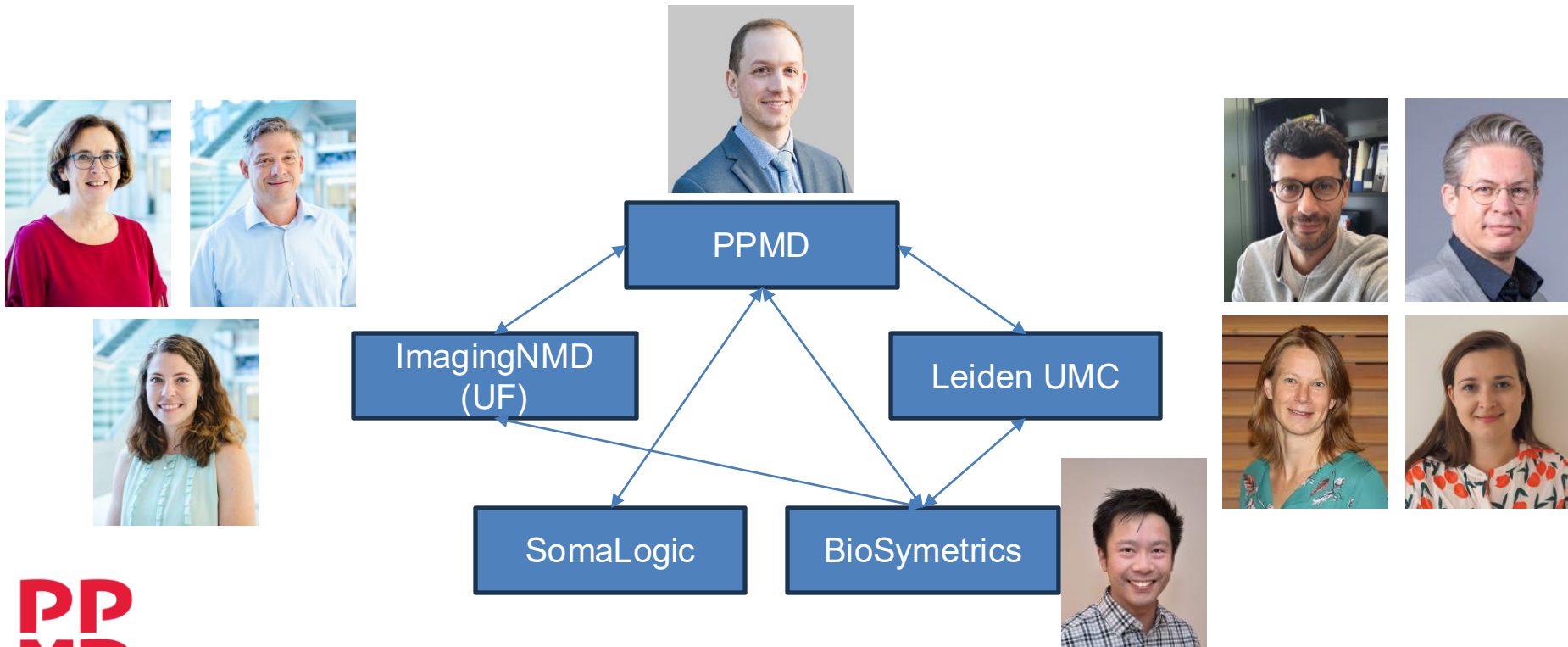
Duchenne Protein Mapping Project



A discovery proteomics study to find proteins in the blood that are associated with functional ability and that predict future function



Duchenne Protein Mapping Project



Serum Samples

ImagingNMD

- 309 total serum samples
- 80 individuals with DMD

Leiden University

- 407 total serum samples
- 74 individuals with DMD

somalogic



~7,000 proteins

Findings

**Repulsive guidance molecule
BMP co-receptor A (RGMA)**

**ADP-ribosyltransferase 3
(ART3)**

Delta like notch ligand 1 (DLK-1)

**ANTRX cell adhesion molecule
2 (ANTXR2)**

Blood levels are associated with Northstar Ambulatory Assessment, 10 meter walk/run time, and 6MWT. They are also predictive of loss of walking ability.
(↓ protein = ↑ risk)

Publishing and Sharing Data

Observational Study > [Nat Commun. 2025 Oct 13;16\(1\):9073. doi: 10.1038/s41467-025-64146-y.](https://doi.org/10.1038/s41467-025-64146-y)

Large-scale serum protein biomarkers discovery associated with function and clinical milestones in Duchenne muscular dystrophy

<https://pubmed.ncbi.nlm.nih.gov/41083485/>

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MDBiomarkers (v 1.12) [Site map](#) [Home](#) [Data curation](#) [Visualization](#) [Tutorial](#) [FAQ](#) [Funding/Acknowledgements](#)

Last updated: Jan 2026

Overview table [Biomarker-specific details](#) [Download Report](#)

Total studies (Total biomarkers): 28 (>6000)

Source: serum, muscle, proteome

Technology used: TMT, SOMAscan, Affymetrix, RT-PCR, Affymetrix HG-U133A

Association: DMDspecific, Treatment, Age trend

Show 10 entries

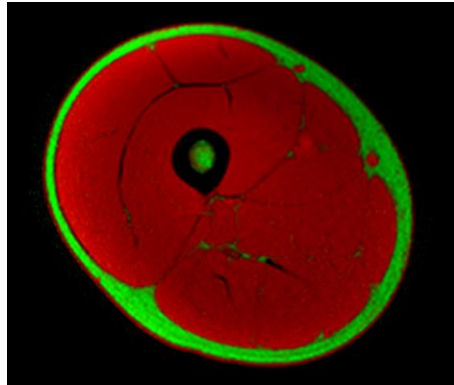
Search:

TargetFullName	Target	UniProt	EntrezGeneID	EntrezGeneSymbol	DMD specific (serum)	DMD specific (tissue)	Treatment Responsive (serum)	Change with age
All	All	All	All	All	All	All	All	All
complement-c3b; comp...	c3b; c3d; c3adesarg...	P01024	718	C3	21/37 (↓)	4/4 (↑)	11/24 (-)	11/18 (↓)
fibrinogen; d-dimer; ...	fibrinogen; d-dimer; ...	P02679	2266	FGG	12/13 (↑)	1/7 (-)	4/6 (↓)	7/7 (↓)
creatine-kinase-mm...	ck-mb; ck-mm; ck-m	P06730	1158	CKM	11/11 (↑)	2/3 (↓)	1/8 (-)	6/6 (↓)

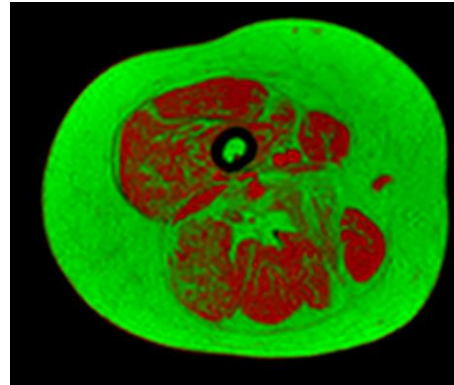
Data on:
mdbiomarkers.com/

Muscle Fat Study (Discovery study)

- Muscles are replaced by fat and fibrotic tissue in DMD.
- What proteins in the blood are related to the amount of fat in muscles?



Control



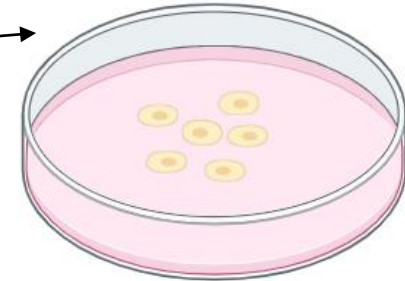
DMD

Muscle Fat Study (Discovery study)

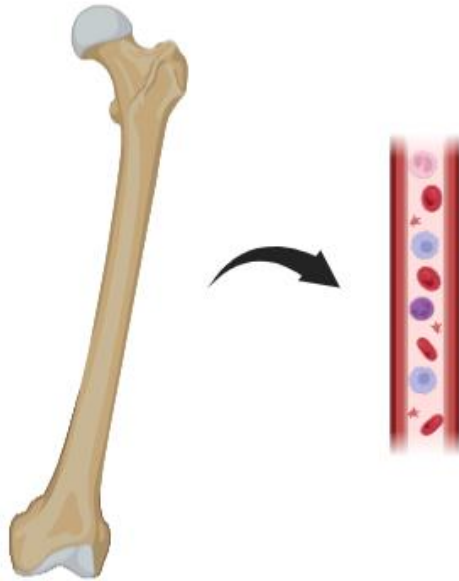
What proteins in the blood are related to the amount of fat in muscles?

- 74 proteins
 - Adipose tissue proteins
 - Inflammation related proteins
 - Proteins associated with fibrosis and extracellular matrix
 - Muscle growth proteins
 - Cell communication

Ongoing/future project



Bone Biomarkers (Targeted study)



We looked at proteins associated with:

- Building new bone
- Breaking down bone
- Signaling processes that regulate bone building and breaking down

Bone Biomarkers (Targeted study)

What we found:

- Proteins associated with building new bone were decreased compared to controls (and sometimes decreased even more by corticosteroids)
- Proteins associated with breaking down bone were also decreased in DMD compared to controls (and decreased even further by corticosteroid use)
- Signaling proteins were altered in DMD leading to more bone breakdown. Corticosteroids worsened some of these protein levels.

Concluding thoughts...

- The Protein Mapping Project identified protein associated with physical function and predictive of future loss of function
 - DLK1, ANTXR2, ART3, RGMA
 - Validation assays needed in our cohorts and/or other cohorts
 - Exploration of biological rationale required
- Additional work is giving insight into the biology of muscle replacement by fat and the signaling processes that are affected in DMD osteoporosis.

Acknowledgements

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