

LIPOFUSCIN ACCUMULATES IN SKELETAL MUSCLE OF ME/CFS AND POST-COVID

Jelle Y Huijts¹, Braeden T Charlton¹, Anouk Slaghekke¹, Brent Appelman², Per W B Larsen³, Anita E Grootemaat³, Wendy Noort¹, Michèle van Vugt⁴, Richie P Goulding¹,

¹ Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, The Netherlands

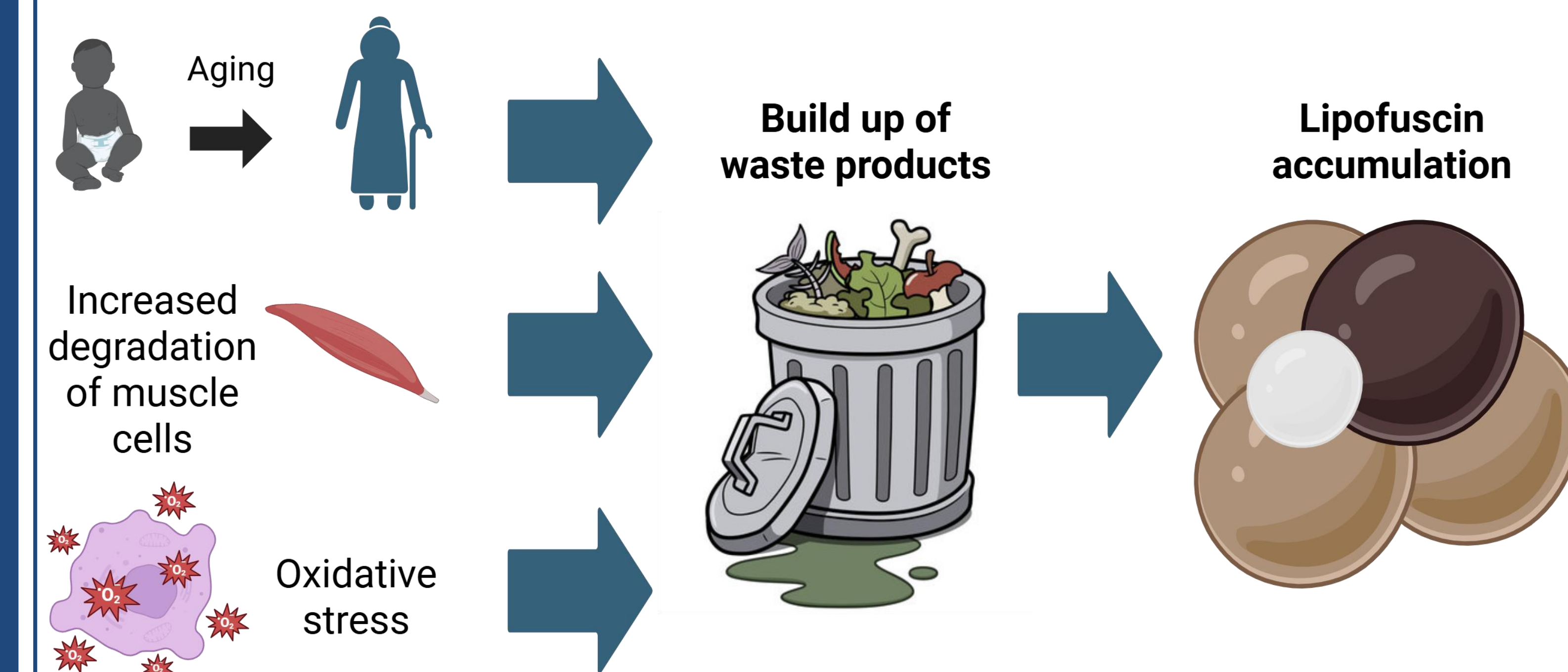
Nicole N van der Wel³, Rob C I Wüst¹

³ Electron Microscopy Centre Amsterdam, Amsterdam UMC, The Netherlands

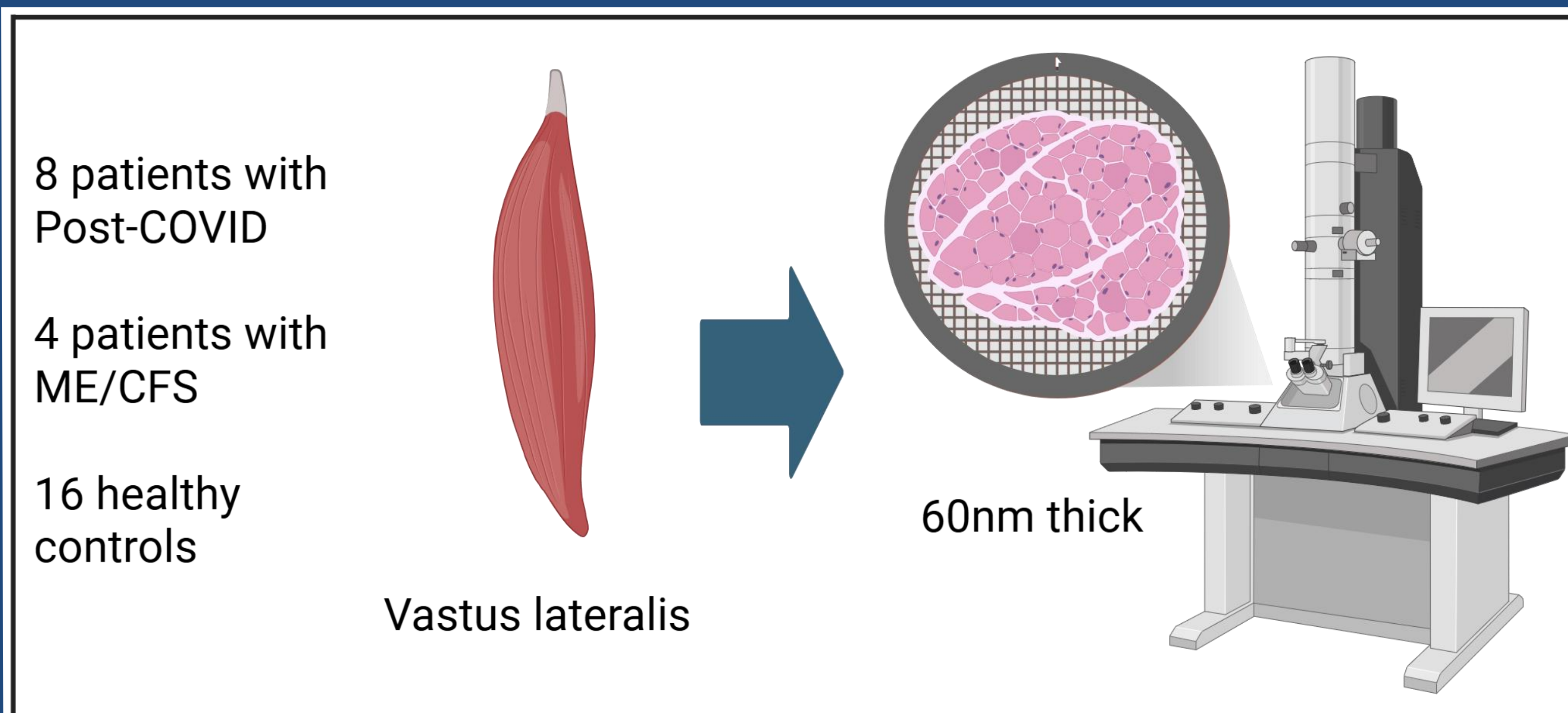
² Experimental and Molecular Medicine, Amsterdam UMC, The Netherlands

⁴ Department of Internal Medicine, Amsterdam UMC, the Netherlands

Background



Methods

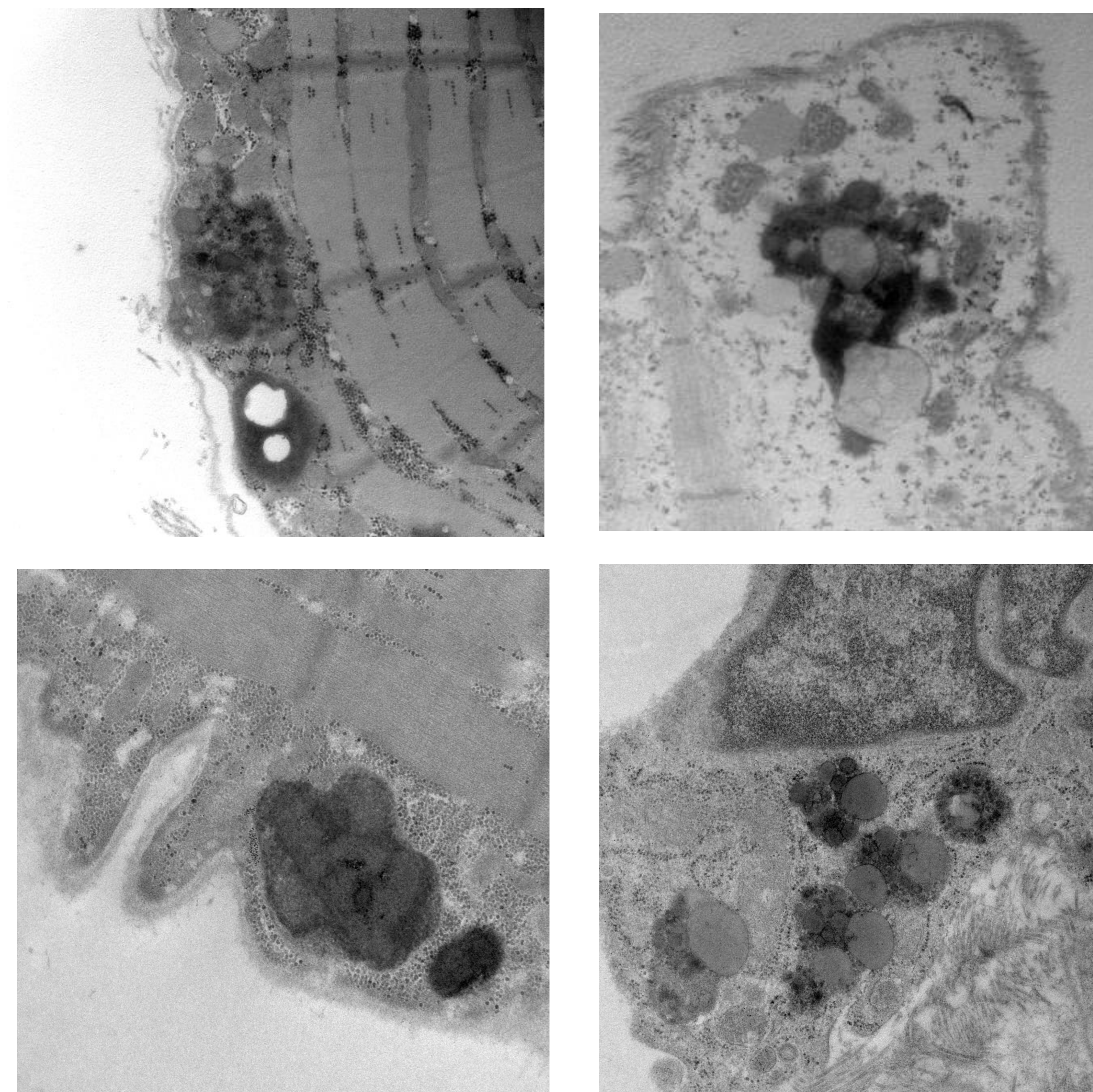


- Vastus lateralis muscle biopsies from 16 healthy controls (18-63 years), 8 patients with post-COVID (28-58 years) and 4 with ME/CFS (28-66 years)
- Samples processed for electron microscopy
- Imaged with an electron microscope at **1200-49500x** magnification

Aim of the study

To investigate the accumulation of lipofuscin in skeletal muscle of healthy people and people with post-COVID and Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS).

Lipofuscin accumulation in skeletal muscle



Lipofuscin accumulation

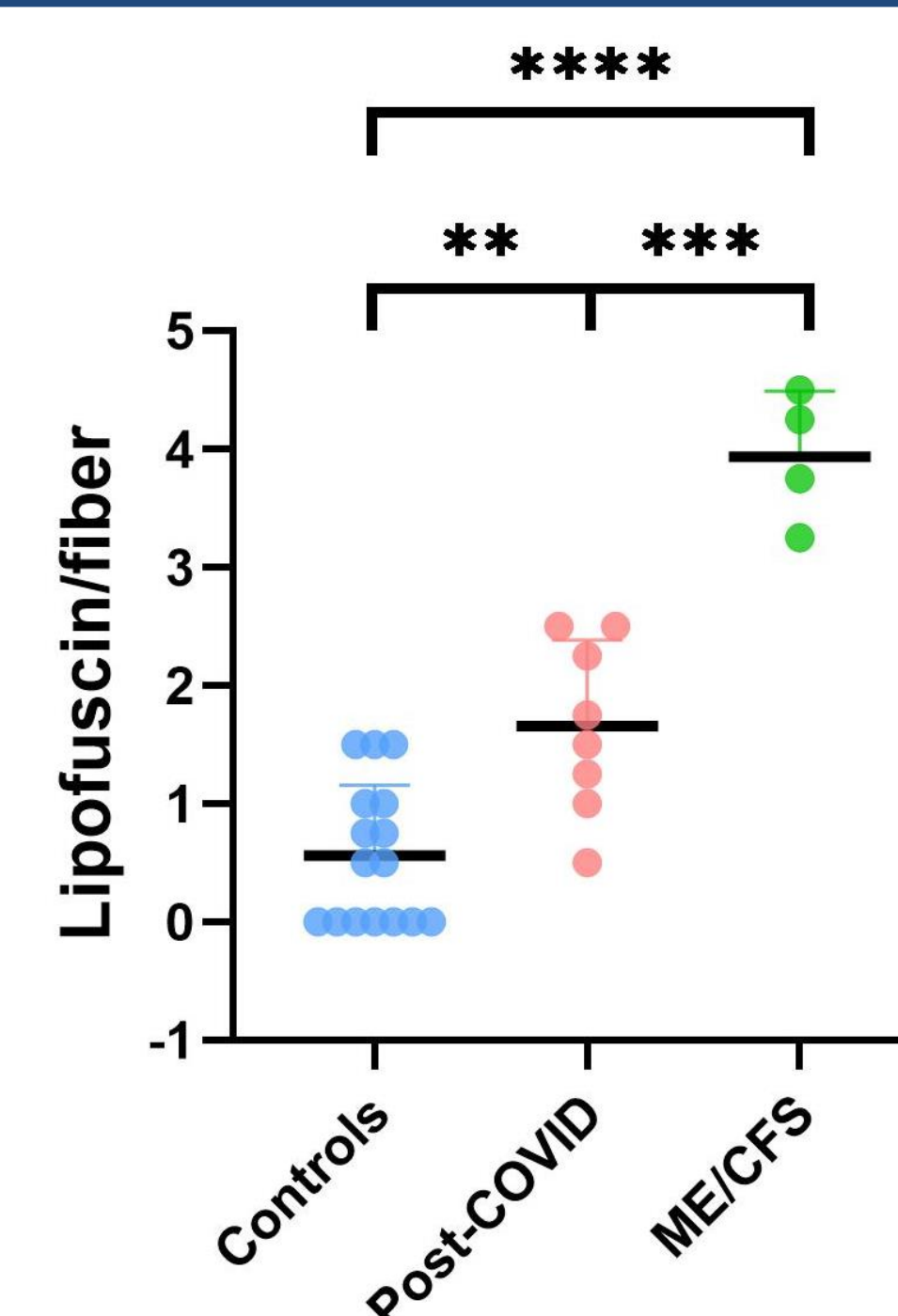


Figure 4: Lipofuscin accumulation in skeletal muscle. Lipofuscin accumulation (number per fiber) was higher in patients with post-COVID ($p=0.010$) and ME/CFS ($P<0.001$) compared to controls.

Accelerated aging in diseased muscle

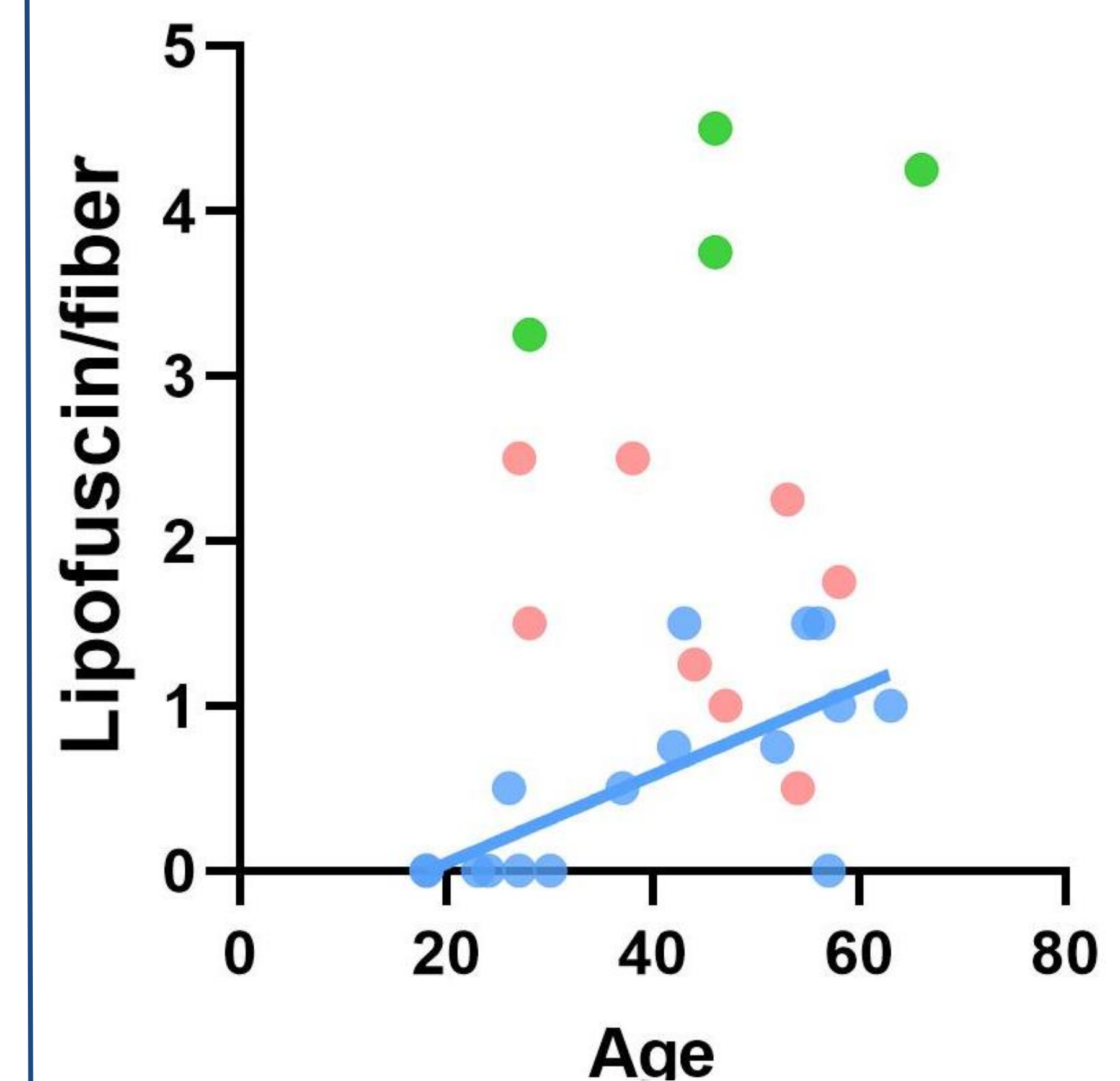


Figure 5: Lipofuscin increases with age.

The amount of lipofuscin per fiber shows a linear increase with age in healthy controls. This relation is absent in the participants with post-COVID and ME/CFS.

Estimated biological age based on lipofuscin accumulation in post-COVID and ME/CFS combined is 109 years vs. a chronological age of 47

Conclusion

- Lipofuscin accumulates in skeletal muscle with age
- Our preliminary data shows the accumulation of lipofuscin in ME/CFS and post-COVID
- Lipofuscin can be a physiological marker of aging.
- Our data hints to lipofuscin-linked accelerated aging of skeletal muscle in post-COVID and ME/CFS.
- **Future outlook:** What is the functional relevance of lipofuscin accumulation? Can lipofuscin be detected in the blood.

