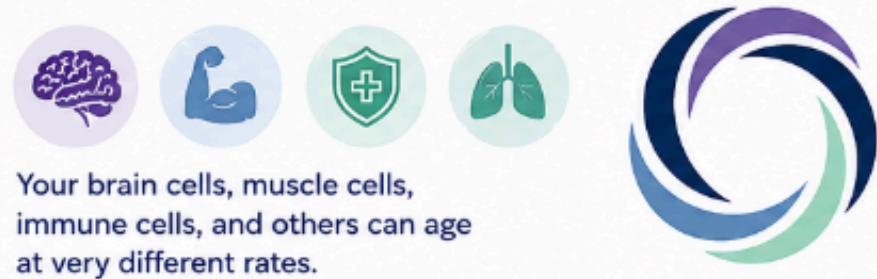


A NEW MAP OF AGING: EVERY CELL HAS ITS OWN CLOCK





A landmark study in *Nature Medicine* analyzed blood from **60,542 people**, measured over **7,000 proteins**, and traced them back to the specific cell types that made them.

They built a separate “aging clock” for more than **40 cell types**.




Your brain cells, muscle cells, immune cells, and others can age at very different rates.





KEY FINDINGS

 <p>60,542 PEOPLE STUDIED</p> <p>The largest study of its kind, using cutting-edge proteomics and single-cell data.</p>	 <p>7,000+ PROTEINS MEASURED</p> <p>Proteins in the blood were traced back to the cell types that produced them.</p>	 <p>40+ CELLULAR CLOCKS</p> <p>Separate biological aging clocks were built for more than 40 different cell types.</p>	 <p>AGING IS ASYNCHRONOUS</p> <p>Cells and tissues throughout the body age at different rates—often independently.</p>
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AGING VARIES GREATLY BETWEEN PEOPLE

 <p>20–25% OF PEOPLE</p> <p>showed accelerated aging in only one cell type.</p> <p><i>Aging often starts in one place.</i></p>	 <p>MOST PEOPLE FALL SOMEWHERE IN BETWEEN</p>	 <p>1–3% OF PEOPLE</p> <p>had accelerated aging in 10 or more cell types.</p> <p><i>This reflects a much broader biological aging burden.</i></p>
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CELLULAR AGING PREDICTS DISEASE YEARS EARLY

 <p>ASTROCYTES (BRAIN CELLS)</p> <p>Extremely aged astrocytes greatly increased the risk of Alzheimer's disease, especially in people with two copies of the APOE4 gene.</p>	 <p>SKELETAL MUSCLE CELLS</p> <p>Extremely aged myocytes were associated with a 12.7x higher risk of Amyotrophic lateral sclerosis (ALS).</p>	 <p>RESPIRATORY EPITHELIAL CELLS (LUNG CELLS)</p> <p>Among smokers, accelerated aging was linked to a 58% higher risk of lung cancer—beyond the risk from smoking itself.</p>	 <p>IMMUNE CELLS & OTHERS</p> <p>Distinct aging patterns predict future risk for many diseases long before symptoms appear.</p>
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WHY THIS MATTERS

-  Aging is a network phenomenon, not a single disease.
-  We can now identify which tissues are aging fastest and intervene earlier.
-  Personalized preventive medicine is the future.

NEXT FRONTIER



Combining protein aging clocks with lipidomics (including plasmalogens) could reveal **WHY** certain cells age faster—and how to protect them.