Docket #: S21-450

AgeIndex: A Whole-Genome Epigenetic Aging and Rejuvenation Index

Researchers at Stanford have developed AgeIndex, the *first* whole-genome epigenetic aging index and method based on Whole Genome Bisulfite Sequencing (WGBS) assays. AgeIndex provides an **unbiased estimate of the biological age of any cell in the body (human or other mammal) by measuring the loss of its epigenetic information**. As cells replicate, the transfer of epigenetic information to cells is not completely faithful, therefore, cellular replication accompanies a gradual loss of important information. Using a large dataset of WGBS data, the researchers demonstrated that the age-dependent loss of epigenetic information could be measured by comparing the cell with embryonic stem cells (defined as Age 0 cells). **AgeIndex is capable of quantifying biological aging, at a cellular and chromosomal level, in different tissues, both in vitro and in vivo, and therefore able to assess the efficacy of new anti- aging and rejuvenation treatments**. While several epigenetic aging 'clocks' have been developed recently they are not tuned for rejuvenation. A robust measure to accurately quantify aging *as well as* rejuvenation has yet to be commercialized.

Stage of Development
The researchers have tested AgeIndex in human and mice using 4 different sequencing and microarray assays (WGBS, RRBS, EPIC, and Methyl 450K assays). To their knowledge, this is the only aging index that successfully works with any tested assays. Optimization efforts are ongoing.

Applications

- Quantifying biological aging, e.g., consumer kits or research
- Measuring efficacy of rejuvenation treatments

- Ageindex can also be applied to free circulating DNA to provide a fast and reliable method to assess chronological and biological aging

Advantages

- Unlike competing methods, AgeIndex takes advantage of the **whole genome** and contains **all the regulatory regions** surrounding gene promoters

Publications

- Mahdi Moqri, Andrea Cipriano, Daniel Nachun, Tara Murty, Guilherme de Sena Brandine, Sajede Rasouli, Andrei Tarkhov, Karolina A. Aberg, Edwin van den Oord, Wanding Zhou, Andrew Smith, Crystal Mackall, Vadim Gladyshev, Steve Horvath, Michael P. Snyder, Vittorio Sebastiano. PRC2 clock: a universal epigenetic biomarker of aging and rejuvenation. bioRxiv, preprint, June 05, 2022.

Patents

- Published Application: WO2023158680

Innovators

- Mahdi Moqri
- Vittorio Sebastiano
- Andrea Cipriano
- Michael Snyder

Licensing Contact

Seth Rodgers

Licensing Manager, Life Sciences

Email