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The Epigenetic Clock is a Promising Biomarker of Aging and can Accurately Predict Actual Human Age

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INTRODUCTION

Aging biomarkers are biomarkers that may better predict function at later ages than chronological age. In other words, aging biomarkers indicate a true biological age that may differ from chronological age. Validated biomarkers of aging allow test interventions to extend lifespan, as biomarker changes are observable throughout an organism's lifespan. Maximum lifespan provides a means of validating biomarkers of aging, but longitudinal studies take too long to be a practical tool for long-lived species like humans. Ideally, biomarkers of aging investigate biological aging processes rather than predisposition to disease, because minimal trauma to the organism, and are reproducibly measured at short intervals compared to the organism's lifespan. Most aging biomarkers have been genes, molecules and proteins discovered in basic research such as telomeres, proteomics and cytokines. However, it is almost impossible to completely clarify the aging mechanism with a single biomarker. Due to the complexity of the aging process, biomarkers of aging may need to be composed of multiple genes, proteins and metabolites. Biological age is based on a set of biological markers, parameters for assessing an individual's functional status. Aging is not just dependent on the passage of time. Chronological age is only an indicator of the time scale in the aging process. Biological age may therefore be more representative of true aging than chronological age, which provides a quantitative measure of individual aging.

DESCRIPTION

Although grey hair increases with age, grey hair is not a biomarker of aging. Similarly, skin folds and other common age-related changes are no better indicators of future function than chronological age have so far met with limited success. Advances in big data analytics have enabled the development of a new type of aging clock. The epigenetic clock is a promising biomarker of aging and can accurately predict actual human age. Further studies of blood clocks on large datasets of Korean, Canadian and Eastern European populations showed that biomarkers of aging are population-specific and can predict mortality. It is also possible to predict the real age of humans using the transcriptome clock. The recent introduction of low-power, compact sensors based on micro-electro-mechanical Systems (MEMS) offers a unique opportunity to capture and store a person's digitized activity records in the cloud. A generation of wearable and affordable devices was born. As a result, using state-of-the-art deep machine learning techniques, proof-of-concept digital biomarkers of age in the form of predictors of all-cause mortality from a sufficiently large collection of week-long human physical activity streams whose data are supplemented can be constructed with abundant clinical data. A new epigenetic marker discovered in the study of senescent cells is histone loss. Most evidence indicates that histone loss is associated with cell division. In yeast senescence and fission micrococcus nuclease sequencing showed approximately 50% nucleosome loss.

CONCLUSION

Changes in physical biomarkers should be proportional to species age changes. Therefore, once biomarkers of aging are established, people will be able to dive into the study of lifespan extension and find timelines for the development of potential genetic diseases. It will allow identification of a person's biological age. DNA methylation uses the structure of DNA at different stages of life to determine age. DNA methylation is the methylation of cysteine regions. Hyper methylation of this region is associated with decreased transcriptional activity and hypomethylation vice versa. In other words, the more tightly the region of DNA is held, the more stable and young the species is. Looking at the characteristics of DNA methylation in tissues, it was found to be almost zero in embryonic tissues are used to determine accelerated aging and the results are reproducible in chimpanzee tissue.

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