Test detects molecular marker of aging in humans

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In 2004, researchers at the University of North Carolina at Chapel Hill Lineberger Comprehensive Cancer Center announced a crucial discovery in the understanding of cellular aging. They found that as cells and tissues age, the expression of a key protein, called p16INK4a, dramatically increases in most mammalian organs. Because p16INK4a is a tumor suppressor protein, cancer researchers are interested in its role in cellular aging and cancer prevention.

Now the team has proven that the same biomarker is present in human blood and is strongly correlated both with chronological age and with certain behaviors such as tobacco use and physical inactivity, which are known to accelerate the aging process.

In a paper published online ahead of print in the journal *Aging Cell*, the researchers reported that they have solved technical hurdles to develop a simple blood test to detect p16INK4a expression, which is present in cells called T-lymphocytes, also known as T-cells.

"This is a major step toward a practical tool to clinically determine a person's actual molecular, as opposed to just their chronological age," said UNC Lineberger member Norman Sharpless, M.D., the senior author of the study and associate professor of medicine and genetics at UNC's School of Medicine.

They validated the test by obtaining blood from two groups of healthy human volunteers, totaling 170 subjects, who also filled out a

questionnaire about current and past health status and health behaviors.

They found that expression of the biomarker was strongly correlated with the donor's chronological age and, in fact, increased exponentially with age. In addition, increased levels were independently associated with tobacco use and physical inactivity as well as with biomarkers of human frailty.

Sharpless said that the researchers were surprised by some of their findings, "We found a very weak correlation between the biomarker and obesity - as measured by body mass index (BMI) - despite other data suggesting that caloric restriction slows aging. The data suggest the possibility that reduced exercise may actually be worse with regard to molecular age than a higher BMI."

"Although we don't know whether this test is a good reflection of cellular age in all types of human tissues, we believe it is a first step toward a better understanding of issues like the suitability of organs for transplantation, how well patients are likely to recover after surgery or the future toxicity of chemotherapy for cancer patients," he added.

Source: University of North Carolina School of Medicine (news : web)