

# Exceptional cognitive and physical health in old age leaves immunological fingerprint

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Exceptional cognitive and physical function in old age leaves a tell-tale immunologic fingerprint, say researchers at the University of Pittsburgh and Children's Hospital of Pittsburgh of UPMC. Likewise, older adults who have mild impairments bear a distinct immunologic pattern, too, according to findings published today in the *PLoS One*.

Old age is not synonymous with impairment and disability, noted lead investigator Abbe N. de Vallejo, Ph.D., associate professor of pediatrics and immunology, University of Pittsburgh School of Medicine.

"Our study indicates that getting older does not necessarily mean that the immune system gets weaker, as many of us assumed," he said. "The immune system is dynamic, and the changes it undergoes over time very much influence function."

For the project, the team collected blood samples from 140 participants who had been followed in the Cardiovascular Health Study (CHS) for nearly two decades and were 78 to 94 years old. With only two participants younger than 82, the average age of the group was 86. The team also gathered information about the participants' health and function, medical history and hospitalizations, and self-rated health, and assessed their cognitive and physical function using standard tests.

Previous research has shown that with age, [immune cells](#) called T-cells become more like [natural killer](#) (NK) cells, which typically target [tumor cells](#) and virus-infected cells, Dr. de Vallejo said. A closer look in the

new study shows that participants who were most physically and cognitively resilient had a dominant pattern of stimulatory NK receptors on the T-cell surface, and that these unusual T-cells can be activated directly through these NK receptors independently of the conventional ones. The functionally resilient elders also have a distinct profile of [blood proteins](#) called cytokines that reflect an immune-enhancing environment.

Conversely, the group that showed mild health impairment had a dominant pattern of inhibitory NK receptors on their T-cells, and they have a cytokine profile indicating a pro-inflammatory environment. Both of these immunologic features could suggest a greater susceptibility to illness.

"These findings indicate that there is remodeling or adaptation of the immune system as we age that can be either protective or detrimental," Dr. de Vallejo said. "Now we have an immunological fingerprint that can identify individuals who are more likely to stay physically and cognitively well."

He and his colleagues are now studying factors, such as genetics or traits developed during childhood that might influence the adaptation of the immune system with advancing age.

Provided by University of Pittsburgh Schools of the Health Sciences

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