

Scientists identify enzyme important in aging

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The secret to longevity may lie in an enzyme with the ability to promote a robust immune system into old age by maintaining the function of the thymus throughout life, according to researchers studying an "anti-aging" mouse model that lives longer than a typical mouse.

The study, led by Abbe de Vallejo, Ph.D., associate professor of [pediatrics](#) and immunology, University of Pittsburgh School of Medicine, and immunologist at Children's Hospital of Pittsburgh of UPMC, reports that the novel mouse model has a thymus that remains intact throughout its life. In all [mammals](#), the thymus—the organ that produces T cells to fight disease and infection—degenerates with age.

Results of the study are published in this week's issue of the *Proceedings of the National Academy of Sciences*.

"These findings give us hope that we may one day have the ability to restore the function of the thymus in old age, or perhaps by intervening at an early age, we may be able to delay or even prevent the degeneration of the thymus in order to maintain our immune defenses throughout life," said Dr. de Vallejo.

The mouse model that Dr. de Vallejo's team studied was developed by his colleague Cheryl Conover, Ph.D., an endocrinology researcher at Mayo Clinic. In this "knockout" [mouse model](#), researchers deleted an [enzyme](#) known as pregnancy-associated plasma protein A (PAPPA). PAPPA-knockout mice live at least 30 percent longer and have significantly lower occurrence of spontaneous tumors than typical mice.

PAPPA controls the availability in tissues of a hormone known as insulin-like growth factor (IGF) that is a promoter of cell division. Hence, IGF is required for normal embryonic and postnatal growth. But IGF also is associated with tumor growth, inflammation and cardiovascular disease in adults. By deleting PAPPA, the researchers were able to control the availability of IGF in tissues and dampen its many ill effects. In the thymus, deletion of PAPPA maintained just enough IGF to sustain production of T cells without consuming precursor cells, thereby preventing the degeneration of the thymus.

"Controlling the availability of IGF in the thymus by targeted manipulation of PAPPA could be a way to maintain immune protection throughout life," Dr. de Vallejo said. "This study has profound implications for the future study of healthy aging and longevity."

Source: University of Pittsburgh Schools of the Health Sciences ([news : web](#))

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