

# Flu shots not a magic bullet for the elderly—and new research helps to explain why

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Credit: University of Reading

Elderly people who find their annual flu shot is not helping them beat the virus may be lacking in effective natural killer cells, according to new research.

In a paper published in *Frontiers in Immunology*, a team from the University of Reading looked at levels of different types of natural killer (NK) cells in older and younger people and whether the number, type and activity is linked to the effectiveness of the [flu vaccine](#). Among the key findings, the team discovered that [older people](#) with very low NK activity failed to respond to the flu vaccine at all.

Professor Parveen Yaqoob, Head of Chemistry, Food and Pharmacy at the University of Reading said:

"Our paper shows that the natural killer cell population changes as we get older. We compared the NK cells in young and older people and found them to be different; there were fewer of the active NK cells in older people and they did not respond in the same way to a flu vaccination.

"To look at this further, we separated the older subjects into those who had very low NK activity and those who had higher NK activity. Those with low activity failed to respond to the vaccine at all, whereas in those who had higher NK activity, about 27 percent responded to the vaccine.

"It suggests that in older people, for whom protection against flu is critical, having low NK activity means that they are likely not to respond well to the flu vaccine."

As part of the study, the team looked at whether a pre and probiotic mixture use could help those with low NK counts. However, although previous evidence suggests that probiotics could enhance the all-important NK cell activity, the University of Reading team's tests showed no effect on the vaccine effectiveness.

Professor Yaqoob said:

"We provided young and older subjects with a specially formulated pre and probiotic for 8 weeks in total, with the flu vaccine being administered halfway through. However, the treatment had no beneficial effect. This might be because the age-related decline in immunity is too profound to alter through nutrition, or it could be that a different probiotic might have worked better.

"What is unique about the study is the direct comparison of NK cell

populations and activity in young vs older subjects in conjunction with a flu vaccination. It demonstrates that trying to increase the active NK cell population during ageing could improve the response to vaccination, and that individuals who have somehow managed to preserve their NK activity have a better chance of responding to the flu vaccine. Having said this, the immune system is highly complex and targeting NK cells alone will not necessarily result in a measurable benefit.

"It's important to note that we are not suggesting older people should avoid the flu shot. As a next step, we need to look into the ways in which people preserve NK activity, and immune function in general, throughout their lives in order to maintain the ability to respond to the flu [vaccine](#) for as long as possible as possible."

Natural killer (NK) cells are white blood cells that are part of the immune system and people who have low numbers of NK cells or NK [activity](#) are thought to be at higher risk of infection because these [cells](#) perform a 'surveillance' role, constantly searching for infections and destroying them.

They are recruited to the respiratory tract within 48 hours after infection with influenza and are thought to play a role in the immune response to a flu infection or vaccination.

**More information:** Agnieszka Przemska-Kosicka et al. Age-Related Changes in the Natural Killer Cell Response to Seasonal Influenza Vaccination Are Not Influenced by a Synbiotic: a Randomised Controlled Trial, *Frontiers in Immunology* (2018). [DOI: 10.3389/fimmu.2018.00591](#)

Provided by University of Reading

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