

Booster immunization in same limb as the first shot yielded stronger adaptive immunity in mice

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A collaboration between researchers at Duke University and Harvard Medical School has shown that mice receiving a booster shot in the same

limb resulted in stronger adaptive immunity than a shot in another limb. In their paper published in the journal *Science Immunology*, the group describes their study involving immunizing mice against the flu and then giving them booster shots at a later time in different parts of the body to see if there were any differences, and what they found by doing so.

As the worldwide pandemic has continued, millions of people the world over have been given booster shots to strengthen the impact of immunization after adaptive immunity has waned over several months. In such efforts, patients have typically been given the shots in the arm of their choice. In this new effort, the researchers have found evidence that suggests patients may want to choose the same arm that received the initial shot.

The researchers infected test mice with influenza hemagglutinin, the protein used in flu vaccines. Initial vaccinations were given in their right back footpad. All of the mice received a second [booster shot](#) three months later, either in the same location or in the left back footpad. Blood samples were collected before and after all of the vaccinations.

In looking at the [blood samples](#), the researchers found that all of the mice produced roughly equal amounts of antibodies and B cells within eight days of receiving the booster shot. But they also found that those mice boosted in the same limb had higher numbers of mutated B cells, which evolve due to exposure to the protein in the shots they received, than the mice that got the shot in the opposite limb. Such trained memory cells, the researchers note, become more important as the virus infecting the [mice](#) evolves.

Suspecting that the higher numbers of the mutant B cells were the progeny of germinal cells in the [lymph nodes](#) altered by the first shot, the researchers marked some of them with a [fluorescent protein](#) to trace their activities after both shots were given. Doing so showed higher

numbers of cells in the secondary germinal center after the booster was given for those inoculated in the same limb.

More information: Masayuki Kuraoka et al, Recall of B cell memory depends on relative locations of prime and boost immunization, *Science Immunology* (2022). [DOI: 10.1126/sciimmunol.abn5311](https://doi.org/10.1126/sciimmunol.abn5311)

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