

## Why green vegetable aid the immune system: a new finding

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Researchers reporting online in the journal *Cell*, a Cell Press publication, on October 13th have found another good reason to eat your green vegetables, although it may or may not win any arguments with kids at the dinner table.

It turns out that green vegetables — from bok choy to broccoli — are the source of a chemical signal that is important to a fully functioning immune system. They do this by ensuring that immune cells in the gut and the skin known as intra-epithelial lymphocytes (IELs) function properly.

“It is still surprising to me,” said Marc Veldhoen of The Babraham Institute in Cambridge. “I would have expected cells at the surface would play some role in the interaction with the outside world, but such a clear cut interaction with the diet was unexpected. After feeding otherwise healthy mice a vegetable-poor diet for two to three weeks, I was amazed to see 70 to 80 percent of these protective cells disappeared.”

Those protective IELs exist as a network beneath the barrier of epithelial cells covering inner and outer body surfaces, where they are important as a first line of defense and in wound repair. Veldhoen’s team now finds that the numbers of IELs depend on levels of a cell-surface protein called the aryl hydrocarbon receptor (AhR), which can be regulated by dietary ingredients found primarily in cruciferous vegetables. Mice lacking this receptor lose control over the microbes living on the intestinal surface, both in terms of their numbers and composition.

Earlier studies suggested that breakdown of cruciferous vegetables can yield a compound that can be converted into a molecule that triggers AhRs. The new work finds that mice fed a synthetic diet lacking this key compound experience a significant reduction in AhR activity and lose IELs. With reduced numbers of these key immune cells, animals showed lower levels of antimicrobial proteins, heightened immune activation and greater susceptibility to injury. When the researchers intentionally damaged the intestinal surface in animals that didn’t have normal AhR activity, the mice were not as “quick to repair” that damage.

As an immunologist, Veldhoen says he hopes the findings will generate interest in the medical community, noting that some of the characteristics observed in the mice are consistent with those seen in patients with inflammatory bowel disease.

“It’s tempting to extrapolate to humans,” he said. “But there are many other factors that might play a role.”

For the rest of us, he says, “it’s already a good idea to eat your greens.” Still, the results offer a molecular basis for the importance of cruciferous vegetable-derived phyto-nutrients as part of a healthy diet.