Vitamin A supplementation may cause the immune system to 'forget' past infections

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Retinol or Vitamin A 3D space model (balls model). Credit: YassineMrabet, Wikipedia.

Although vitamin A supplementation can have profound health benefits when someone is deficient, new evidence is emerging to show that vitamin A supplementation above and beyond normal levels may have negative health consequences. A new research report published in the July 2015 issue of the *Journal of Leukocyte Biology* may help to explain why too much vitamin A can be harmful. Too much vitamin A shuts down the body's trained immunity, opening the door to infections to which we would otherwise be immune. This study adds to the arguments

that vitamin A supplementation should only be done with clear biological and clinical arguments. Furthermore, it also suggests that low vitamin A concentrations in certain situations may even be "normal."

"This study helps to explain the mechanisms of anti-inflammatory effects of vitamin A and by doing so opens the door to identifying novel ways to modulate the immune response and restore its function in situations in which it is dysregulated," said Mihai G. Netea, M.D., Ph.D., a researcher involved in the work from the Department of Internal Medicine at Radboud University Medical Center in Nijmegen, The Netherlands.

To make this discovery, Netea and colleagues stimulated immune cells, isolated from volunteers, with Vitamin A and saw that the cells produced fewer cytokines, key proteins that help ward off microbes, upon stimulation with various mitogens and antigens. Furthermore, the cells were also stimulated with various microbial structures, which resulted in long-term activation or training of the cells. When the same experiments were performed in the presence of vitamin A, the microbial structures were no longer able to activate the immune cells.

"The interface of nutrition and immunity is an area of considerable importance, especially in an age when dietary supplements and vitamins are quite common," said John Wherry, Ph.D., Deputy Editor of the *Journal of Leukocyte Biology*. "These new findings shed light on an importance balance in vitamin A levels for optimal immunity. These studies have implications for how we think about daily vitamins, but also for the developing world, where improving diet could have dramatic benefits on how the immune system is trained to respond to different infections."

More information: Rob J. W. Arts, Bastiaan A. Blok, Reinout van Crevel, Leo A. B. Joosten, Peter Aaby, Christine Stabell Benn, and

Mihai G. Netea. Vitamin A induces inhibitory histone methylation modifications and down-regulates trained immunity in human monocytes. *J. Leukoc. Biol* July 2015 98:129-136; DOI: 10.1189/jlb.6AB0914-416R