Research may lead to new and improved vaccines

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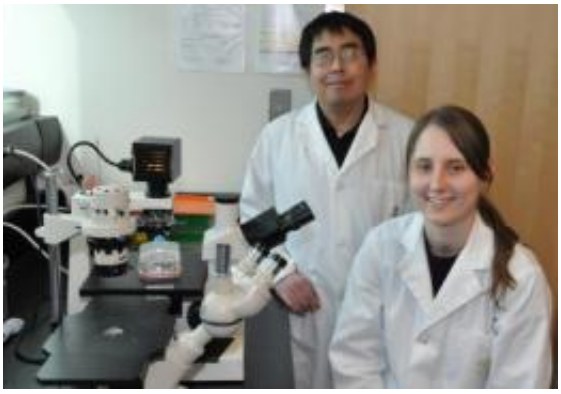

Yan Shi, Ph.D., (L) and Tracy Flach are in their University of Calgary lab. Credit: Bruce Perrault

Alum is an adjuvant (immune booster) used in many common vaccines, and Canadian researchers have now discovered how it works. The research by scientists from the University of Calgary's Faculty of Medicine is published in the March 13 online edition of *Nature Medicine*. The new findings will help the medical community produce more effective vaccines and may open the doors for creating new vaccines for diseases such as HIV or tuberculosis.

"Understanding alum properties will help other vaccines because we are one step deeper into the mechanistic insight of adjuvants, which are essential for human vaccines to work," says Yan Shi, PhD, from the Faculty of Medicine and a member of the Snyder Institute of Infection,

Immunity and Inflammation.

Alum is a common grocery store staple used in pickling. It is very effective in inducing antibody responses and is the only human vaccine adjuvant approved for large-scale immunization. It has been in use for 90 years and appears in almost all vaccines we receive as without an adjuvant vaccines in general do not work.

"Knowledge provided in this study may help us manipulate alum with additional adjuvant components to direct an attack against major diseases which require a killer T cell response such as HIV, Tuberculosis, and malaria," says Tracy Flach from the Faculty of Medicine and the study's first author.

The research reveals that alum interacts with a group of immune cells called dendritic cells via their cell membrane lipids. Dendritic cells, the sentinel of our immune system, heed the call of alum and move on to activate a group of T cells that control antibody production.

The breakthrough came as the team made use of a cutting edge technology developed in the Faculty of Medicine called single cell force spectroscopy. This technique allowed the UCalgary team to study individual cells and measure their responses to alum.

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