New material for air cleaner filters that captures flu viruses

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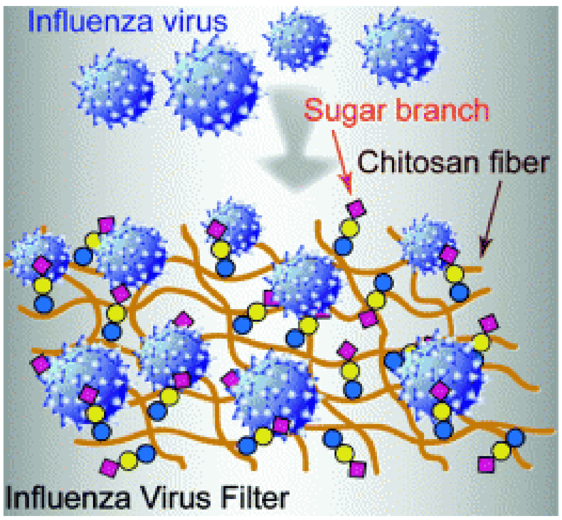

With flu season just around the corner, scientists are reporting development of a new material for the fiber in face masks, air conditioning filters and air cleaning filters that captures influenza viruses before they can get into people's eyes, noses and mouths and cause infection. The report on the fiber appears in ACS' journal *Biomacromolecules*.

Xuebing Li, Peixing Wu and colleagues explain that in an average year, influenza kills almost 300,000 people and sickens millions more worldwide. The constant emergence of new strains of virus that shrug off vaccines and anti-influenza medications has led to an urgent need for new ways of battling this modern-day scourge. So Li, Wu and colleagues sought a new approach, using a substance termed chitosan made from ground shrimp shells.

The scientists combined chitosan with substances that the flu virus attaches to in order to infect cells. They found that this new version of chitosan ideal for attaching to fibers of face masks and air filters was highly effective in capturing flu virus. The material could become an important addition to vaccinations, anti-influenza medications, and other measures in battling flu, they suggest.

More information: Carbohydrate-Functionalized Chitosan Fiber for Influenza Virus Capture, *Biomacromolecules*, Article ASAP. DOI: 10.1021/bm200970x

Abstract
The high transmissibility and genetic variability of the influenza virus have made the design of effective approaches to control the infection particularly challenging. The virus surface hemagglutinin (HA) protein is responsible for the viral attachment to the host cell surface via the binding with its glycoligands, such as sialyllactose (SL), and thereby is an attractive target for antiviral designs. Herein we present the facile construction and development of two SL-incorporated chitosan-based materials, either as a water-soluble polymer or as a functional fiber, to demonstrate their abilities for viral adhesion inhibition and decontamination. The syntheses were accomplished by grafting a lactoside bearing an aldehyde-functionalized aglycone to the amino groups of chitosan or chitosan fiber followed by the enzymatic sialylation with sialyltransferase. The obtained water-soluble SL–chitosan conjugate bound HA with high affinity and inhibited effectively the viral attachment to host erythrocytes. Moreover, the SL-functionalized chitosan fiber efficiently removed the virus from an

aqueous medium. The results collectively demonstrate that these potential new materials may function as the virus adsorbents for prevention and control of influenza. Importantly, these materials represent an appealing approach for presenting a protein ligand on a chitosan backbone, which is a versatile molecular platform for biofunctionalization and, thereby, can be used for not only antiviral designs, but also extensive medical development such as diagnosis and drug delivery.

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