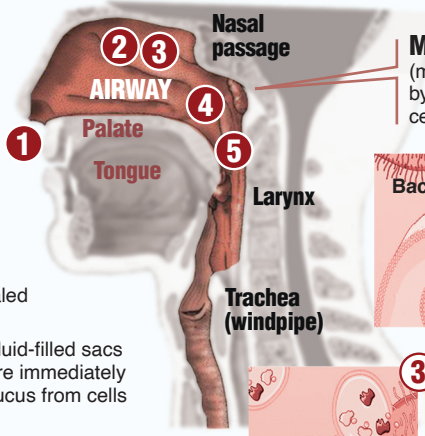
Science Matters

‘Swarm’ attacks bacteria in nose

A newly discovered mechanism of the immune system explains how the airway protects itself from infection. It may lead to new ways to deliver drugs via the airway.

Bacteria are present in almost every breath of air we take in



Mucus membrane (mucosa) maintained by mucus-producing cells lines the airway

1 Bacteria are inhaled

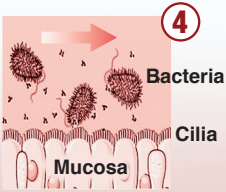
2 A swarm of tiny fluid-filled sacs called **exosomes** are immediately secreted into the mucus from cells lining the airway

3 Within 5 minutes, proteins in the exosomes attack the bacteria directly in an immune response

Bacteria being attacked

Exosomes release immune proteins and molecules

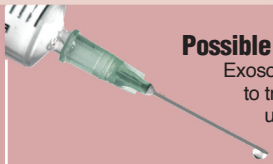
4 Tiny hairs **(cilia)** in the mucosa sweep the anti-microbial proteins from the front of the nose to the back



5 As a result, cells further along the airway are vaccinated against an invader before they even see it

This immune process is as effective as antibiotics at killing bacteria

Source: Benjamin Bleier of Harvard Medical School’s Massachusetts Eye and Ear; Journal of Allergy and Clinical Immunology
Graphic: Helen Lee McComas, Tribune News Service



Possible medical application

Exosomes could potentially be used to transfer inhaled drugs along the upper airway -- and possibly even into the lower airways and lungs