

# New research reveals how cat dander triggers allergic responses

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New research reveals how the most common cause of severe allergic reactions to cats, the Fel d 1 protein which is found in cat dander, triggers an allergic response.

Scientists have discovered that when the cat protein Fel d 1 is in the presence of very low doses of the ubiquitous environmental [bacterial toxin](#), lipopolysaccharide (LPS), it activates the pathogen recognition receptor Toll-like receptor 4. Until now, it was not understood how Fel d 1 generated such a large inflammatory response in the immune system.

Allergic reactions are the result of the immune system overreacting to a perceived danger. Instead of identifying and responding to a harmful virus or bacteria, it misidentifies different allergens, including dander (microscopic pieces of [animal skin](#) often accompanied by dried saliva from grooming), as dangerous and mounts an [immune response](#).

In order to find out how Fel d 1 triggers these [allergic reactions](#), the researchers exposed human cells to cat and dog dander proteins in the presence or absence of low levels of LPS. The researchers found that when the bacterial toxin LPS is present, it increases the signalling to the body's immune system, intensifying the body's inflammatory response to the cat protein Fel d 1.

They also discovered that the part of the immune system that recognises the LPS contaminated Fel d 1 is the pathogen recognition receptor Toll-like receptor 4 (TLR4). (TLR4 also plays a role in a heightened immune response, and subsequent allergic reaction, to dust mite allergens and as well as the metal nickel.) The researchers then used a drug which inhibits the TLR4 response and found that it blocks the effects of the cat dander protein on [human cells](#), thereby preventing an [inflammatory response](#).

Dr Clare Bryant, lead author of the research from the University of Cambridge's Department of Veterinary Medicine, said: "How cat dander causes such a severe allergic reaction in some people has long been a mystery. Not only did we find out that LPS exacerbates the immune response's reaction to cat dander, we identified the part of immune system that recognises it, the receptor TLR4."

Additional research revealed that the dog allergen Can f 6 (a protein found in dog dander) also enhances LPS-induced activation of TLR4. The researchers believe that dog-allergy sufferers could also benefit from new drugs which inhibit TLR4.

Dr Bryant continued: "As drugs have already been developed to inhibit the receptor TLR4, we are hopeful that our research will lead to new and improved treatments for cat and possibly dog allergy sufferers."

The research was funded by the Wellcome Trust and the Medical Research Council (MRC). It was published in the *The Journal of Immunology*.

Provided by University of Cambridge

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