

PRESS RELEASE

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Hypoallergenic pets: dream or reality?

Luxembourg Institute of Health navigates the science behind supposed ‘sneeze-free’ animals

Dr Christiane Hilger and her research team at the Luxembourg Institute of Health, in collaboration with the Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, delve into the intricate world of hypoallergenic animals. Their research, which includes an original article and a comprehensive review, challenges common beliefs surrounding hypoallergenic pets, highlighting that even breeds marketed as such, like the Sphynx cat or Labradoodle, still produce major allergens. The team studied the American Bashkir Curly Horse, a so-called hypoallergenic breed, concluding that there is no scientific evidence supporting their putative hypoallergenic status. The collaborative efforts signify a crucial stride in unravelling scientific evidence from unsupported claims, laying the foundation for evidence-based decision-making in the quest for hypoallergenic pets.

Furry companions hold a special place in many hearts, but for those with allergies, the dream of having a pet can be elusive. Animal allergens are present on fur, in saliva and urine, and they are easily dispersed into the indoor environment and readily detectable in household dust. Current estimates state that in the general adult population, sensitization to pets affect 10 – 14% of individuals in Europe and the United States, bearing a high risk of developing clinical symptoms such as allergic rhinitis or asthma. Specific cat, dog, or horse breeds are often advertised as hypoallergenic, and patients are seeking advice from clinicians. Dr Christiane Hilger, Group Leader of Molecular and Translational Allergology in the Department of Infection and Immunity at the Luxembourg Institute of Health, couples a recently published review article with her original research to delve into the intricate world of hypoallergenic animals. The collaborative effort of the original research, conducted together with Prof. Monika Raulf from the Institute for Prevention and Occupational Medicine of the German Social Accident Insurance (Bochum, Germany), Prof. Gunnar Dittmar from the Luxembourg Institute of Health, and two clinical centers, the Centre Hospitalier de Luxembourg, and the Odense Research Center for Anaphylaxis in Denmark, present new insights on so-called hypoallergenic horses, whereas the review summarizes current knowledge and research strategies that could offer hope for allergic patients.

Data on primary horse allergy are scarce, and so far only four respiratory allergens have been characterized. In an attempt to verify the popular belief that American Bashkir Curly Horses are hypoallergenic and provoke fewer allergic reactions, Dr Hilger’s team conducted an extensive study, which was recently published in *Clinical and Translational Allergology* (doi.org/10.1002/clt2.12329). Contrary to claims, a thorough proteomic analysis of horse hair extracts, including a molecular examination of the major allergen Equ c 1, revealed no significant differences between Curly and Quarter Horses, nor to a mixture of hair sampled from 32 horse breeds. Curly stallions showed even an overall higher allergen content than stallions of the Quarter Horse breed. Despite identifying new variants of Equ c 1, the research found no molecular evidence supporting the notion that Curly Horses are less allergenic than other breeds, challenging the presumed benefits for horse-allergic individuals. “*Our study suggests that Curly Horses are not safer for horse-allergic patients than other*

breeds. Ideally, a clinical trial with well-characterized patients needs to be conducted to make a final statement on the case of the Curly Horse” concludes Bente Janssen-Weets, the first author of the study.

Then, in the review published in *Allergologie Select* (doi:10.5414/ALX2454E), Dr Hilger's research team delves into the prevailing scientific evidence concerning allergic reactions induced by furry animals, shedding light on the challenges confronted by sensitized individuals. Regarding cats, the review reveals that, despite assertions of hypoallergenicity, all known breeds continue to produce Fel d 1, the principal cat allergen. To address this, strategies are primarily centred on various methods to target Fel d 1. The attempt to generate Fel d 1-free cats by selective breeding has been abandoned. Current strategies aim at blocking the allergen by vaccinating cats or supplementing cat food with antibodies. However, whereas 90% of clinically allergic patients are sensitized to Fel d 1, most individuals also react to multiple cat allergens, posing a significant challenge to these intervention approaches, which still have to be validated in clinical studies.

When it comes to dogs, the allergy sensitization profiles are more complex than in cats. The review highlights how the absence of a dominant allergen, akin to Fel d 1 in cats, causes both children and adults to have an allergic response to multiple allergens. As already demonstrated for cats and horses, dogs produce a large individual variability of allergen levels even within the same breed, and these appear to be influenced by the dogs' gender. Studies to date challenge the notion of hypoallergenic dog breeds, revealing that no scientific evidence supports their existence. Allergen shedding by so-called "hypoallergenic" dogs, like Labradoodles, Labrador retrievers, Poodles, Spanish Waterdogs and Airdale terriers, showed no significant difference compared to other breeds. The complex allergen profile of dogs hampers a targeted approach to reduce dog allergen secretion.

For other furry animals, like cattle, small mammals like hamsters, rabbits, guinea pigs, and ferrets, data are sparse. Existing studies reveal high individual variation in allergen levels among different breeds of cattle, underscoring the need for further research in this area.

"Our work lays the groundwork for evidence-based decisions, aiming to dispel the myth and provide valuable insights for both allergic individuals and pet enthusiasts," concludes Dr Hilger. "Despite widespread interest in hypoallergenic pets, our collaborative efforts reveal the unfortunate myth surrounding their existence. Allergic reactions to animal dander are common, and current strategies, limited to avoidance, symptomatic treatment and allergen immunotherapy which however is not available for all pets, fall short of providing viable alternatives for allergic individuals. It is crucial for future approaches to acknowledge the intricate allergenic profiles of pets, paving the way for strategies that align with the complex reality. Ongoing research remains essential to explore prevention strategies to reduce the global burden of allergic diseases in the population. "

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About the Luxembourg Institute of Health (LIH)

The Luxembourg Institute of Health (LIH) is a public biomedical research organisation focused on precision health and invested in becoming a leading reference in Europe for the translation of scientific excellence into meaningful benefits for patients.

The LIH places the patient at the heart of all its activities, driven by a collective obligation towards society to use knowledge and technology arising from research on patient derived data to have a direct impact on people's health. Its dedicated teams of multidisciplinary researchers strive for excellence, generating relevant knowledge linked to immune related diseases and cancer.

The institute embraces collaborations, disruptive technology and process innovation as unique opportunities to improve the application of diagnostics and therapeutics with the long-term goal of preventing disease.

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