**////Title: Understanding the Key Role of Mould Spores in Allergic Asthma**

**////Stand-first**: Professor Araceli Díaz Perales and her colleagues at the Centre for Plant Biotechnology and Genomics in Spain have made the discovery that mould spores on straw contribute to the increase in allergic asthma reactions. Their work utilising an experimental mouse model of human asthma has important implications for understanding, preventing and treating this common condition.

**////Body text:**

Asthma is a prevalent disease that negatively impacts the quality of life of patients. All across Europe, grass pollen is the most common cause of allergic asthma. There are many different types of grass, but *Phleum pratense* (also known as Timothy grass) is an established culprit in triggering allergic asthma. Many individuals who suffer from grass allergy are also prone to severe asthmatic attacks in early autumn.

In the centre of Spain, grass has died and turned to straw by autumn, and as a result, many mould spores are present on the straw surfaces at this time. Mould spores are found in high quantities in the air in autumn, and potentially may account for increases in asthma attacks at that time of year.

Professor Araceli Díaz Perales at the Centre for Plant Biotechnology and Genomics in Spain and her colleagues hypothesised that for some individuals, the *combination* of mould spores and grass allergens is an important trigger for asthma attacks.

To test this prediction, the researchers used a mouse model to mimic asthmatic reactions as observed in humans. In medical research, the use of such models is an established approach to furthering our understanding of human diseases in closely controlled conditions.

The mice were sensitised with grass pollens to experimentally induce allergic reactivity. Then, the allergic mice were exposed to either pollen or straw with mould spores. Both pollen and straw with mould spores triggered asthmatic responses in the allergic mice, but not the healthy control mice who had not been sensitised, as expected.

Going further in the characterisation, Professor Perales´s group found that the allergen behind this phenotype belongs to Group 1 allergens. Among all the grass pollen allergens, Group 1 are the most prevalent although these allergens typically have a lower pollen content than the others.

Professor Diaz Perales and her colleagues then studied how these group 1 allergens reach the airways of affected individuals to trigger asthmatic responses. They made the fascinating discovery that Group 1 allergens, known to be present in pollen and now also known to be present in straw, are capable of physically binding to the spores. On this basis, the researchers propose that mould spores present on grass might act as air-carriers of the allergens.

Referring back to the existing literature, Professor Diaz Perales and her colleagues note that it is widely accepted that mould can contribute to the development of asthma. For example, in hot, humid climates such as the Mediterranean region, high spore concentrations are associated with increases in hospitalisations due to asthma attacks. So, not only can mould contribute to the development of asthma in the first place, but the work by Professor Diaz Perales and her colleagues shows that it is also involved in triggering asthma attacks when pollen is no longer present – when using mice as an experimental model at least.

The researchers suggest that several questions regarding the role of mould in asthma are yet to be solved. Nonetheless, the relevance of mould to better understanding asthma is clear. Further research to delineate the key role of moulds in asthma would help improve both our diagnostic and therapeutic tools for the benefit of millions of sufferers worldwide.

This SciPod is a summary of the paper ‘Group 1 allergens, transported by mold spores, induce asthma exacerbation in a mouse model’, published in Allergy. DOI: https://doi.org/10.1111/all.14347

For further information, you can connect with Araceli Díaz Perales at araceli.diaz@upm.es