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Impact of pollen associated lipid mediators (PALMs) from grass pollen on human mast cells

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We recently demonstrated that pollen do not only function as allergen carriers but are also a rich source of bioactive lipids. These pollen-associated lipid mediators (PALMs) act as immunostimulators and -modulators on cells of the innate and adaptive immune system.Herein we aimed to investigate the impact of water-soluble factors from grass pollen (Phleum pratense L.), their Hexane isopropanol total lipid extracts (HIP), RP-HPLC fractions (RP) from HIP and associated phytoprostanes (PPE1) on human mast cells# effector functions such as degranulation.IgE- and Calcium-Ionophore-mediated mast cell degranulation was documented by β-hexosaminidase release. The human mast cell line LAD2 as well as primary mast cells (PMCs) isolated from human foreskin were sensitized with or without human myeloma IgE for 16 h. After centrifugation, they were stimulated with anti-human IgE or Calcium-Ionophore following pretreatment with Phleum pratense L. aqueous pollen extracts (Phl.-APE), HIP, RP and PPE1. The β-hexosaminidase content in supernatants and cell pellets was measured by p-nitrophenyl-acetyl-glucosaminide formation.Water-soluble factors from pollen (Phl.-APE) dose-dependently enhanced the Calcium-Ionophore and IgE/α-IgE-mediated degranulation. Additionally, pollen derived lipids such as HIP-extracts and RP-HPLC-fractions also synergistically increased specific and unspecific mast cell degranulation. A similar potentiation of IgE/α-IgE-mediated degranulation was observed by PPE1. In the absence of IgE-receptor crosslinking only Phl.-APE was able to induce mast cell degranulation. All these outcomes were observed in LAD2 as well as in PMCs.Our results suggest that pollen-associated lipid mediators (PALMs) such as PPE1 may profoundly influence mast cell degranulation. The mechanisms leading to this effect are currently under