A Key Role of Melanin-Concentrating Hormone in Eosinophilic Esophagitis

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Background: Eosinophilic Esophagitis (EE) is a rapidly growing world-wide disease characterized by an infiltration of eosinophils in the esophagus with severe epithelial hyperplasia. Recent gene expression profiling performed on patients with EE and on healthy individuals has identified a gene encoding for Melanin-Concentrating hormone (MCH) to be up-regulated in patients with EE. If a link between MCH and EE can be established, new therapies for EE may be possible. In this study, we aimed to determine the role of MCH in various aspects of EE.
Methods: Real-time PCR analysis and immunohistochemistry were performed on normal and EE esophageal biopsies to examine expression levels of MCH and its receptor MCHR1. To assess the effects of MCH in vitro, esophageal epithelial cells (TE-7) were exposed to various concentrations (0 to 10000 nM) of the hormone and assessed for cellular proliferation. To test the role of MCH in vivo, wild-type and MCH-deficient mice were exposed intranasally to *Aspergillus fumigatus*, which had been shown previously to induce EE in mice. Their harvested esophagi were then stained and quantified for eosinophils and epithelial proliferation. Lung tissues were also obtained from WT mice and MCH-KO mice, subjected to *Aspergillus* stimulation *in vitro*, and analyzed for IL-13 expression by ELISA.
Results: Patients with active EE had elevated expression of MCH that correlated with eosinophil levels. In vitro assays with esophageal epithelial cells showed thus far that MCH did not induce cell proliferation. In vivo analysis demonstrated that MCH-KO mice were protected from aspects of experimental EE induction including eosinophil accumulation and induced expression of IL-13.
Conclusion: MCH is elevated in the esophagus of EE patients and has a key role in disease induction in an experimental model of EE.