MedicalXpress

Scientists elucidate the role of a key molecule involved in eosinophilic esophagitis

August 31 2015

Scientists from the D'Or Institute of Research and Education (IDOR), the Federal University of Rio de Janeiro (UFRJ) and the Yale University School of Medicine have elucidated the chemical process behind a mysterious gastrointestinal disease that is becoming more frequent every day: the eosinophilic esophagitis (EoE), also known as the "asthma of the esophagus". The researchers identified a molecule which plays a key role in this condition and that can be a target in a new therapeutic strategy.

The eosinophilic esophagitis is a chronic inflammatory disorder of the esophagus. In patients with this condition, a type of white blood cell from the immune system, the eosinophil, builds up in the lining of the tube that connects the mouth to the stomach, the esophagus. This buildup inflames and injures the esophageal tissue leading to tissue scarring and fibrosis, which causes difficulty for swallow. In severe cases, the patients may need to undergo a procedure to dilate the esophagus to let the food pass.

The disease is relatively new, with the first diagnosis made in the 70's. Scientists don't know yet what can trigger this kind of esophageal inflammation. The most accepted hypothesis is that it may be caused by allergic hypersensitivity to certain foods (like nuts and milk), air pollution or chemical components present in the modern industrialized foods and oral hygienic products.

Trying to better understand the disease, the leader of the study, Heitor De Souza, from IDOR, decided to look for a molecule called MIF

(macrophage migration inhibitory factor), which his group had already seen involved in other allergenic inflammations. MIF is released by our immune cells, including eosinophils, when our body is under attack of pathogens.

Analyzing biopsies from patients diagnosed with EoE, De Souza saw that MIF was highly expressed in their esophageal mucosa compared with healthy people and patients suffering from other esophageal diseases, like gastroesophageal reflux disease. The presence of MIF could explain the accumulation of eosinophils, as this molecule is known to attract immune cells and prevent them from dying. Indeed, in vitro experiments proved that MIF significantly increases the attraction of eosinophils.

The researchers also tested the role of MIF in mice modeled for EoE. Sick mice genetically modified to be MIF deficient have reduced inflammation compared with mice that have not been modified. Furthermore, the early administration of a drug that blocks the effect of MIF prevented the eosinophils accumulation in the esophagus and the development of esophagitis in treated mice.

"Our work is the first to show the role of MIF in EoE", says De Souza. "Together, our results implicate MIF in the pathogenesis of EoE and suggest that targeting MIF might represent a novel therapy for EoE."

There is no cure for EoE. The current treatment for the disease is based on the intake of corticosteroids, which can lead to side effects and cannot be taken uninterruptedly. The study can pave the way to an effective and safer therapy for patients with this condition.

"If we could give the patients a medicine that blocks MIF, it would be more effective and safer than giving them corticosteroids like we do today", points out De Souza. "We are now one step closer to an effective treatment for this condition."