

ALLERGY, VITAMINS

## CA<sup>2+</sup> AND IGE

8.05.2007

Two decades ago, 10% calcium gluconate had been recommended for the [treatment of anaphylaxis](#) (couldn't find any explanation for that but remember one of my teachers saying it will stabilize the membranes). There is now an update in [scienceblog:-doi:10.1038/ni1441](#): Mice lacking the calcium-activated nonselective cation channel TRPM4 (trmp4<sup>-/-</sup>) lose the ability to suppress Ca<sup>2+</sup> influx in mast cells that otherwise leads to degranulation and histamine release.

BTW - I am always wondering about the dual function of vitamin D on calcium homeostasis and immune regulation. Sure, bones simply are a large Ca<sup>2+</sup> reservoir and the large-conductance Ca<sup>2+</sup>-activated K<sup>+</sup> channel is essential for innate immunology ([scienceblog:-doi:10.1038/nature02356](#)) but the TRPM4 story is probably the best example linking both systems besides vitamin D.

### Addendum 15/9/08

An update on [STIM1](#)

Allergen stimulation induces Ca<sup>2+</sup> influx and elicits the secretion of inflammatory mediators from mast cells. Here we show ... that cells lacking [the Ca<sup>2+</sup>-binding endoplasmic reticulum protein] STIM1 had much less degranulation and cytokine production after FcεRI stimulation.

and [CRACM1](#)

CRACM1 (also called Orai1) constitutes the pore subunit of store-operated calcium release-activated calcium channels ... Mast cells derived from CRACM1-deficient mice showed grossly defective degranulation and cytokine secretion, and the allergic reactions elicited in vivo were inhibited ... CRACM1 is crucial in mouse mast cell effector function.

plus two papers, one on blunted IgE-mediated activation of mast cells in [mice lacking a Ca<sub>2+</sub> channel](#) and another one on [elevated calcium activating IL4 transcription](#).

## Addendum 27/11/09

Finally, I had the chance to hear [Stefan](#) yesterday in Großhadern on [Orai1](#) - a truly excellent talk. Orai1 defective knock in mice seem to have an abrogated (his slide said attenuated) delayed hypersensitivity as found in the ear swelling test.

## Addendum 18/6/10

Thanks to SD, here is an old JACI paper that confirms my clinical experience of an immediate Ca<sub>2+</sub> effect on symptom relief:

### **Influence of oral calcium medication on nasal resistance in the nasal allergen provocation test**

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*Although calcium has been used for several decades to treat allergic diseases of the skin and respiratory tract, controlled studies demonstrating the action of oral preparations in allergic rhinitis are lacking. This placebo-controlled, double-blind, crossover study shows that 1000 mg calcium administered orally significantly inhibits the allergen-induced swelling of the nasal mucosa in the allergen provocation test. Sneezing and secretion, which are allergic symptoms, were not reduced. This study is the first to confirm the positive effect of oral calcium on a symptom of allergic rhinitis. (J ALLERGY CLIN IMMUNOL 1993;91:599-604.)*

**Key words:** Oral calcium medication, nasal allergen challenge, airway resistance