



How far do calcium release measurements properly reflect its multiple roles in dental tissue mineralization?

R. R. Braga¹ · I. About²

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Dear Editor,

Multiple papers are published highlighting the interest of calcium release for inducing pulp mineralization or dentin/enamel remineralization. However, the required calcium concentrations necessary to achieve these results still need to be established to give this important subject full consideration.

At the cellular level, calcium acts as a ubiquitous second messenger with multiple physiological roles on intracellular mechanisms such as proliferation and cell differentiation by activating protein kinases. This explains the fact that calcium ion release from pulp capping materials is investigated *in vitro* for their potential in inducing odontoblastic differentiation and mineralization [1]. However, studies evaluating the calcium concentration released from the materials are never directly related to the pulp effects of these concentrations and the link between these events remains speculative.

Enamel and dentin remineralization with the use of resin-based materials containing calcium under different forms (for instance as calcium orthophosphate or bioactive glass particles) has been demonstrated *in vitro*, *in situ* and *in vivo* [2–4]. Remineralization studies often bring the cumulative ionic concentrations released in solution by these materials over a certain period of time. Unfortunately, a dose-response relation-

ship between calcium release and mineral recovery is still to be established. Moreover, it is important to remember that concentrations found in solution do not represent those actually reaching the target enamel or dentin lesion, which would require more complex micro-analytical techniques.

Thus, we strongly believe calcium mineralization/remineralization potential and effects should be interpreted considering the limitations described above. It is of utmost importance that authors give the correct interpretations of their findings. Reviewers and editors also have an important role attracting the authors' attention to these important aspects encouraging them to address these limitations.

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✉ R. R. Braga
rrbraga@usp.br

I. About
imad.about@univ-amu.fr

¹ Department of Biomaterials and Oral Biology, University of São Paulo School of Dentistry, São Paulo, Brazil

² CNRS, ISM, Institute Movement Science, Aix Marseille University, Marseille, France