

Powder Cellulose in Allergic Rhinitis Management: Relevance of in vitro Findings to Real-Life Safety

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Dear Editor,

We have had a long-standing interest in studying the effectiveness and safety of the specific formulation of cellulose powder (CP) denoted as hydroxy-propyl-methyl-cellulose in rhinitis. We have demonstrated that CP insufflated into the nose, either on its own to serve as a mechanical barrier or as an add-on to enhance the effectiveness of nasally applied drugs, has significant beneficial effects on all subjective symptoms, reduces the need for nasal or oral symptom-relieving medications, and reduces objective measures of nasal inflammation. We also found the nature and severity of reported adverse events not to differ from placebo [1, 2]. Therefore, we read with keen interest the article “Effect of Cellulose Powder on Human Nasal Epithelial Cell Activity and Ciliary Beat Frequency” by Zhou et al. [3] in your reputable journal. This ex vivo study suggests that higher doses of CP may have a negative effect on the viability of the nasal epithelium and on its ciliary beat frequency. We are impressed with the sophisticated design and methods the authors have used but have certain doubts about the relevance of their results to the clinical reality.

Our main concern relates to the low level of approximation provided by their

experimental air-liquid interface culture model, in which the matrices of excised mucosal tissues from different locations are digested to release epithelial cells into a suspension to be further subjected to the effect of different concentrations of dissolved CP. The mucosa of the nasal cavity has a high complexity that depends on the specific location within it or the paranasal sinuses. There are 7 different cell types, which are distributed differently in the vestibular, respiratory, and olfactory regions of the nose and the glandular formations [4]. There are structures in place to ensure the integrity of the mucosa (basal and supportive cells, cellular junctions), and the whole mechanism is maintained and regulated by a fine vascular and neuronal network. Therefore, it is an oversimplification to believe that subjecting epithelial cells extracted through a rough multistep artificial procedure impairing the mucosal integrity would approximate to the chain of events taking place in the nose after instillation of CP. The weakest point of ex vivo models based on homogenized tissue and cell suspensions derives from the lack of mucus naturally lining the mucosal surface: it has a complex structure, which in health consists of an upper layer of viscoelastic gel, overlying a serous

sol layer [5]. The cilia beat inside the sol layer and propel the mucous gel along with all the debris captured into it. Thus, there are no direct bonds between the gel layer and the mucociliary epithelium and its villae. Under different physiological and pathological conditions, there are changes in the composition of the mucus and of its fluid phase. The initial hypothesis of the inventor of the specific blend of the CP used in the study of Zhou et al. [3] had been that it would restore the impaired fluidity of the nasal secretions and would improve the cleansing of the nasal cavity and surrounding sinuses. Indeed, the extensive clinical experience gathered so far does not suggest deleterious effects of CP: no signs of impaired mucosa or of plugging of the ostia of the paranasal sinuses have been detected after months of usage. The formulation even appears to have some “healing” effect on its own [6]. What we have documented in a real-life randomized double-blind study in subjects with seasonal allergic rhinitis is a moderate slowdown of the nasal mucociliary clearance as assessed by saccharine test after 1 month of regular application [7].

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Actually, Zhou et al. [3] state that their experimental setup suggests a possible detrimental effect on the survival of the nasal epithelial cells only with the highest concentration of CP they use. Whether such a

concentration is achievable in reality is another question that has no direct answer. By all means, prudence is always a good counselor, and exceeding the recommended dose should be done carefully.

Disclosure Statement

The authors have no conflicts of interest to declare.

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