

Prospects for *in situ* within a host enzymatic production of immunostimulatory microbial lysis products

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Dear Editor,

Microbial lysis products (digested microbial biomasses or individual cell components derived thereof, such as muropeptides and other peptidoglycan fragments, lipopolysaccharides, β -glucans) are well known for their immunostimulatory effects, including enhancement of resistance to infections, augmentation of antibody production, and anti-tumor activities (see [1] for review). Thus it is not surprising that new microbial lysis product-based drugs constantly enter the market and that such-type drugs are successfully applied to treat certain conditions of the immune system functioning, the treatment being performed exclusively by direct (intranasal, oral, subcutaneous, etc.) administration [1]. There are, though, several good reasons to believe that alternative possibilities to achieve health benefits of microbial lysis products do exist (see below).

More than thirty years ago P. Jollès (1976) expressed an idea that lysozyme's effects on the host immune system may come in part from its capacity to solubilize intestinal bacteria, microbial cell wall fragments liberated being responsible for the host's enhanced immune responses [2]. A few years later Y. Namba et al. (1981) showed that the effects of oral administration of hen egg-white lysozyme are comparable with those of lysozyme-digested bacterial cell walls and thus not only proved P. Jollès right, but also provided a strong scientific grounding for the immunostimulatory effects of exogenously applied lysozyme observed in a lot of subsequent studies (and some earlier ones), including those performed with human beings [2]. Similar effects resulting from oral application of other lytic enzyme preparations, namely bacterial lysozyme and lysosubtilin, have been recorded recently [3]. A hypothesis that the immunostimulatory effects of oral proteolytic enzymes (systemic enzyme therapy) might also be due to microbial lysis products was presented as well [4].

Exogenously applied antimicrobial enzymes are not the only ones capable to induce the appearance of the im-

munostimulatory microbial lysis products *in situ* in the intestines. In this respect, activation of intestinal microorganisms' own lytic enzyme systems (microbial autolysis) within the gut using certain food-grade substances capable to perform such an action, food-protein hydrolysates being an example, has been shown to be highly prospective [5].

In conclusion, since microbial cell wall-degrading enzymes (both acting from without or within the microbial cell), some representatives of proteolytic enzymes including, have already recommended themselves as potential immunity enhancers [2-5], further studies on activities of these enzymes directed at a thoroughgoing evaluation of the immunostimulatory effects of microbial lysis products released should be encouraged as these may open up new immunopharmacological strategies (as well as long-awaited 'immunostimulatory antimicrobials' or 'antimicrobial immunostimulants', no matter what you call them).

References

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