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Nitric oxide donor, S-nitrosoglutathione, to maintain intestinal barrier integrity: Potential therapeutic candidate for prevention of inflammation recurrences

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Nitric oxide (NO) is known to play a pivotal role to maintain the intestinal barrier integrity, such as regulation of oxidative stress, healing, mucus secretion, immune system regulation, etc. S-nitrosoglutathione (GSNO), a nitric oxide donor is naturally secreted by enteric glial cells after stimulation of the vagus nerve. GSNO is known to prevent inflammatory events and to preserve intestinal barrier integrity. We have highlight in a Ussing chamber model that there is a concentration-dependant effect of NO on rat ileon intestinal permeability: A low concentration of GSNO (0.1 μM) significantly decreases the permeability of sodium fluorescein after two hours when compared to high concentrations (100 μM). This effect is not observed in the presence of glutathione equivalent concentrations. Moreover, GSNO degradation and absorption on isolated rat intestine were studied and we found that an enzymatic activity of gamma-glutamyl-transpeptidase expressed on intestinal epithelioma (and also by microbiota), is involved in GSNO intestinal permeability. Also, the inhibition of endogenous secretion of NO by using N-nitro-L-arginine methyl ester (NO synthases inhibitor) showed us that NO observed effect in intestinal permeability comes from exogenous supply with GSNO. From these results, GSNO could be proposed as an innovative prophylactic agent, in order to prevent relapses of inflammation for inflammatory bowel diseases patient in clinical remission.

Recent Publications

1. Cheadle G A, *et al.*, (2013) Enteric glia cells attenuate cytomix-induced intestinal epithelial barrier breakdown. *PloS one*, 8(7):e69042.
2. Savidge T C, *et al.*, (2007) Enteric glia regulate intestinal barrier function and inflammation via release of S-nitrosoglutathione. *Gastroenterology* 132(4):1344-1358.
3. Hanigan M H and Frierson H F (1996) Immunohistochemical detection of gamma-glutamyl transpeptidase in normal human tissue. *J Histochem Cytochem* 44(10):1101-1108.

Biography

Romain Schmitt is pursuing his PhD and is currently working at the NGERE Inserm U1256 Lab, France. He has already published few papers with his colleagues and is currently working on many papers that will be published in the upcoming year.

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