Decontamination of pathogenous prions and pyrogen molecules by the flowing afterglow of a reduced-pressure N_2-O_2 cold-plasma

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The current methods of sterilization of medical devices are not able to inactivate the prion proteins responsible for the mad-cow disease. These methods are also unable to inactivate completely pyrogen molecules such as Lipopolysaccharide (LPS) and Lipoteichoic acid (LTA) respectively from Gram-negative and Gram-positive bacteria. Knowing that our sterilization system, based on a low-pressure N_2-O_2 discharge flowing-afterglow, is efficient for the inactivation of microorganisms such as bacterial spores [1] and bacteria, we wanted to evaluate the decontamination potential of this system for prions and pyrogens.

We demonstrated by *in vitro* (on polystyrene strips) and *in vivo* (on steel inserts in mice) experiments that our sterilization system can decontaminate prion proteins [2]. Furthermore, we present preliminary results showing that it is possible to reduce the pyrogenic activity of LPS and LTA molecules through exposure to the N_2-O_2 discharge flowing-afterglow.

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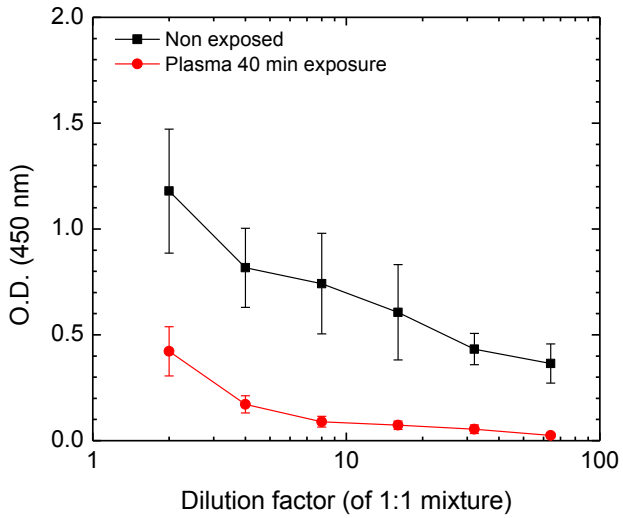

Figure 1: *Immunoreactivity (determined by ELISA) of homogenate mixture made from BSE-positive and BSE-negative bovine brains, coated on polystyrene surface wells at different dilutions, after 40 min exposure to the N_2-O_2 discharge flowing afterglow as compared to non-exposed samples (control).[2]*

References

[1] M. Moisan et al, International Journal of Pharmaceutics (2001), **226**, 1-21.
[2] B. Elmoualij et al, submitted to Plasma Processes and Polymers (2012).