Title: **Adsorption of lysozyme on Silica Surfaces and Specific ion effects**
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This document must contain an EXACT copy of the *Summary*.

The summary must not exceed **ONE** double-sided page. Tables, schemes and figures are allowed. You must label and consecutively numerate them (Figure 1, Scheme 1, Table 1…). This summary MUST be written in English.

The use of improved pharmaceutical formulations, which release the drug at the targeted cancerous tissue only, would reduce undesired side effects of the chemotherapeutics. Thus, nanoparticles are often helpful in order to reduce those side effects in biological media due to their surface properties. Surface functionalitzation plays a key role in in determining biodegradation, cytotoxicity and biodistribution through interactions which may be meditated by the macromolecules occurring in biological media.

This project is focused on the effect of different buffers on lysozyme adsorption on flat silica surfaces and hydrophobized silica surfaces as well as mesoporous silica nanoparticles functionalized with amino groups (MSN-NH_2).

In order to know the adsorption amount of lysozyme we used ellipsometry, where each buffer has been studied independently at two different buffer concentrations at the same pH. The effect of different buffers can be related to specific ion effect described interaction of buffers and salts induces relevant effects on the charged interfaces (Hofmeister effect), and thus lysozyme loading.

Lysozyme adsorption on mesoporous silica at pH 7.15 was found to be buffer specific.

The following figure is set as a result example:

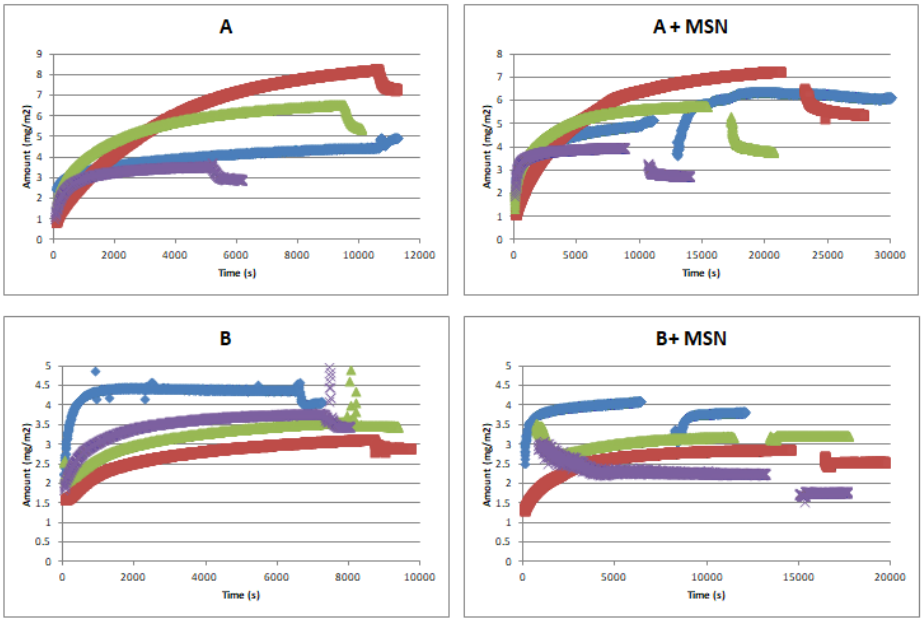

Figure 1. Specific buffer and MSN-NH_2 effects on adsorbed lysozyme amount on a hydrophilic silica surface (A) and on hydrophobic silica surface (B). These right plots represent added MSN-NH_2. BES is represented in blue, citrate in red, phosphate in green and TRIS in purple.
(T = 298K; pH = 7.15; buffer concentration 50mM)

The sequential addition of MSN-NH_2 causes more extensive desorption of lysozyme from the flat surface as observed with ellipsometry. Large effects of the buffer are also observed. The competitive adsorption to the particles, i. e. lysozyme protein corona formation, is likely to promote detachment from the silica surface.

Lysozyme adsorption relies upon buffer salts electrostatics considerations on MSNs surfaces; citrate and phosphate molecular structures grant an akind lysozyme loading performance while BES and TRIS present an utterly diverse performance.

Conclusevly, these nanoparticles would allow to conduct further studies on targeting cancerous cells as their surface properties could be used in biological media.