New biomaterials based on polysaccharide derivatives for minimally invasive administration of local drug delivery systems

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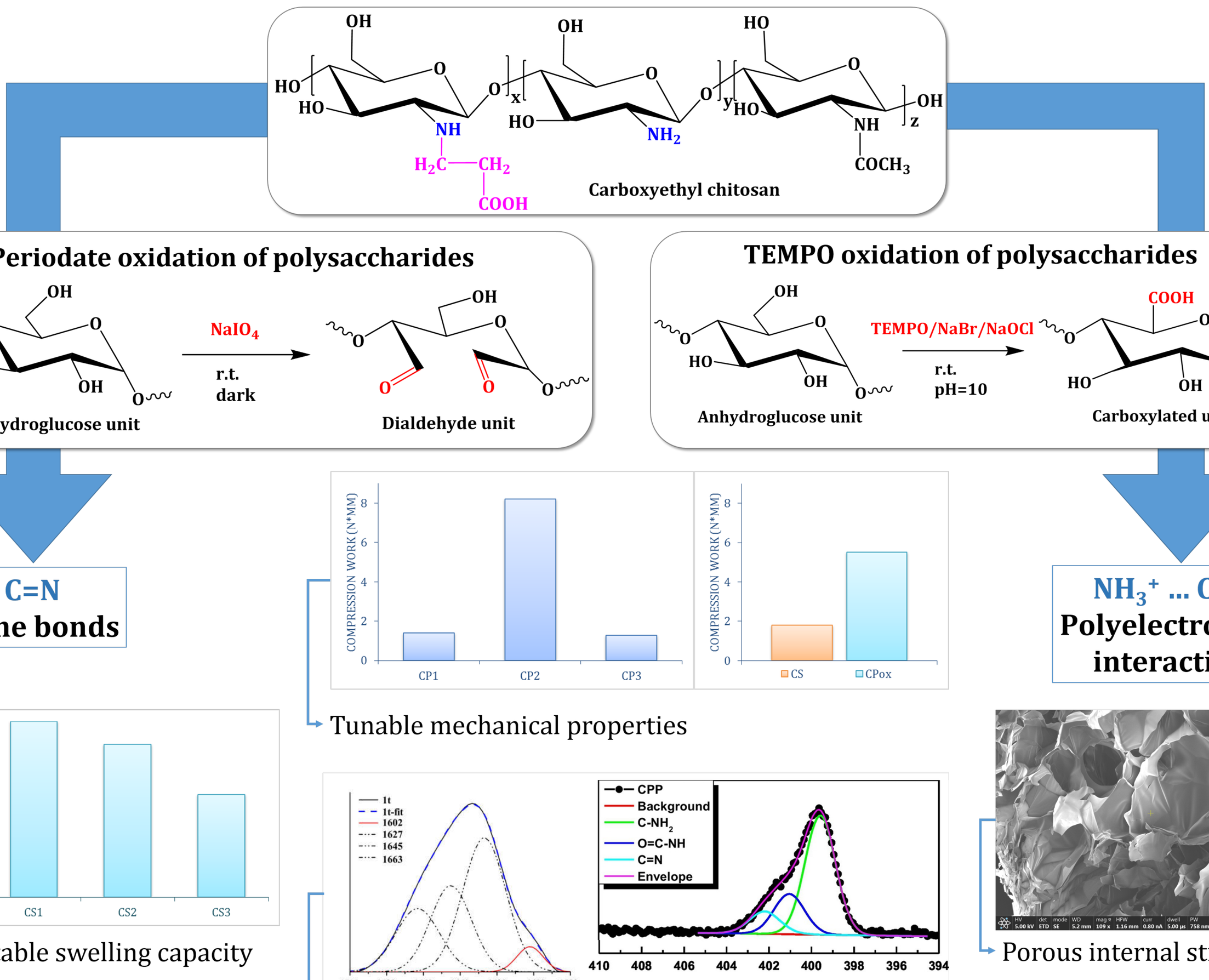
INTRODUCTION

Minimally invasive procedures are continuously of interest for the medical community due to their undisputable advantages: low negative impact on the patient's well-being, fast recovery, and maximal clinical benefits. However, these procedures when applied to drug delivery systems exhibited a series of drawbacks. The most prevalent obstacle is the needle clogging during the administration. Another problematic aspect is the fact that after administration the polymeric mixture does not crosslink fast enough and the components are readily dispersed in the neighboring tissues. The key point to maintain both structural and functional integrity is a very good optimization of the self-healing behavior. This will ensure efficient, controlled drug delivery and improved therapeutic effect. Gelation can occur *in situ* due to changes in pH, temperature or type of ions, therefore not requiring an initiator or crosslinker.



CONCLUSIONS

In our study, we took advantage of the functional groups naturally occurring in the structure of polysaccharides. Particularly, selective oxidation protocols are attractive for obtaining derivatives with added value, improved properties and increased reactivity [2]. Aiming to explore the impact of different types of interactions, we focused on derivatives either with carboxylic or aldehyde groups. When coupling these macromolecules with chitosan, which is a highly versatile amine-bearing polysaccharide, the resulting biomaterials possess advanced properties [3,4]. Most importantly, the networks exhibit injectability and readily tunable gelation and mechanical properties. In addition, the structures have good hydrophilicity and the pore size varies with the density and strength of the interactions between the polymers.

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