Nanotherapy to control transmission and systemic infection caused by *Candidozyma auris*

Gabriel Davi Marena; Danilo Henrique Ramos; Martha Helena Chaves Magalhães and Carlos Pelleschi Taborda

Laboratory of Pathogenic Dimorphic Fungi, Department of Microbiology, Institute of Biomedical Sciences, University of São Paulo (ICB -USP)

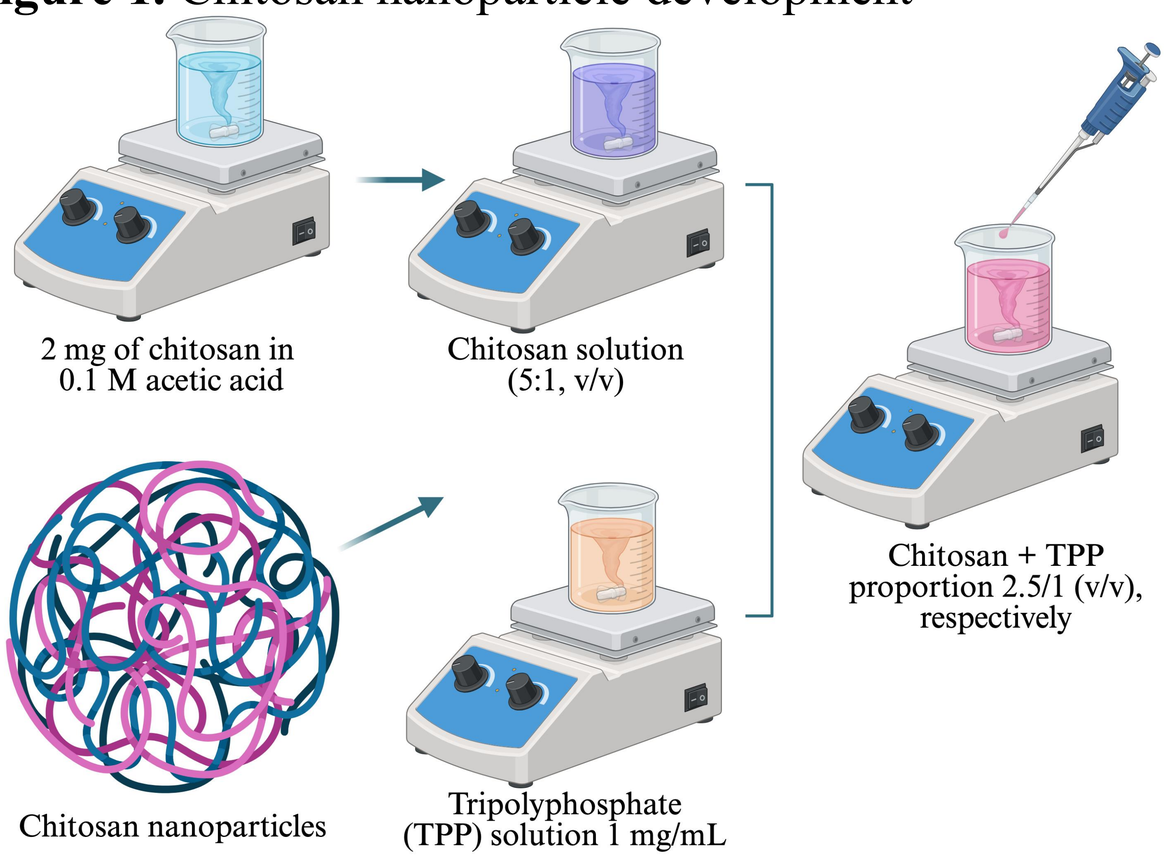
E-mail: gabmardavi@gmail.com; taborda@usp.br

Introduction

The increase in diseases caused by resistant fungi is alarmingly growing, to the point that the World Health Organization has issued a list of critical priority fungi, including *Candidozyma auris*. In this context, nanomedicine can contribute to the development of safer, more effective, and selective therapies, improving the therapeutic potential against these infections (1,2). Therefore, this study developed a chitosan nanoparticle to encapsulate an anti-adhesin ALS3 monoclonal antibody present in the cell wall of *C. auris* and contribute to controlling fungal adhesion to surfaces.

Methodology

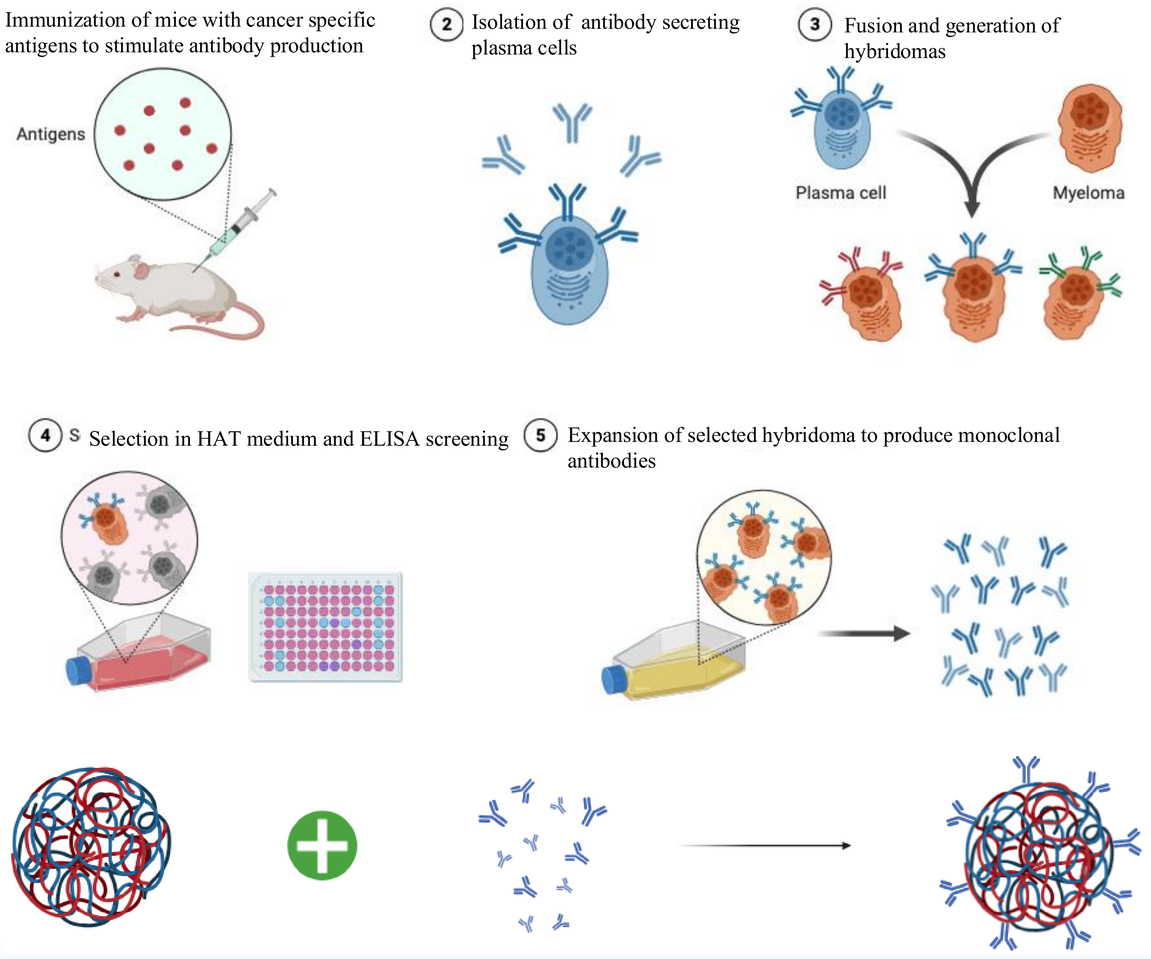
Figure 1. Chitosan nanoparticle development



Created in BioRender. Marena, G. (2026). https://BioRender.com/1eh4s11

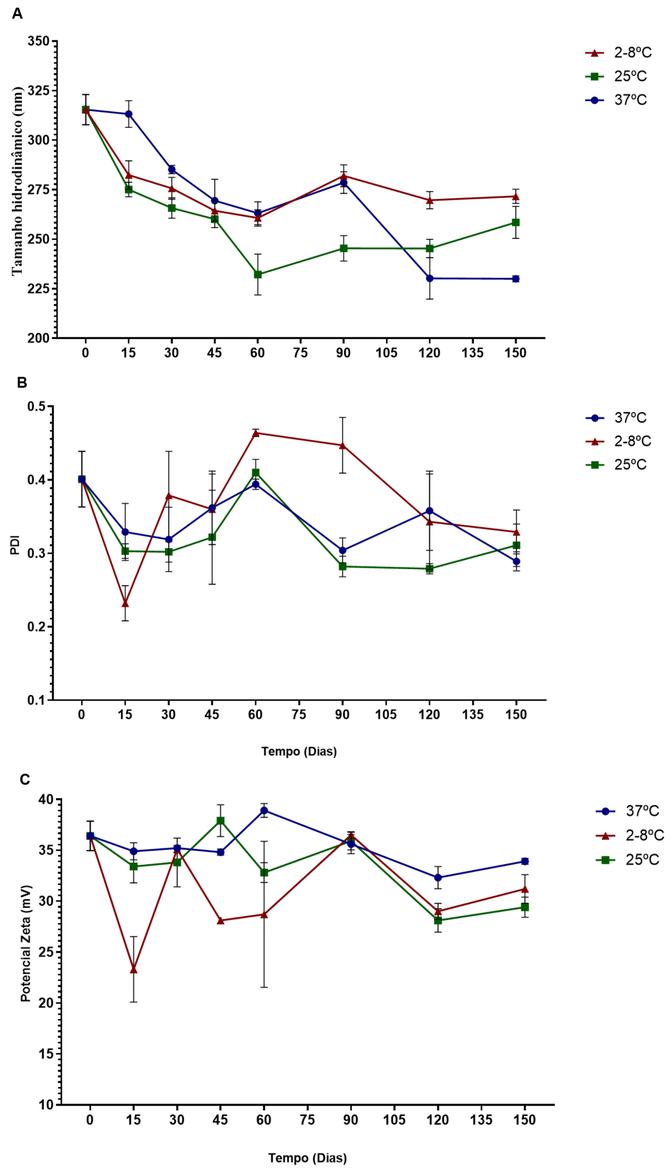
In processing

Figure 2. Hybridoma technology



Results:

Figure 3. Characterization and stability of chitosan nanoparticles in different storage forms.

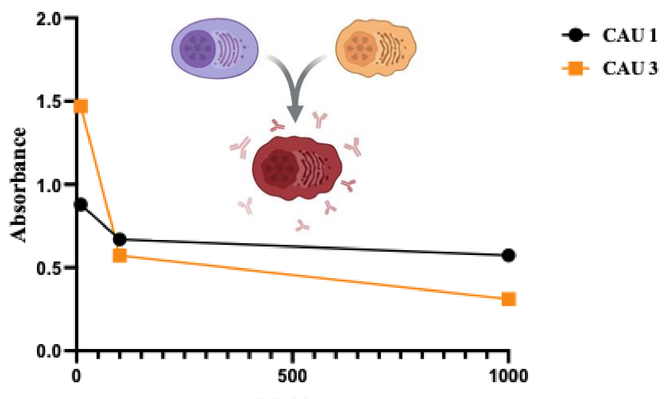


The results obtained showed nanoparticles with an average size of 309.9 nm, a coefficient of variation between replicates of 6.28%, a polydispersity index (PDI) below 0.5, and a zeta potential (ZP) above 20.0 mV. This was used to determine the surface charge of the nanoparticles in solution, demonstrating the electrokinetic potential and colloidal stability (LARA et al., 2020). The result remained above 20.0 mV. The average size obtained was higher than that proposed by SPÓSITO et al. (2024).

Figure 3. (A): Zize nanoparticle; (B): polydispersity index; (C): Zeta potential

Results: Antibody

Figure 4. Immunization



The absorbance results indicate a positive immune response in mice immunized with CAU 1 and 2 peptides. Consequently, lymph nodes were harvested for fusion with myeloma cells and the production of monoclonal antibodies.

Figure 4. CAU 1: Peptideo 1; CAU 3: Peptideo 3

Conclusion

Based on the results, it can be concluded that the chitosan nanoparticle presented appropriate physical conditions for a polymeric system and was stable for a significant period. Furthermore, initial hybridoma assays indicated positive clones against the ALS peptide sequence, which will subsequently be functionalized in chitosan nanoparticles.

Financing

CEPID ARIES Antimicrobial Resistance Institute of São Paulo — 21/10599-3

FAPESP — 24/07461-8, 25/15390-6

Institution

ICB USP