A multi-stage pulmonary drug delivery system based on pollen grains

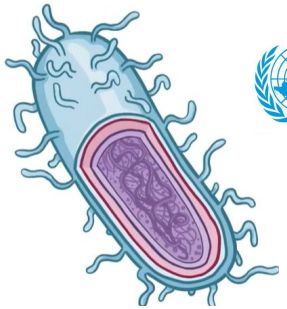
LORENA VALVERDE-FRAGA

CONTROLLED RELEASE SOCIETY
CRS 2024 Annual Meeting AND Exposition
JULY 8-12, 2024 • BOLOGNA, ITALY

INTEGRATING
Delivery Science
ACROSS DISCIPLINES

Introduction

The emergence of antibiotic resistance is a global public health problem.



World Health Organization

Micobacterium tuberculosis

Current therapeutic strategies

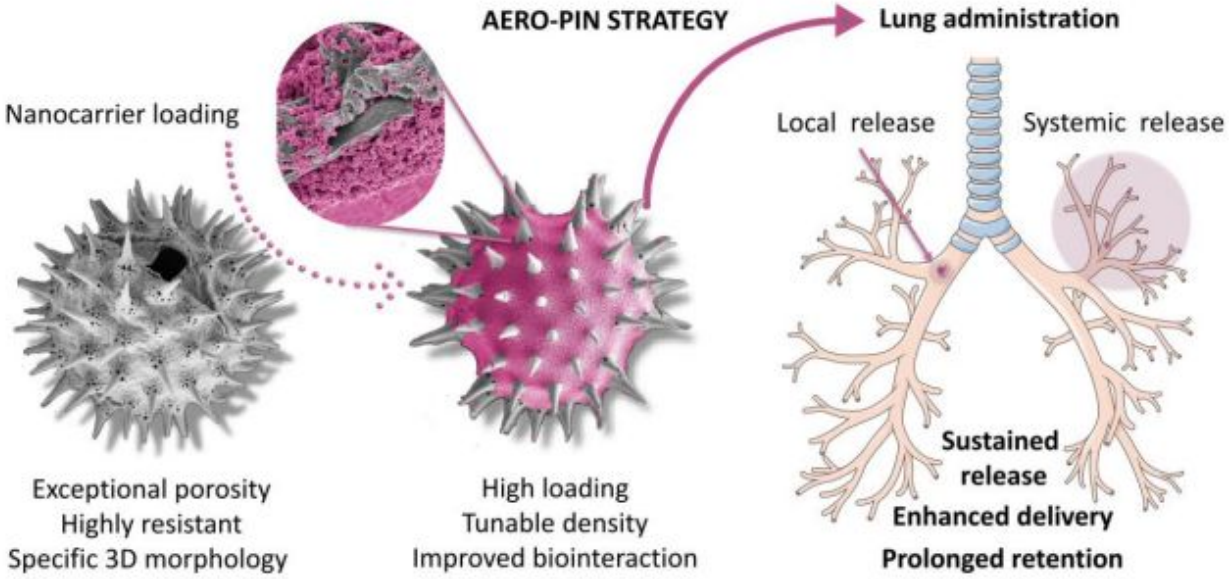
⇩

Oral administration of bactericidal agents for 6 to 9 months

⇩

Targeting anti-tuberculosis drugs directly to infected macrophages

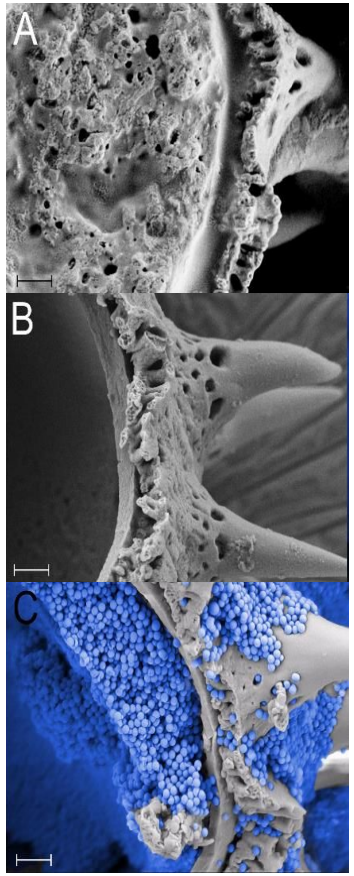
Chitosan nanocapsules



- ☑ Faster onset of action
- ☑ Greater efficacy

Micro/nano system developement

1. Pollen purification



polymers
MDPI

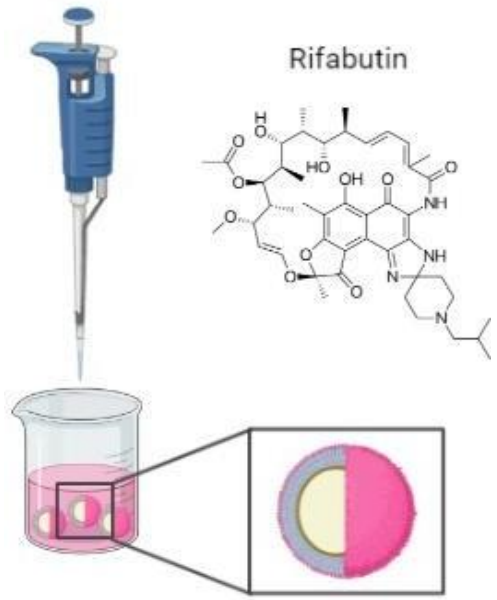
Article

Purification of Hollow Sporopollenin Microcapsules from Sunflower and Chamomile Pollen Grains

Jose Manuel Ageitos, Sandra Robla, Lorena Valverde-Fraga, Marcos Garcia-Fuentes and Noemi Csaba *

Matricaria chamomilla

2. Ncs development



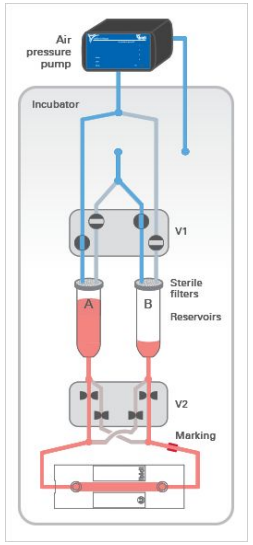
- Size ≈ 200 nm
- Zeta potential +20 mv
- Loading up to 50%
- Control release

Contents lists available at ScienceDirect
European Journal of Pharmaceutical Sciences
journal homepage: www.elsevier.com/locate/ejps
ELSEVIER

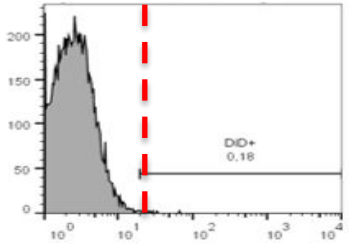
Design and in vitro assessment of chitosan nanocapsules for the pulmonary delivery of rifabutin*

Lorena Valverde-Fraga [a,b], Razan Haddad [b,c], Nasr Alrabadi [c], Sandra Sánchez [d], Carmen Remuñán-López [a,e], Noemi Csaba [a,b,*]

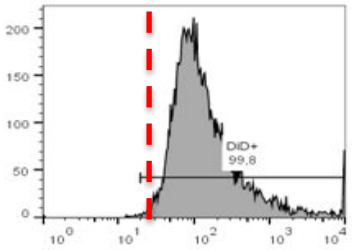
3. Flow experiments



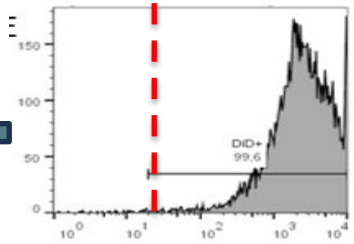
Control
IF: 2,95

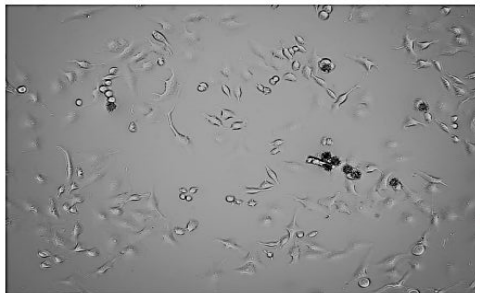


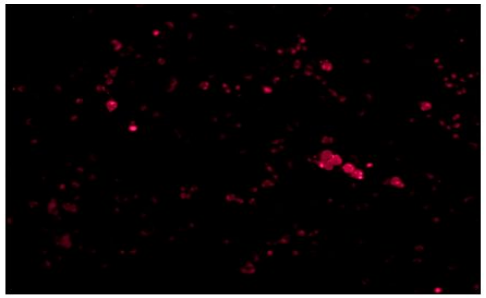
NCS PEG
IF: 378



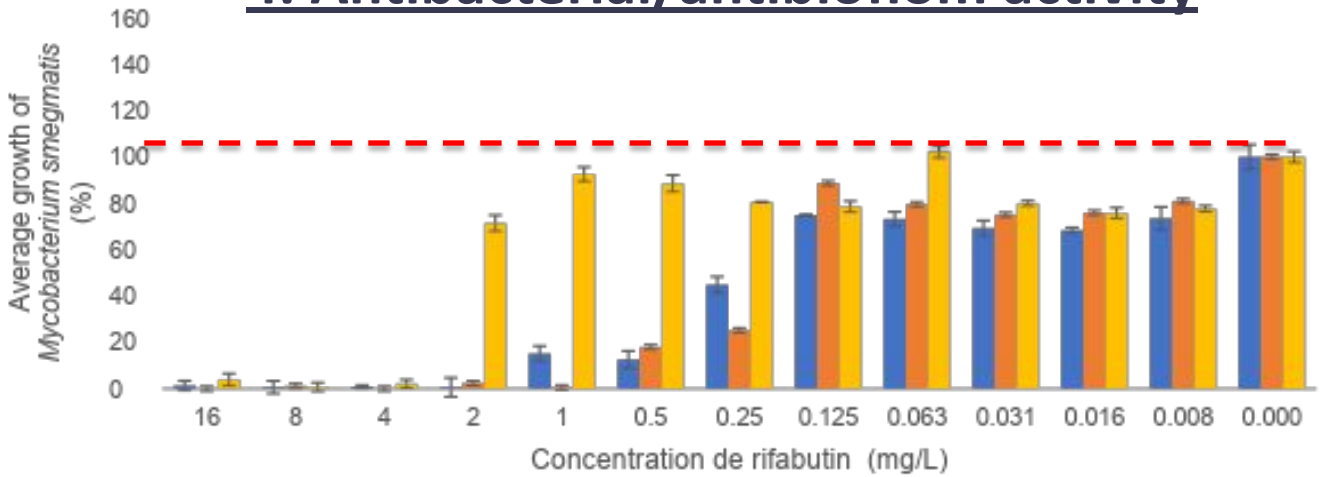
Pollen + PEG
IF: 1695

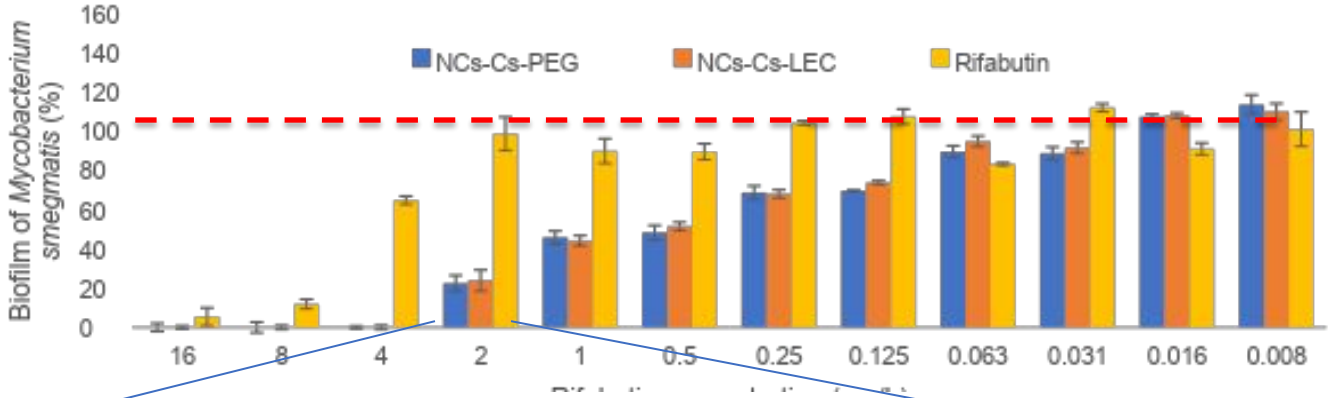


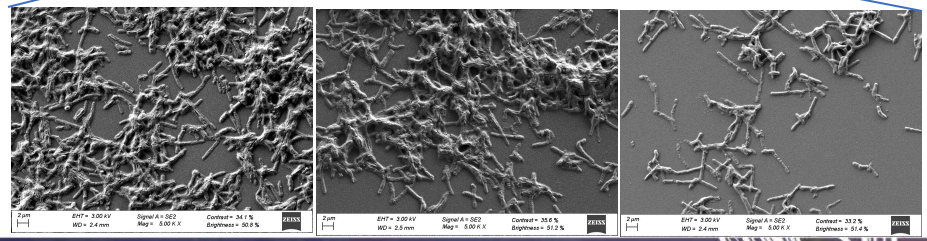




4. Antibacterial/antibiofiom activity



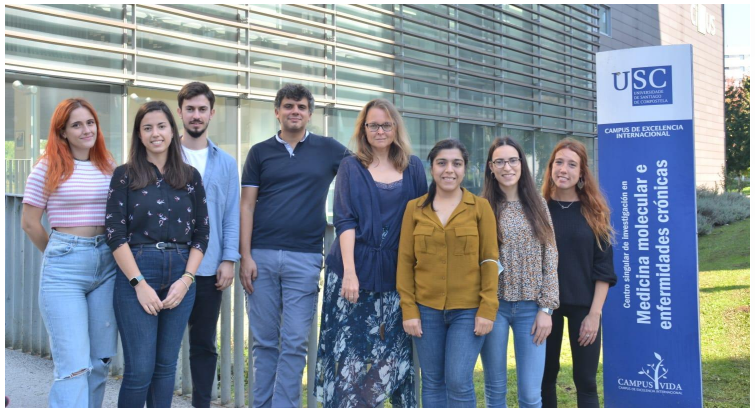




Conclusion

- A protocol is proposed for obtaining purified pollen microcapsule
- The p cellular interaction and rete
- An anti indicated complete inhibi
- Further ilm dispersal activity
- Overall, this ho system could be an interesting candidate as pulmonary mucosal delivery system for the local treatment of infectious diseases.

Poster 1112!!



In collaboration with:

Prof. Sandra Sánchez Poza

NeoGiANT

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

XUNTA DE GALICIA

GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN

EUROPEAN UNION
European Regional Development Fund

CONTROLLED RELEASE SOCIETY
CRS 2024 Annual Meeting AND Exposition
JULY 8-12, 2024 • BOLOGNA, ITALY

INTEGRATING
Delivery Science
ACROSS DISCIPLINES