

Beyond Intravenous Administration of Therapeutic Nanocarriers

Anna Roig¹, Anna Solé-Porta¹, Aina Areny-Balagueró², A. Grayston³, Miguel García-Gabilondo³, Marta Camprubí-Rimblas², Daniel Closa⁴, Antonio Artigas², Anna Rosell³

¹Institut de Ciència de Materials de Barcelona, ICMA-B-CSIC, Campus UAB, 08193 Bellaterra, Spain

²Critical Care Research Center, Parc Taulí Hospital Universitari, Institut d'Investigació i Innovació Parc Taulí (I3PT-CERCA), UAB, 08208 Sabadell, Spain

³Neurovascular Research Laboratory, Vall d'Hebron Institut de Recerca, VHIR-UAB, Barcelona, Spain.

⁴Institut d'Investigacions Biomèdiques de Barcelona, (IIBB-CSIC, 08036 Barcelona, Spain

roig@icmab.cat

Nanocarriers specifically designed to improve pharmacokinetics and drug therapeutic outcomes have already demonstrated high potential for treating several complex pathologies. For that a rational nanocarrier design and an adequate administration are both necessary.

I will explain our advances proposing novel administration routes for nanomaterials to safely arrive at the targeted organs. The intravenous route still has many drawbacks, including side effects associated with systemic drug distribution and the high accumulation of most nanomaterials in the liver, kidneys, and spleen, which may cause chronic injuries or immune-mediated side effects such as infusion reactions.

The first example refers to endovascular brain delivery, targeting neuroregeneration after stroke ^[1]. The second one concerns nebulization to reach distal areas of the lungs for sepsis treatment.^[2,3]

References

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- [2] A. Areny-Balagueró, W. Mekseriwattana, M. Camprubí-Rimblas, A. Stephany, A. Roldan, A. Solé-Porta, A. Artigas*, D. Closa*, A. Roig*, *Pharmaceutics* 14(2022) 447. [Fluorescent PLGA nanocarriers for pulmonary administration: influence of the surface charge](#)
- [3] A. Solé-Porta, A. Areny-Balagueró, M. Camprubí-Rimblas, E. Fernández Fernández, A. O'Sullivan, R. Giannocari, R. MacLoughlin, D. Closa, A. Artigas, A. Roig*, *Small Science* 4,9 (2024) 2400066. [Efficient Nebulization and Pulmonary Biodistribution of Polymeric Nanocarriers in an Acute Lung Injury Preclinical Model](#)

Figure



Figure 1. Nebulization of polymeric nanocarriers with commercial medical equipment.