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## **HOW TO STORE MICROENCAPSULATED MESENCHYMAL STEM CELLS. CONVENTIONAL CRYOPRESERVATION AND VITRIFICATION**

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Cell microencapsulation permits the immobilization of desired cell and its protection from the immune system. This technology is being studied as drug and cell delivery system to treat different diseases. However, different aspects need to be improved to reach the clinics, as the preservation process, which would facilitate the “on demand” access of patients to the treatment in a clinic far from the manufacturer and reduce the costs of this technology. Several parameters should be considered on the encapsulated cell-cryopreservation such as the time and temperature during the process, or the cryoprotectant solutions (CPAs) used. Two different freezing methods are being used with specific freezing rates and CPAs. On the one hand, the slow freezing protocol uses slow cooling rates and low concentration of CPAs, minimizing the creation of intracellular ice as well as the toxic and osmotic damage of cells when exposed to CPAs. We have compared several penetrating and non-penetrating cryoprotectants at different concentrations to elucidate the optimal cryoprotectant solution with slow cooling protocol, concluding that DMSO 10% is the most suitable cryoprotectant solution, among the assessed ones. On the other hand, in vitrification protocols, the sample is rapidly cooled down with high concentrations of CPAs achieving an ice-free/vitreous state, not only on cooling but also on thawing. Interestingly, vitrification could be an alternative to slow freezing if it can promote better integrity of the capsules while maintaining a good cell viability, being then, the future perspective of microencapsulated cells preservation.

### **Biography**

Haritz Gurruchaga has completed his bachelor degree in Pharmacy in 2013. The past three years, he has been working in the department of Pharmacy and Food Sciences at the University of the Basque Country (UPV/EHU). In the meanwhile, he has completed a M.Sc. degree in Pharmacology and completed a research work entitled “*Cryopreservation of microencapsulated murine mesenchymal stem cells genetically engineered to secrete erythropoietin*” that has been published recently in the International Journal of Pharmaceutics. Currently, he is enrolled as a PhD student in the University of the Basque Country (EHU/UPV) and he is working in the project entitled “*Optimization of cryopreservation of microencapsulated cells by slow cooling and vitrification protocols*”. Nowadays, we are testing the optimal combination of CPAs for the vitrification of microcapsules.

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