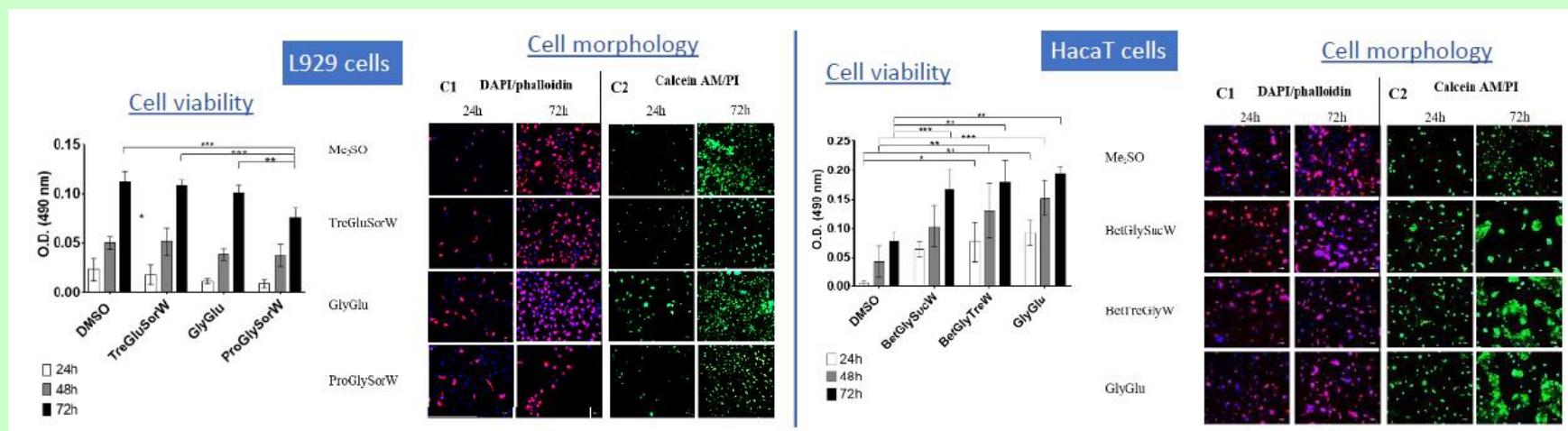



**Ongoing work – Natural deep eutectic systems: an emerging class of cryoprotectant agents**

The potential of using natural deep eutectic systems (NADES) as cryoprotectant agents (CPAs) was evaluated by Des.solve researchers. Several combinations between natural primary metabolites (that have been identified in animals that live in extreme cold climates) were prepared. These eutectic mixtures presented low cytotoxicity towards two cell lines (L929 and HacaT cells), showing the versatility of such systems. Also, their ability to cryoprotect these cells at different temperatures was demonstrated. The major advantage of these systems is the fact that they are composed by biocompatible compounds and, therefore, they do not need to be removed after thawing the cells. This fact would be of great importance if they could be used in stem cells, bone marrow or organs for transplants, hence avoiding the toxic effects of the common used cryoprotectant Me<sub>2</sub>SO (dimethyl sulfoxide). The scientific community is focused on finding new approaches to promote normal, predictable and timely return to function of the cells after cryopreservation, and Des.solve researchers believe that NADES can contribute for those findings, and may be the answer to many problems found in the field of cryobiology.



Jesus, et al, Cryobiology, 2021, <https://doi.org/10.1016/j.cryobiol.2021.05.002>

**Participation in conferences**

- ESAT 2021 - 31<sup>st</sup> European Symposium on Applied Thermodynamics
- 12<sup>th</sup> World Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology
- 7<sup>th</sup> PYCHEM (Portuguese Young Chemists Meeting)
- 27<sup>th</sup> Porto Cancer Meeting
- IMIL - 6<sup>th</sup> Iberoamerican Meeting on Ionic Liquids
- 2nd IMDES – International Meeting on Deep Eutectic Systems

**Book Chapters**

- “A look on target-specificity of eutectic systems based on natural bioactive compounds” - *Advances in Botanical Research*
- “Therapeutic deep eutectic systems for the enhancement of drug bioavailability” - *Springer*
- “Natural deep eutectic systems - a new era of cryopreservation” - *Advances in Botanical Research*

**Publications**

- “Group contribution and atomic contribution models for the prediction of various physical properties of deep eutectic solvents” - *Scientific Reports*
- “The Role of Hydrogen Bond Donor on the Extraction of Phenolic Compounds from Natural Matrices Using Deep Eutectic Systems” - *Molecules*
- “Molecular dynamics studies of therapeutic liquid mixtures and their binding to mycobacteria” - *Frontiers in Pharmacology*
- “Deep eutectic systems from betaine and polyols – Physicochemical and toxicological properties” - *Journal of Molecular Liquids*
- “Untangling the bioactive properties of therapeutic deep eutectic solvents based on natural terpenes” - *Current Research in Chemical Biology*
- “Natural Deep Eutectic Systems, an emerging class of cryoprotectant agents” - *Cryobiology*
- “Improved storage of influenza HA-VLPs using a trehalose-glycerol natural deep eutectic solvent system” - *Vaccine*

**Training of Students**

Despite the confinement, DES.solve kept the doors open to students from all ages: 2 High School Students, 3 Undergraduate Students, and 5 Master students were able to pursue their training in our laboratory.

**2<sup>nd</sup> International Meeting on Deep Eutectic Systems**


Between 15<sup>th</sup> and 17<sup>th</sup> June, DES.solve research group organized the 2<sup>nd</sup> IMDES. Due to the pandemic context, the Meeting occurred exclusively online. Nearly 100 participants from all over the world were present to share and discuss the advances in the field. After the success of this edition, the organizers look forward to the 3<sup>rd</sup> IMDES in 2023.