

High-Throughput Lysosome Isolation and Multi-Modal Functional Characterization

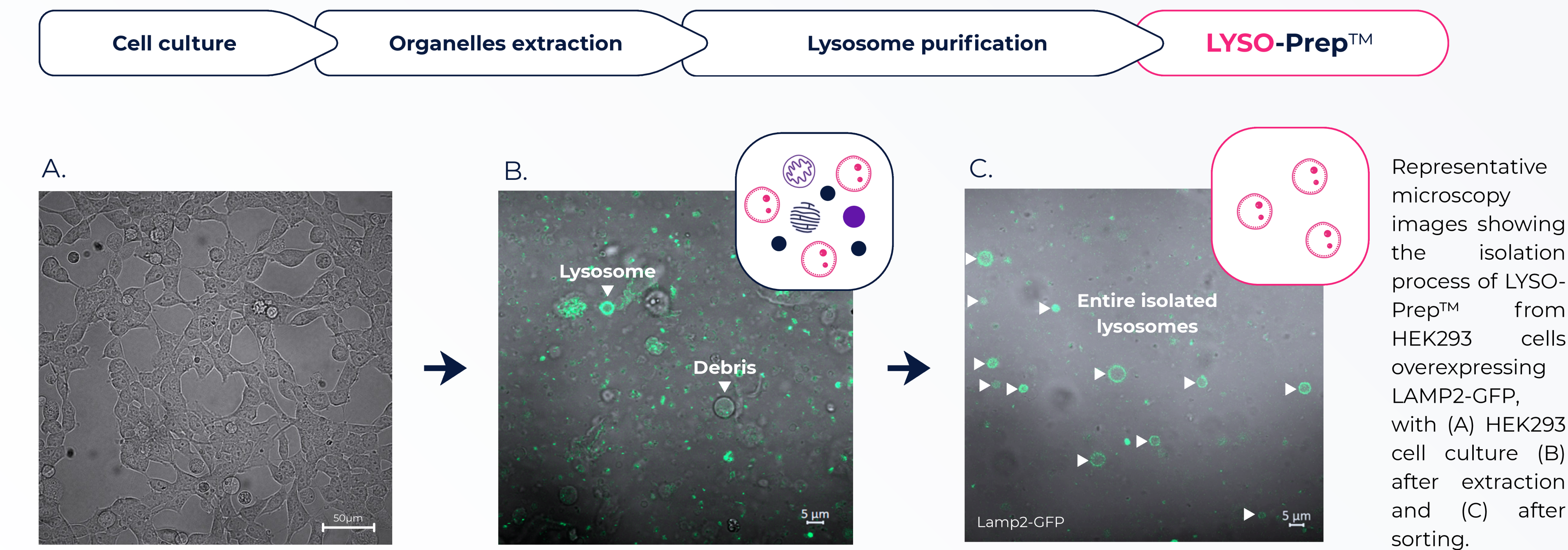
Bastien Masson¹, Jérémy Le Gall¹, Lorraine Leonelli¹, Alexandre Evans¹, Rim Debbiche¹, Marine Moutia¹, Hugo Carrat¹, Hélène Gautier¹, Abdou Rachid Thiam^{1,2}, Alexandre Santinho¹

1: ORIA Bioscience, 75014 Paris, France
2: Laboratoire de Physique de l'Ecole Normale Supérieure, ENS, Université PSL, CNRS, Sorbonne Université, Université de Paris, 75005 Paris, France

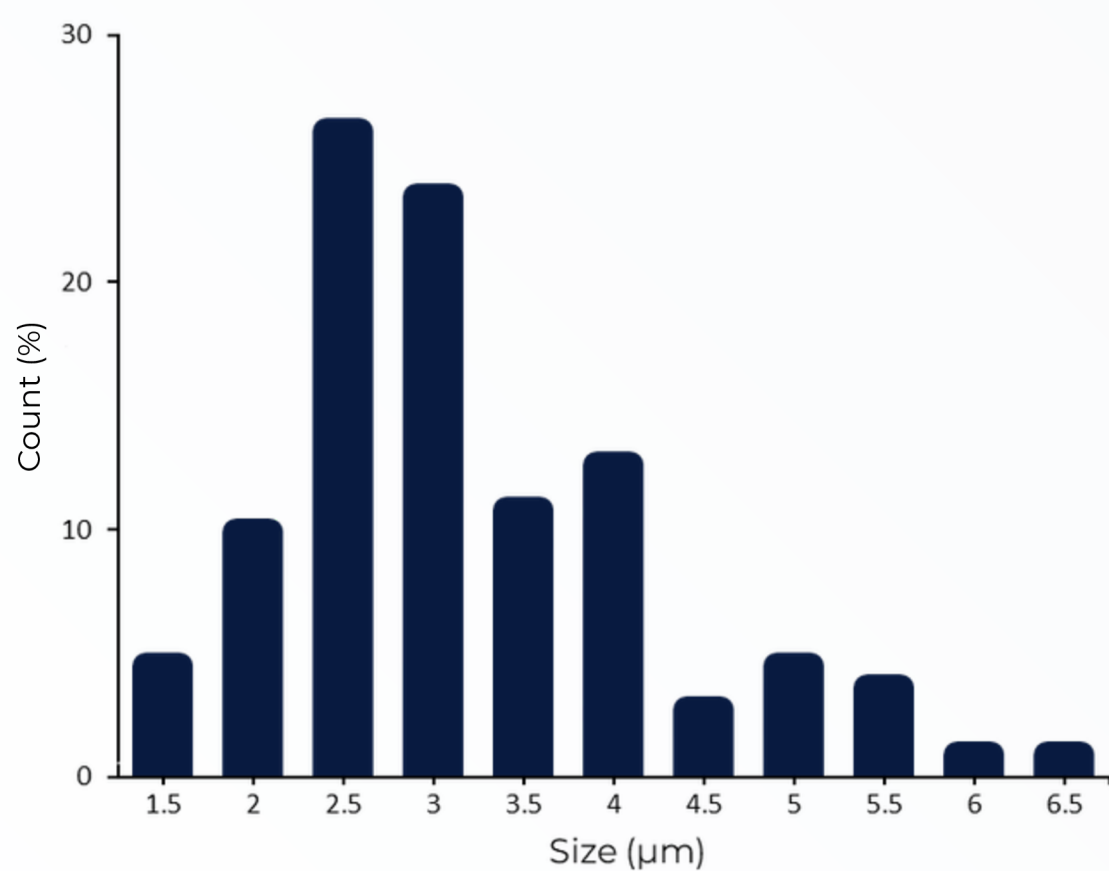
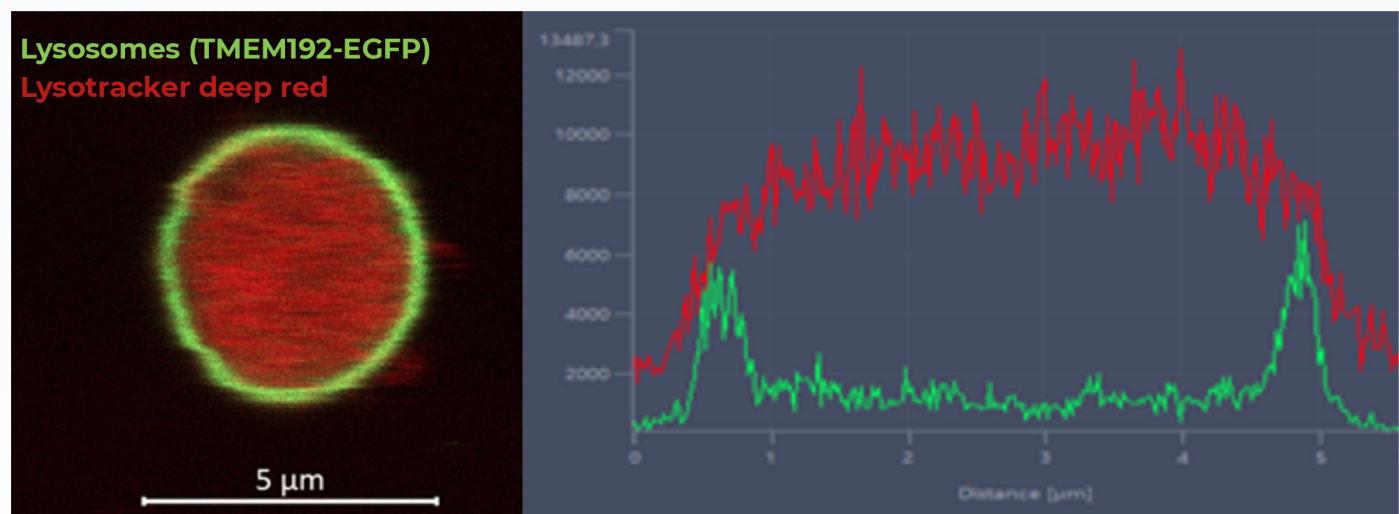
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Lysosomes are key organelles combining essential degradation functions, intracellular homeostasis and signalling. They are implicated in several neurodegenerative diseases, cancer and immune disorders. Despite the fact that 70% of proteins are inside the cells, so far, critical ion channels, transporters and luminal enzymes have been understudied due to technical limitations. ORIA Bioscience has developed a unique microfluidic-based isolation and conservation method to provide scientists with highly pure and functional lysosomes. ORIA's quality control is based on combining imaging, specific protein markers presence, complemented by enzymatic activity as an additional functional readout. Further electrophysiology-based validations on distinct platforms demonstrated the improved functionality and reliability of the LYSO-prep™ for the recordings of key targets e.g. TRPML1, TMEM175 and TCP2.

High-Throughput Microfluidic Platform for Lysosome Isolation

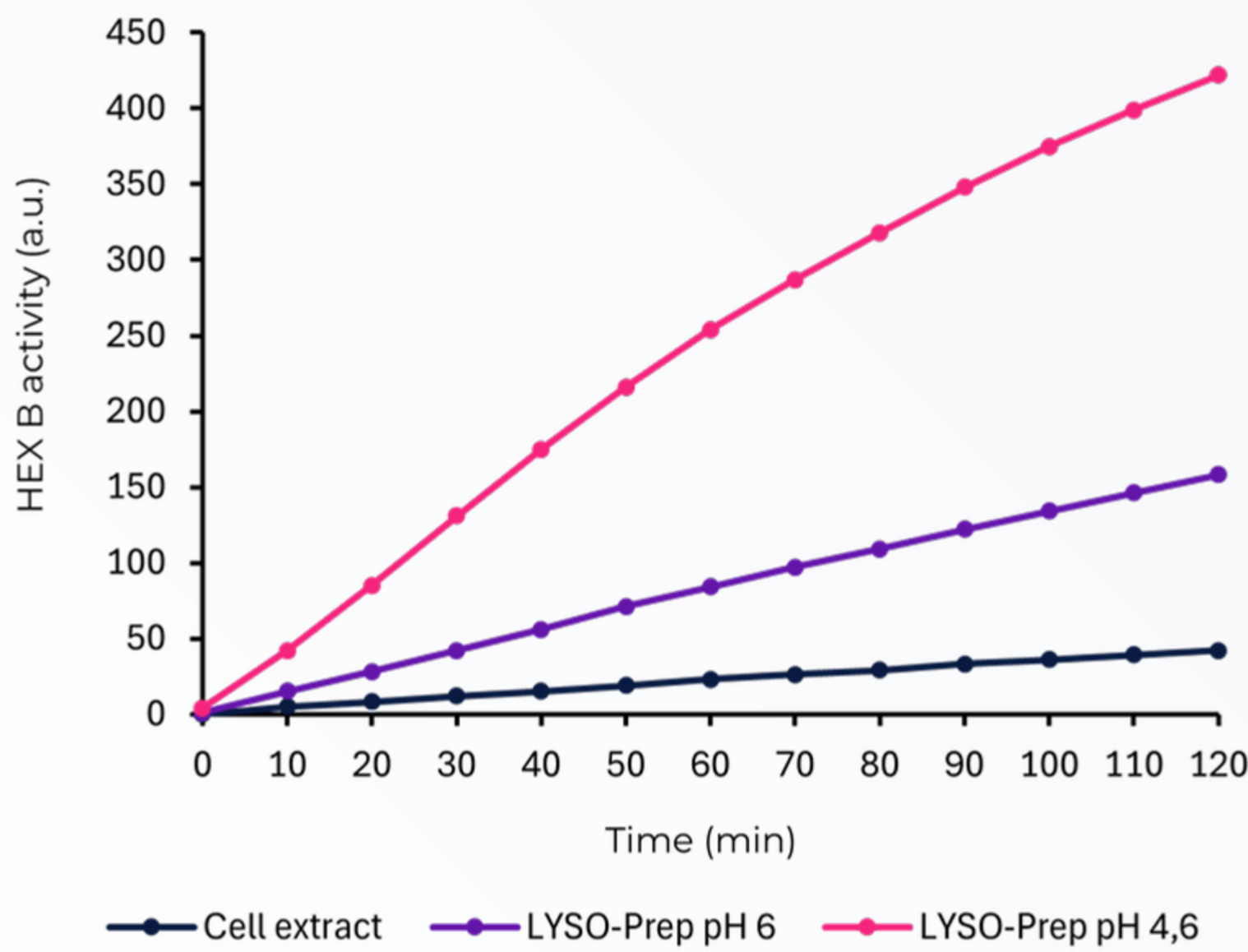


Integrity and Size Distribution



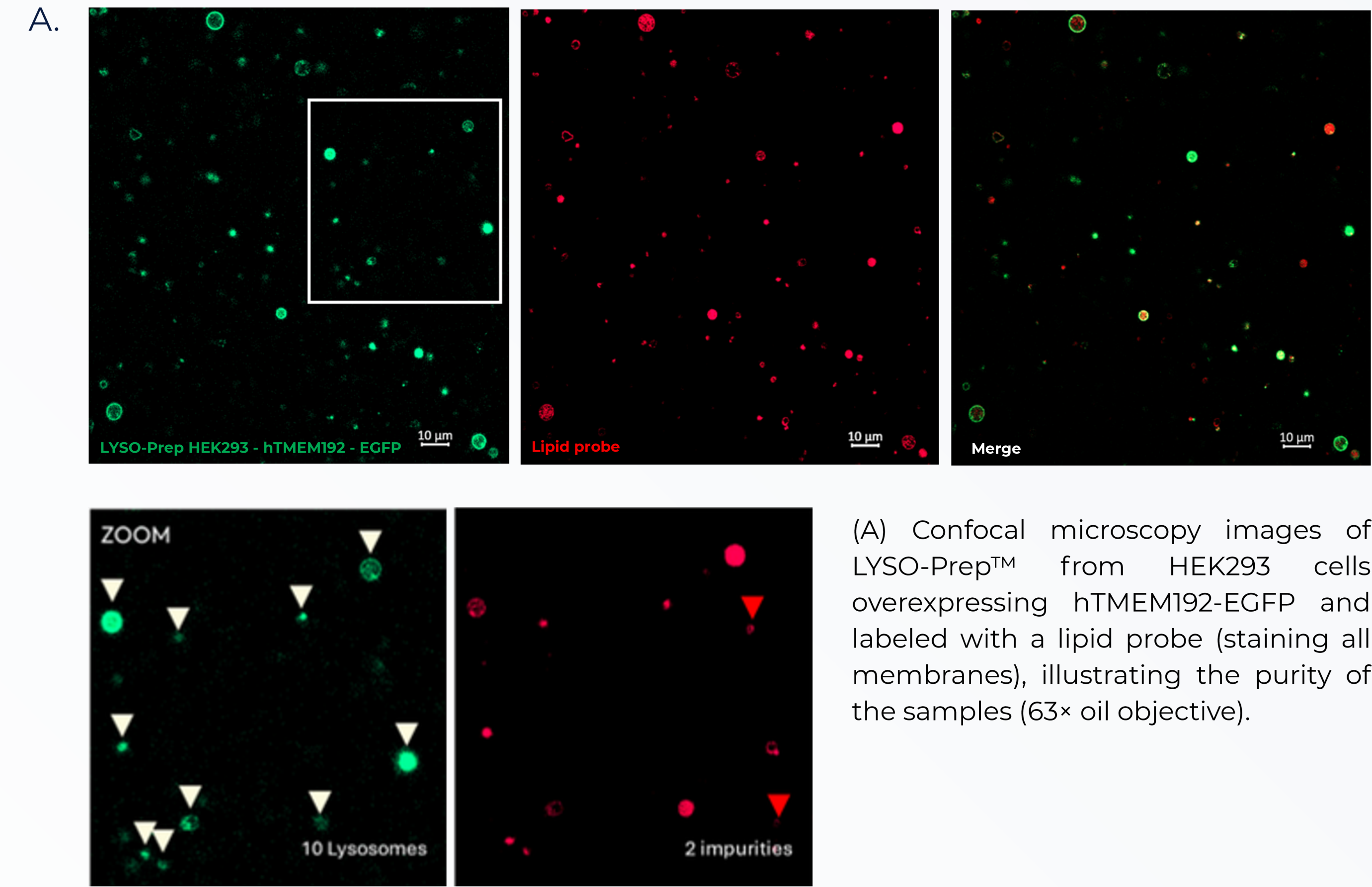
HEX-B Enzyme Activity

A scalable 96-/384-well fluorometric assay was established using LYSO-Prep™, which can be readily adapted to other lysosomal enzymes and integrated into high-throughput screening platforms, additionally providing a sensitive quality-control measure of lysosomal integrity throughout the workflow.

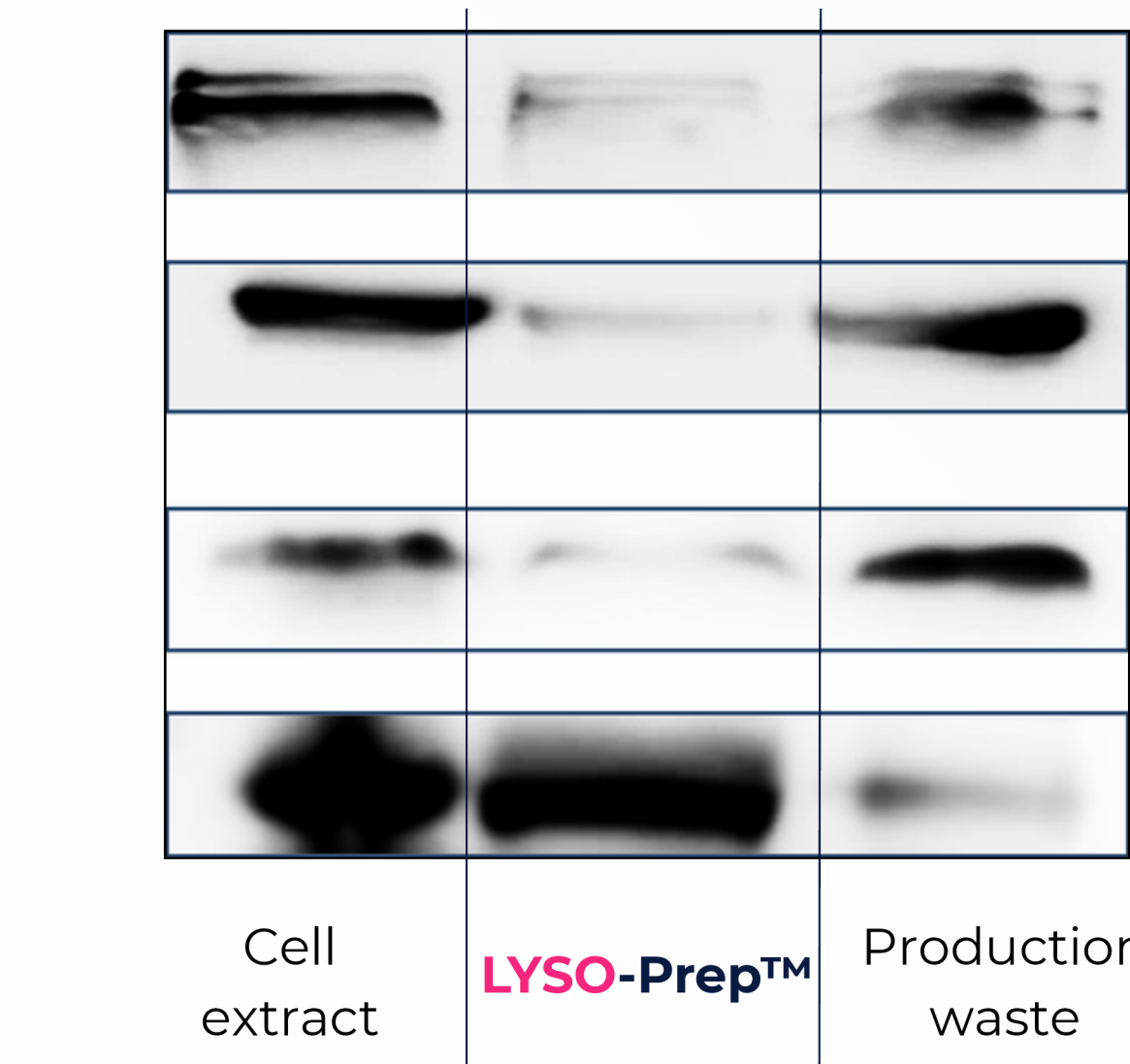


β-Hexosaminidase enzyme activity of LYSO-Prep™ measured in citrate buffer at pH 6.0 and 4.6, and in cell extract, using a fluorometric assay in 96-well format.

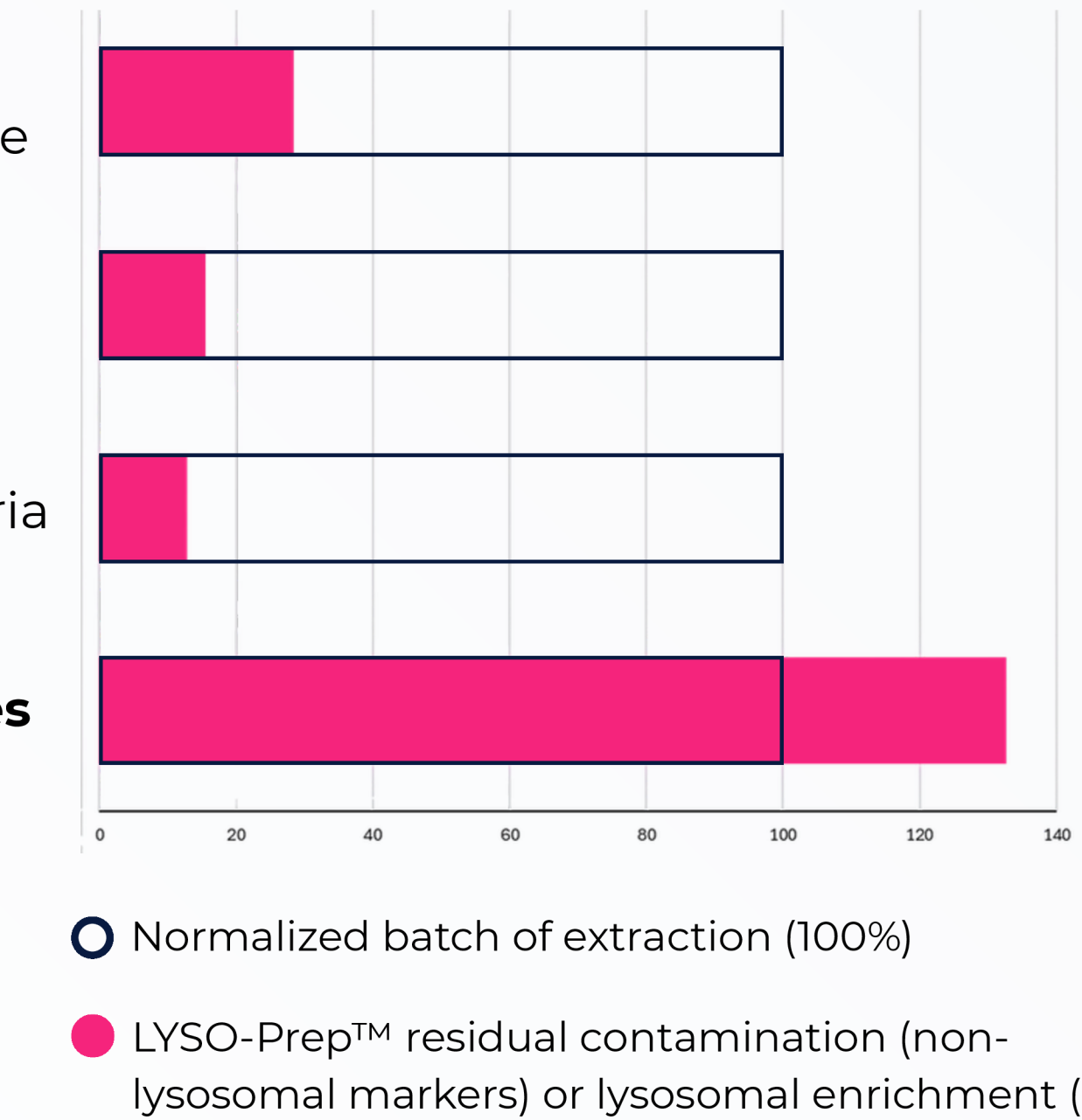
Lysosome Enrichment and Purity Assessment



Western Blot on LYSO-Prep™



Depletion of cellular contaminants and lysosomal enrichment in LYSO-Prep™

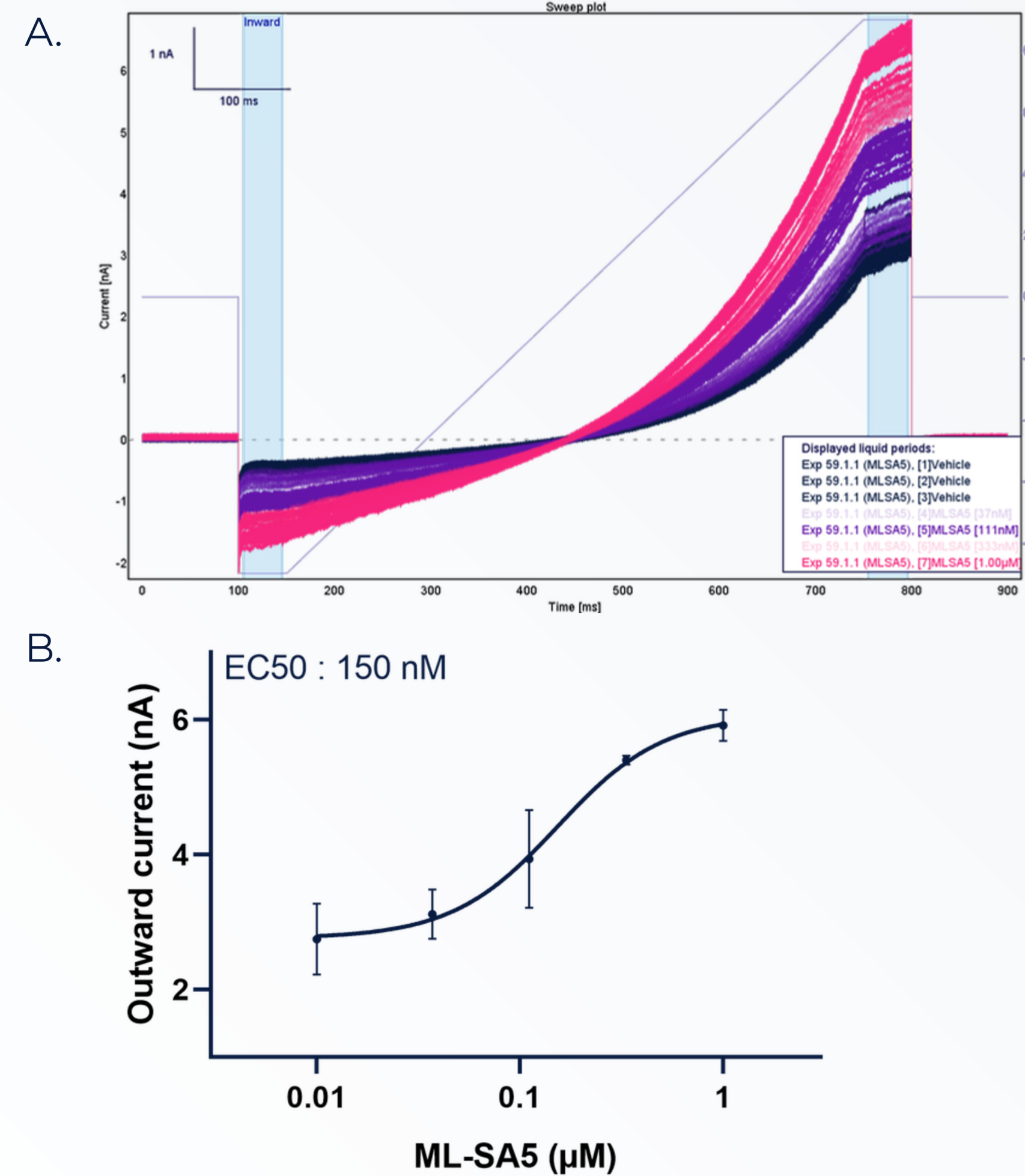


(B) Representative immunoblot and (C) normalized quantification of protein markers before isolation (cellular extract) and after isolation (LYSO-Prep™ from HEK293 cells and remaining extract)

Lysosomal TRPML1 Activity and Pharmacological Electrophysiological Profiling

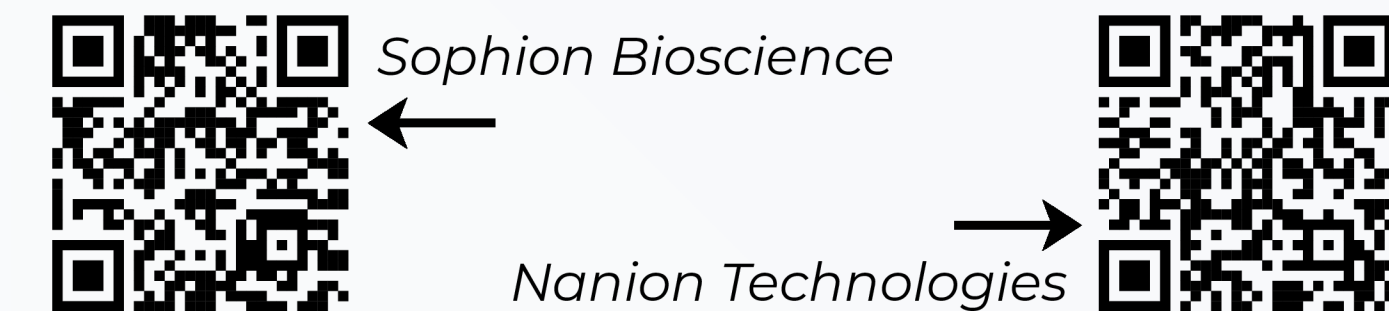
Among lysosomal ion channels, TRPML1 is a member of the transient receptor potential family. It mediates calcium release, and its essential for trafficking, membrane repair and organelles fusion. TRPML1 dysfunctions have been associated with several diseases including Mucopolipidosis type IV (MLIV) or Niemann-Pick disease, making it an important target for new therapeutic strategies.

Automated Patch Clamp

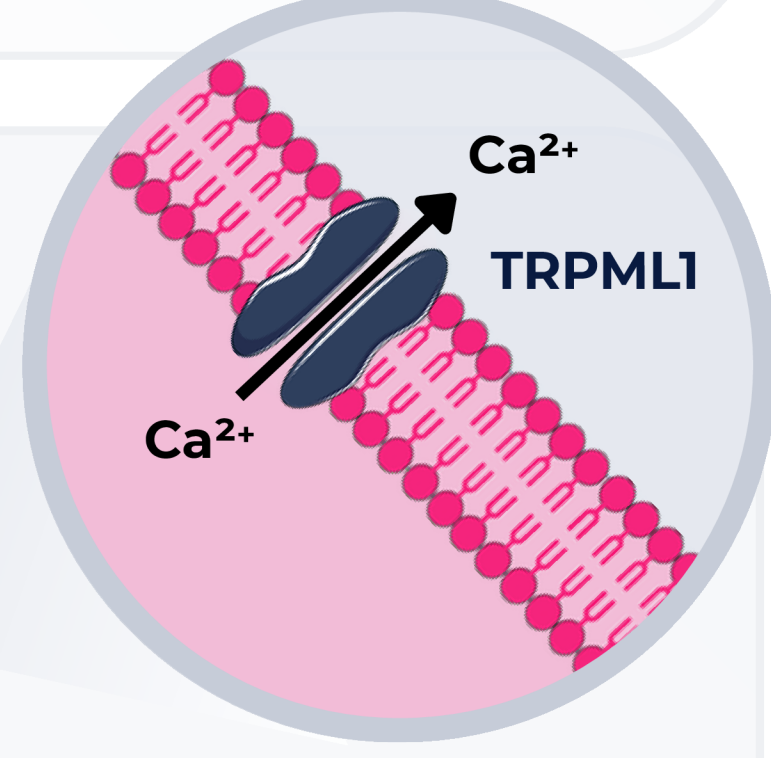
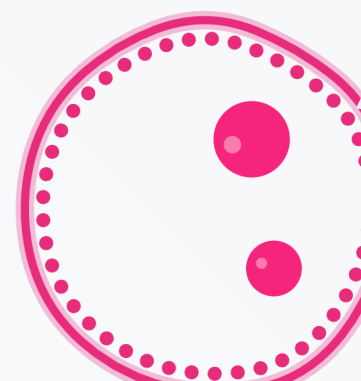


LYSO-Prep™ enables reliable lysosomal recordings across automated patch-clamp platforms. Using Sophion Bioscience's high-throughput APC system, we obtained stable TRPML1 currents and robust concentration-response data. These results matched published values and, enabled comparative pharmacology to support drug-discovery research. LYSO-Prep™ also allows lysosomal recordings at body temperature across different platforms, further highlighting the robustness and physiological relevance of the preparation.

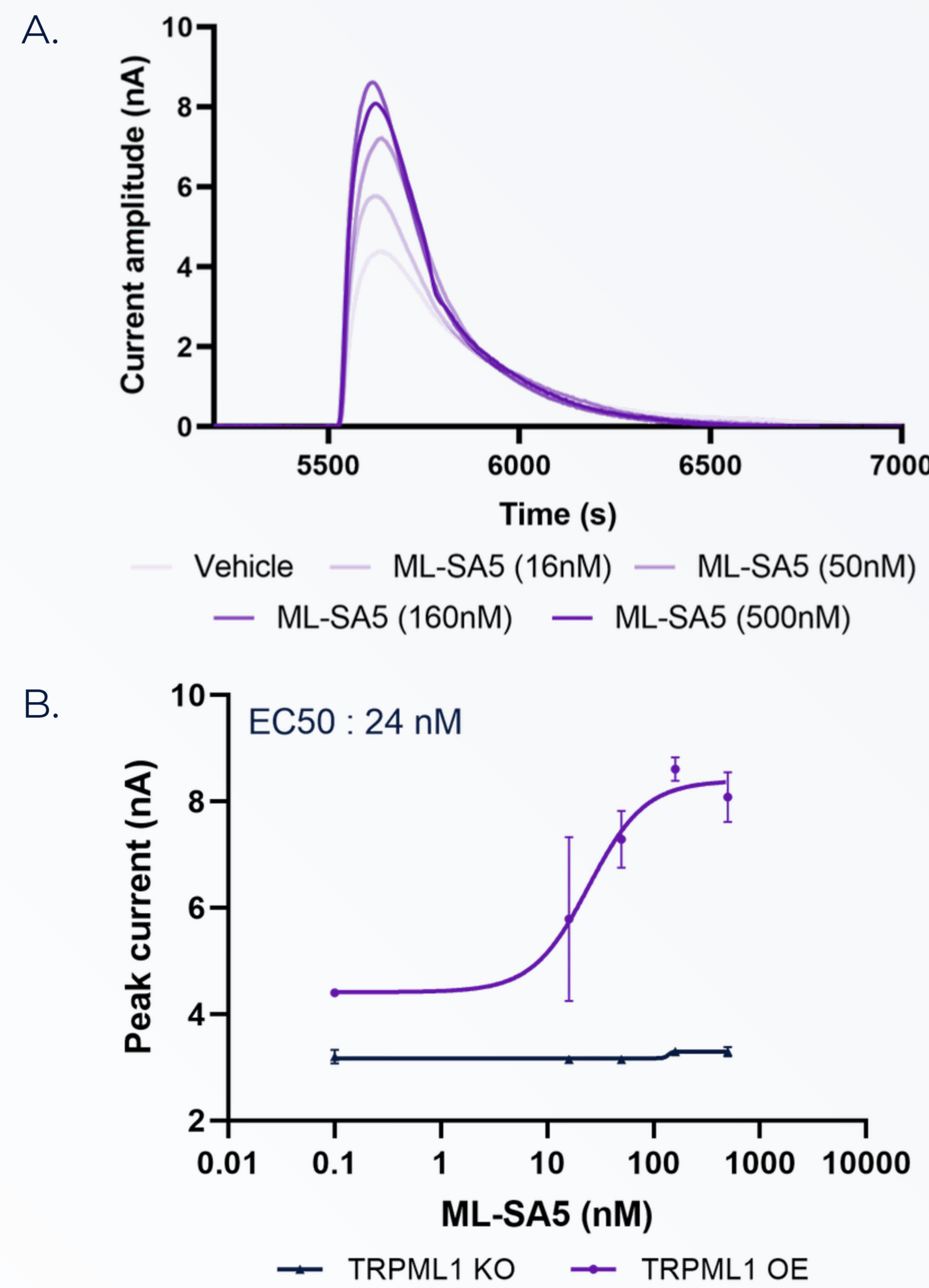
More results on LYSO-Prep™ ion channels activity can be found in the application reports in collaboration with:



Lysosome



Solid Supported Membrane Electrophysiology



LYSO-Prep™ shows functionality across technical platforms³. Using Nanion's SURFE2R N1 SSME system (also validated with 96SE), robust and reproducible lysosomal signals were obtained, highlighting the reliability of the preparation and its suitability for cross-platform functional studies.

LYSO-Prep™ provides standardized, high-yield, frozen, ready-to-use lysosomes with preserved functional integrity. It enables complex pharmacological studies compatible with HTS assays, SSME and APC platforms, achieving 50–80% success rates specifically on APC. With this technology, ORIA's team is reshaping organelle-based drug discovery and revolutionizing organelle studies to support pharmacological research.

1.Santinho, A., Carpentier, M., Lopes Sampaio, J. et al. Giant organelle vesicles to uncover intracellular membrane mechanics and plasticity. Nat Commun 15, 3767 (2024).
2.Waloschková, E. and Masson, B. Breaking barriers in lysosomal electrophysiology: Automated solutions for ion channel analysis. Sophion Bioscience and Oria Bioscience (2026)
3.Murciano, N., Masson, B. et al. LYSO-Preps for organelar electrophysiology: A new tool for high throughput measurement of lysosomal TRPML1 channels using the SyncroPatch 384, SURFE2R N1 and SURFE2R 96SE. Nanion Technologies & Oria Bioscience (2025).