Biomimetic giant vesicles electroformation: biophysical evidences

A. Capocefalo[1*], F. Domenici[1,2], F. Brasili[1], S. Sennato[3], B. Cerroni[2], F. Bordi[1,3]

[1]*Dipartimento di Fisica, Università La Sapienza, P.le Aldo Moro 5, Roma, Italy*
[2]*Dipartimento di Scienze e Tecnologie chimiche, Università di Roma Tor Vergata, Via della Ricerca Scientifica 1 , Roma, Italy*
[3]*Istituto dei Sistemi Complessi ISC-CNR, UOS Roma La Sapienza, Italy*

**capocefalo.a@gmail.com*

Giant Unilamellar Vesicles (GUV) are liposomes of 10-100 µm of diameter formed by a single phospholipid bilayer encompassing an aqueous core. Their cell-like size motivates the wide use of GUV as model membrane system, with the advantage to be visible under light microscope [1].
The most commonly used method of GUV preparation is the so called "electroswelling" of lipids under Alternating Current electric field which leads to a homogeneous population of spherical vesicles characterized by a narrow size distribution [2].
Despite their great relevance as biomimetic system, the underlying mechanism of GUV formation is still poorly understood and an univocal model explaining the vesicles formation is still lacking.
In this work, by using phase contrast microscopy we have performed a real time study on the kinetic of GUV growth. At the same time, we have characterized the structural and topological properties of electroformed vesicles through fluorescence and confocal microscopy, with the final aim to define a simple and intuitive model which connects the vesicles features with the electric field parameters, namely frequency, voltage and waveform.

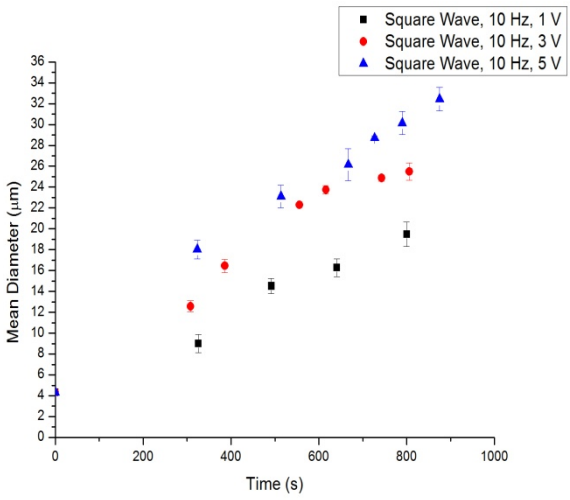

Figure 1 The graph shows the mean diameter of growing vesicles in function of time for a fixed frequency of 10 Hz and different voltages. The size were collected by the microscope analysis software.

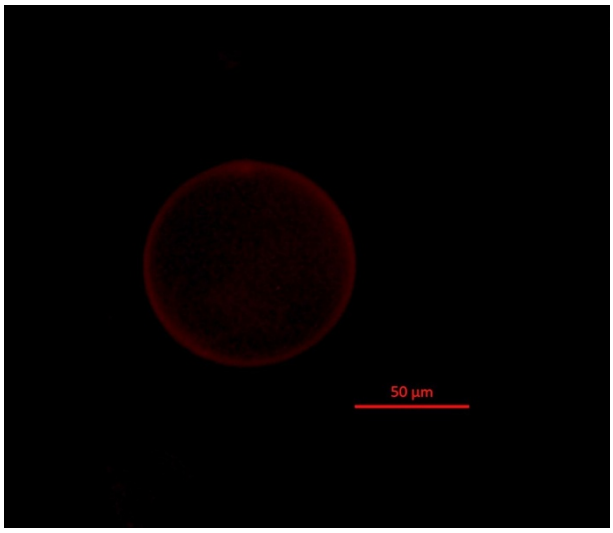

Figure 2 Fluorescence microscope picture of an electroformed GUV.

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[2] M. I. Angelova, S. Soléau, P. Méléard, F. Faucon, P. Bothorel, *Prog. Colloid Polym. Sci.*, 1992, **89**, 127-131.