

Young Scientist Travel Award Winner Nitzan Letko Khait Interview

What attracted you to your PhD study topic?

My PI, Professor Marcelle Machluf, is an inspiring lecturer and researcher, so when a job opening to her lab was posted I immediately applied. I started working in Professor Machluf's lab during my Bachelor's degree; my job was to maintain the cell cultures. The PhD students in her lab were amazing, teaching me techniques and explaining details about their researches. Their enthusiasm drove me to join into the field of drug delivery and controlled release.

Could you briefly outline your research in the area of controlled release?

I use the cytoplasmic membranes of Mesenchymal Stem Cells (MSCs) for drug delivery. I empty the cells and down-size their membranes to get spherical-shaped nano-vesicles, that we call "Nano-ghosts" (NGs). We have successfully encapsulated proteins, DNA and small drugs inside the NGs, and followed their release. Since the NGs maintain the MSCs' surface markers, they also preserve their homing abilities. Thus, the NGs can target and accumulate in sites of inflammation and cancer *in vivo* after intravenous injection, and specifically deliver their payloads to the desired site.

My focus in this research was two-fold: Firstly, I was involved in labelling and *in vivo* tracking the NG systems, and secondly, I explored their ability to target and achieve a therapeutic effect to the inflamed myocardium (heart muscle) after a myocardial infarction (commonly known as a heart attack).

What was your most significant research finding?

The most significant finding was that we proved the accumulation of NGs in the inflamed myocardium in a rat model of ischemia-reperfusion, which mimics a patient with a heart attack. The NGs were found mostly in the inflamed tissue, with very little amounts in blood-filtering organs, and almost no NGs found in healthy heart tissue. Currently, there are no clinically approved delivery systems that specifically target drugs to the heart, so our results were very exciting.

What is your favourite part of research?

My favourite part is conducting the experiments I design, when I get to test my theories and assumptions. It is always exciting to wait for the results, and although biological research is known to have more failures than success stories, I always try to be optimistic.

Has CRS had an influence on your career?

Yes, the conferences are inspiring, and they always motivate me to keep on going and continue with renewed energy. Furthermore, through CRS I got acquainted with many exciting research fields that I didn't have the chance to work on during my PhD, and which I would love to explore further in the future.

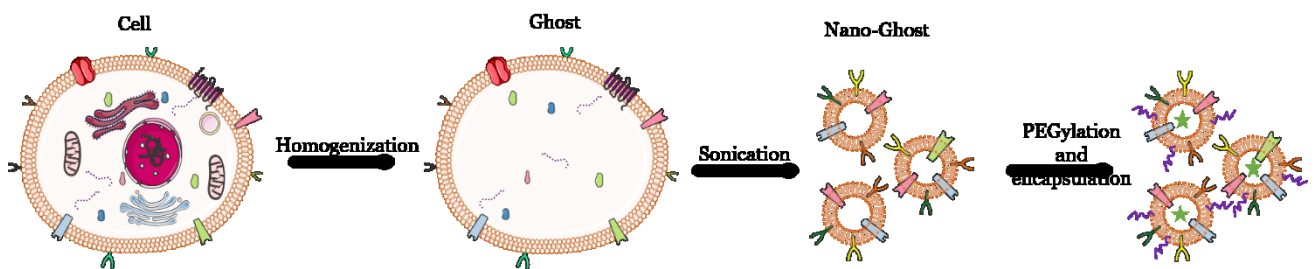
What are your future plans?

I recently graduated with my PhD and moved to Toronto, Canada. I am currently looking for a new and exciting lab to conduct a post-doctoral fellowship in the field of controlled release.



Nitzan Letko Khait (third from the right) receiving her certificate for the Best Oral Presentation by a Young Scientist from the Immediate Past President of CRS, Tamara Minko (first from the right)

From MSCs to Nano-Ghosts (NGs)



Schematic on Nitzan's ground-breaking research utilizing nano-ghosts for efficient drug delivery.