ABSTRACT
With the goal of screening cells in an environment that mimics that of native tissue, we designed a hydrogel for 3D cell culture. With 3D cell culture, we gain an understanding of both cell invasion and cell viability, thereby providing insight that is inherently unavailable with traditional 2D cell culture. To achieve a suitable environment, we synthesize hyaluronan-based hydrogels because hyaluronan is often over-expressed in invasive tumors including those in the breast and lung. To facilitate cell invasion and remodelling of the matrix, the hydrogels are crosslinked with peptides that can be degraded by matrix metalloproteinases (MMPs) secreted by the cells. To enhance cell adhesion, the hydrogels are modified with proteins and/or peptides; to facilitate cell invasion, the hydrogels are modified with growth factor concentration gradients. Using these well-defined hyaluronan-based hydrogels, we investigate both breast cancer and lung cell invasion and their response to different therapeutic treatments.

BIOGRAPHY
Molly Shoichet is the Tier 1 Canada Research Chair in Tissue Engineering at the University of Toronto and Ontario’s first Chief Scientist. She received her bachelor degree in chemistry at the Massachusetts Institute of Technology and Ph.D. from University of Massachusetts, Amherst in polymer science and engineering. She is an expert in the study of polymers for drug delivery and regeneration, materials that promote healing in the body. An award-winning biomedical engineer, she currently leads a laboratory of 32 and has graduated 162 researchers. She has founded three spin-off companies and is actively engaged in translational research. She is the only person to be a Fellow of Canada’s 3 National Academies of Science, Engineering, Health Sciences. Shoichet was the L’Oreal-UNESCO For Women in Science Laureate, North America for 2015. She is an Officer of the Order of Canada, holds the Order of Ontario, is University Professor, and a Foreign Member of the US National Academy of Engineering.