

Insights from the Network

From the bedside to the bench and back: translating practice into targeted therapies for liver disease patients

By Mamatha Bhat

Dr. Mamatha Bhat, staff hepatologist and clinician-scientist at University Health Network, Toronto, shares her insights about what it's like to be a clinician-scientist, her innovative work in liver disease and transplantation, and the importance of continuing to raise awareness and advocate for stem cell and regenerative medicine research in Canada.

Working at the bench or at the bedside both present unique opportunities for career development and for furthering research – I'm fortunate to have experienced both. After completing my medical education and residency in internal medicine and gastroenterology at McGill University, I completed a Transplant Hepatology fellowship at the Mayo Clinic in Rochester, Minnesota, followed by a Canadian Institutes of Health Research Fellowship for Health Professionals to obtain a PhD in Medical Biophysics from the University of Toronto in 2018. My training and education led me to become both a hepatologist and clinician-scientist at the Ajmera Transplant Centre at the University Health Network in Toronto. Since 2018, I have been running a translational research program dedicated to improving health outcomes of patients after liver transplantation. My multidisciplinary research team uses interdisciplinary tools of machine learning, bioinformatics, and RNA nanomedicine to enable a precision medicine approach to long-term complications after liver transplantation through a better understanding of their mechanistic basis. We specifically study hepatocellular carcinoma, non-alcoholic steatohepatitis, post-transplant diabetes and liver regeneration. My research program employs a bedside-to-bench-to bedside approach, to ensure patient needs and clinical outcomes are connected with basic science taking place in the lab.

Using my clinical experience to inspire research projects is an exceptionally rewarding part of my career, despite the challenges that go along with managing the dual roles. It is because of this dual role that clinician scientists are in a unique position to contribute new knowledge and ensure it is translated into clinical practice. It is an excellent way to tackle the gaps in healthcare since you can inform projects from your own clinical experiences and those of patients.



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In fact, my discussions and interactions with patients have inspired ideas for bench-to-bedside projects. I also work very closely with patient partners who provide their valuable life experiences, which has been very important to the translational research that I do and that I hope will ultimately benefit patient care and outcomes.

I believe this openness to new approaches and collaborations is one of the most important characteristics to have as a researcher, as the world has become much more interdisciplinary. Further, as a woman clinician-scientist with a family, there are additional challenges of balancing both a personal and professional life, and I am fortunate to have great support to be able to manage these roles. In the end, being a scientist or clinician-scientist involves a lot of hard work, perseverance, and passion to pursue your research. It is essential to find the environment where you will have the mentorship and support you need to help you flourish professionally and personally.

Finally, I think we need to move away from the one-size-fits-all approach to treating patients and evaluate the potential for new and innovative targeted therapies. I am currently evaluating RNA nanoparticle-based therapies to stimulate regeneration in livers affected by chronic liver disease (CLD) with support from the Stem Cell Network. This represents an interesting example of how therapies could be personalized to an individual patient and delivered in a targeted way, limiting systemic side effects. This project will provide the first steps towards a unique therapeutic strategy to rescue defective liver regeneration in patients with CLD. I look forward to bringing such an approach from the bench to bedside.

Aside from my work in the lab and clinic, I have had the opportunity throughout my career to learn from and collaborate with scientists across Canada through attendance at scientific conferences, events, symposia, and workshops. Recently, I was invited to participate in the [Stem Cell Network's Day on the Hill event](#), celebrating women researchers in regenerative medicine. This was a wonderful event to foster a sense of collegiality and networking among the women members of the Stem Cell Network. It was very interesting to convey our enthusiasm for science and stem cell research to Members of Parliament in Ottawa and emphasize the need to continue to support research for the well-being of Canadians with associated potential for economic benefits. Our goal was to gain champions in Parliament who understand the value of health research and the potential for the regenerative medicine sector, and it was fantastic to see the interest and enthusiasm from the Canadian government in learning more about the research we are conducting and are so passionate about.



From left to right: Molly Shoichet, PhD, MP Jenna Sudds, Dr. Bernard Thébaud, Dr. Mamatha Bhat, Amy Wong, PhD, and PhD Candidate Alexandra Kozlov