TESTING PROMISING THERAPIES WITH NOVEL

CARDIAC IMAGING TECHNOLOGY

Given heart failure's high morbidity and mortality rates, there is a pressing need to better understand the molecular underpinnings of this disease, as well as to develop more targeted preventive and interventional therapies that can ultimately improve patient prognosis. HSRLCE's Dr. Kim Connelly, a non-invasive cardiologist at St. Michael's Hospital, is exploring the use of advanced cardiac imaging techniques to more accurately assess heart damage, such as fibrosis and hypertrophy, as well as test promising gene and stem cell–based therapies.

One of his key collaborators is Dr. Graham Wright, Canada Research Chair in Imaging for Cardiovascular Therapeutics and a senior scientist at the Sunnybrook Research Institute, whose work is focused on advances in cardiac imaging modalities, including optimizing the use of real-time cardiac MRI. The imaging work is not just to develop better diagnostic tools but to guide decision-making about interventions. "We're using novel imaging technology to identify molecular signatures of disease and aiming to develop novel therapeutic strategies," explains Dr. Connelly. They also use cardiac imaging to monitor an experimental or existing therapy in a non-invasive way to see if it is actually working.

They are currently involved in two pre-clinical trials, one of which is the Enhanced Angiogenic Cell Therapy - Acute Myocardial Infarction Trial (ENACT-AMI) in collaboration with the Ottawa Heart Research Institute. The multicentre trial consists of "supercharging" patients' own stem cells with a gene called endothelial nitric oxide synthase (eNOS), then putting the treated cells back into patients after a heart attack to see if improves cardiac function. "We're using MRI to look at tissue damage to see if heart function improves and if remodelling is reduced in that experimental group," explains Dr. Connelly. The study marks the world's first trial to use a combination of gene and cell therapies to treat cardiac disease.

Dr. Connelly is also working on a two-year pilot study that will launch later in 2015 called the Diabetic Renal Disease and Cell-based Therapy (DIRECT) study. Funded by the Banting & Best Diabetes Centre and the HSRLCE, it will examine whether stem cell therapy can reduce fibrosis and improve heart and kidney function in diabetes and cardio-renal disease. Another research project will look at how to improve the function of stem cells by treating them with an anti-aging drug known as an SRT activator before delivering them back into patients. The ultimate prize is to develop a drug that works and that can advance to clinical trials and benefit patients, says Dr. Connelly.

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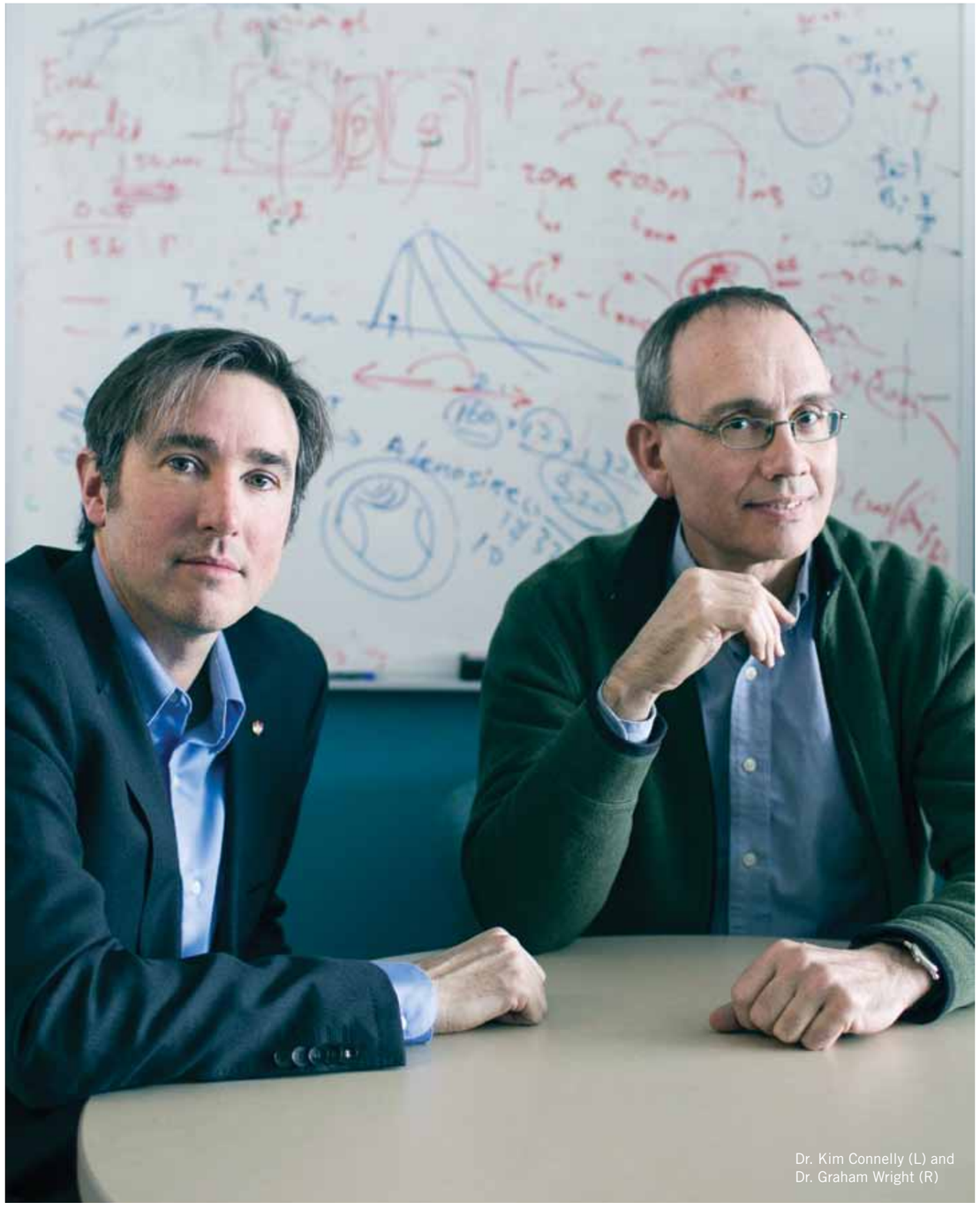

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Dr. Kim Connelly (L) and Dr. Graham Wright (R)