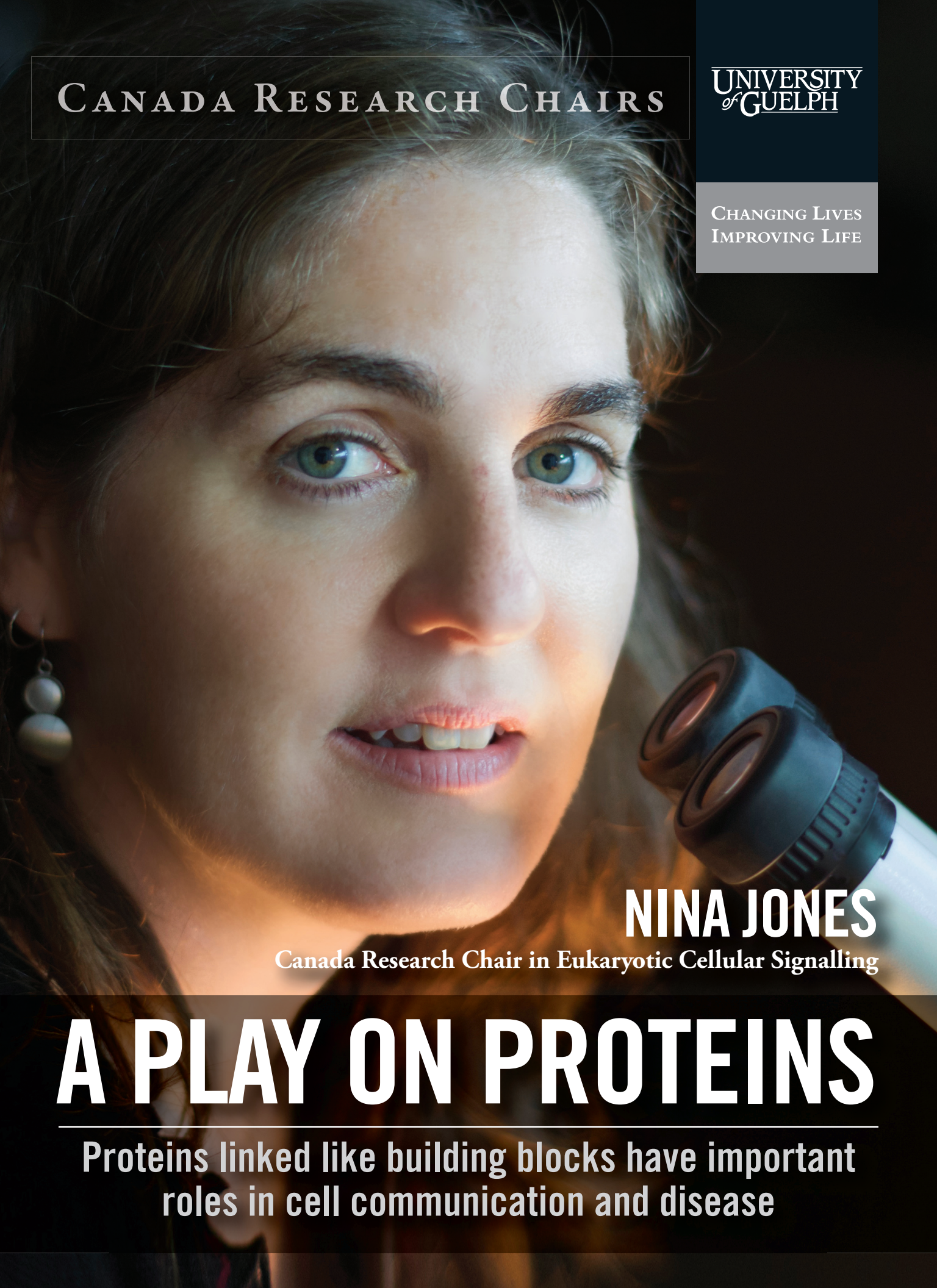


CANADA RESEARCH CHAIRS

UNIVERSITY of GUELPH

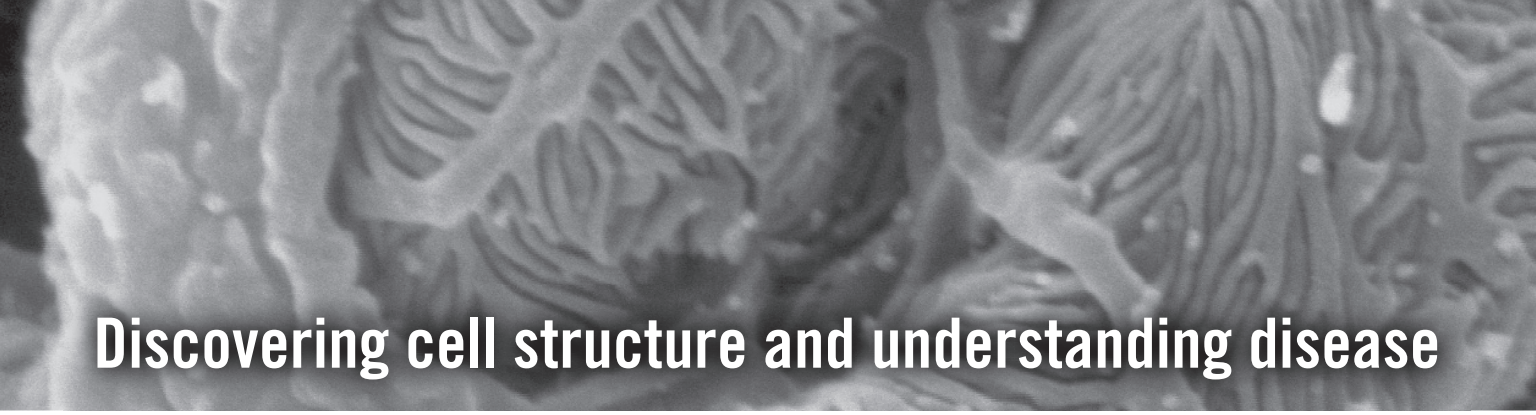
CHANGING LIVES
IMPROVING LIFE

NINA JONES

Canada Research Chair in Eukaryotic Cellular Signalling

A PLAY ON PROTEINS

Proteins linked like building blocks have important roles in cell communication and disease



Discovering cell structure and understanding disease

Cell communication is the key that allows our bodies to function properly. This process, known as signal transduction, allows cells to pass along information within and to each other.

During signal transduction, groups of proteins--linked together like building blocks--turn chemical signals into action.

Like Lego pieces with different shapes, the proteins that pass along and interpret information are connected in plug-and-play fashion.

As the holder of the Tier 2 Canada Research Chair in Eukaryotic Cellular Signalling, Prof. Nina Jones is mapping the connections between these proteins and looking at their roles in biology, including how they relate to disease.

Jones first became interested in signal transduction during her undergraduate studies at the University of Guelph. After obtaining her PhD at the University of Toronto, she completed a fellowship in the lab of the late cell biology pioneer Tony Pawson.

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There, she learned about podocytes – cells essential to helping the kidneys filter blood.

With unique insights into the mysteries of signal transduction, Jones returned to Guelph curious about the forms and functions of the different proteins involved in the process.

She was especially interested in finding out how disruptions in the protein connections were involved in kidney disease.

To determine the function of these proteins, she needed to manipulate the genes behind them and observe what happens when things go wrong.

Now, using what are called knockout mice (known for the genes that researchers remove or "knock out" of them), Jones and her lab can delete, multiply or mutate a gene.

"We found that, when removed, even a single protein could cause a dramatic effect on structures within the body," says Jones.

One of these proteins is known as the Nck protein, which plays an important role in the proper development of heart cells and helps keep kidney podocytes intact.

Researchers discovered that removing the Nck protein rapidly led to kidney failure. In some cases, simply blocking the signalling connections to Nck also interfered with proper cell function.

Jones's investigation into these small but vital proteins could lead to treatments for kidney disease in the future, making drug companies and clinicians interested in her findings.

For now, she says she must continue to follow where the protein pathways take her.

"We're still discovering how cells and tissues are put together," she says. "But this research will ultimately lead us to better understanding of human disease."

Jones plans to continue looking at signal transduction and kidney disease, while also focusing on other disorders, such as heart disease and cancer.

Jones's research is supported by the Canada Research Chairs program, the Kidney Foundation of Canada, the Natural Sciences and Engineering Research Council, and the Canadian Institutes of Health Research.

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