

# Deciphering cellular 'roadmap' of disease-related proteins

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University of Toronto researchers are helping demystify an important class of proteins associated with disease, a discovery that could lead to better treatments for cancer, cystic fibrosis and many other conditions.

Igor Stagljar, Professor in the Faculty of Medicine's Donnelly Centre for Cellular and Biomolecular Research, and his team developed the first roadmap for ATP-binding cassette (ABC) [transporter proteins](#). These proteins are crucial components of every cell, and are also involved in tumor resistance.

Scientists have struggled with understanding how ABC transporter proteins work and communicate with other proteins. Stagljar and his team, including first author Dr. Jamie Snider, have solved the mystery by using Membrane Yeast Two-Hybrid ('MYTH') technology to see how these transporter proteins interact with other vital components in the cell.

"Cell systems are complex and we need to have a solid grasp of how the individual pieces fit together in order to understand why certain diseases occur and how to best treat them," says Stagljar, who is also cross-appointed to the Departments of Biochemistry and Molecular Genetics.

ABC transporter proteins act as cellular gatekeepers by retaining nutrients and expelling toxins from the cell. If these proteins are not working properly, it can cause a number of diseases including: [cystic fibrosis](#), age-related macular degeneration, Tangier disease, and Dubin-Johnson syndrome. ABC proteins can also cause [cancer cells](#) to reject

[chemotherapy drugs](#) which makes treatment less effective.

"Our discovery shows how ABC transporter proteins effect cancer and other diseases, and this knowledge can help us develop better, more targeted drugs. This is truly momentous," said Stagljar.

The study was published today in *Nature Chemical Biology*.

**More information:** Mapping the functional yeast ABC transporter interactome, [DOI: 10.1038/nchembio.1293](https://doi.org/10.1038/nchembio.1293)

Provided by University of Toronto

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