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Dr. Igor Stagljär, Department of
Biochemistry at the University of
Toronto

Yeast Yield Results for Cystic Fibrosis Therapies

Similarities between yeast, humans aid medical research

By: Arthur Churchyard

Yeast may seem simple, but these tiny organisms have enough genes in common with humans to serve as a useful model system for developing new cystic fibrosis treatments, according to a researcher at the University of Toronto.

Six years ago, Dr. Igor Stagljär, a molecular biologist, set out with the idea that more potent, target-specific drugs could be discovered by using yeast, which reproduce quickly and are relatively easy to study. Now his research laboratory is using yeast to test drugs for cystic fibrosis, anthrax and malaria.

“We had to overcome some technical obstacles, but there were many who worked with us to produce extremely promising results,” he says.

In 1996 it was shown that yeast share 30 per cent of their genes with humans. That means certain types of proteins are present in both humans and yeast, allowing researchers to see the effect a drug might have on such proteins.

For example, Stagljär points to the discovery of a compound called Exosin by graduate student Anthony Arnoldo, who used yeast as a model for drug delivery in Stagljär’s lab. In a paper recently published in the journal PLoS Genetics, Stagljär and Arnoldo show that Exosin inhibits bacterial infections in mammalian cells, which means Exosin might be used to treat infections in the lungs of cystic fibrosis patients.

Exosin blocks the activity of one of the major toxins produced by the bacterium *Pseudomonas aeruginosa*, which infects the lungs of people with cystic fibrosis. During the infection, the bacteria release toxins that degrade lung tissues, making breathing difficult. Stagljär hopes to block such toxins in the lungs by delivering either Exosin or a subsequent treatment via puffer or tablets. This would help people with cystic fibrosis breathe more easily and live longer, healthier lives.

“That’s welcome news to the approximately 3,200 Canadians currently grappling with cystic fibrosis,” says Stagljär.

“We are well on the way to developing treatments that will help cystic fibrosis patients live longer with improved quality of life,” he says.

Stagljär’s work becomes even more crucial as bacteria become increasingly resistant to antibiotics.

Antibiotics have traditionally been used to kill bacteria such as *Pseudomonas aeruginosa*, but bacteria have survived to create populations that resist traditional antibiotics. Stagljär says treatments such as Exosin would be able to reduce the damage of bacterial infections that are resistant to current antibiotics.

Next, Stagljär plans to use his yeast-based model to test treatments that could improve the lives of people with malaria and anthrax.

Stagljär’s research is funded by the Canadian Institutes of Health Research, the Gebert Ruf Foundation from Switzerland, Novartis Inc., Genentec Inc. and the National Cancer Institute of Canada.

“We are well on the way to developing treatments that will help cystic fibrosis patients live longer with improved quality of life,” says Stagljär.



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The Association of Faculties
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265 Carling Avenue, Suite 800, Ottawa, Ontario K1S 2E1 | Tel: (613) 730 0687 | Fax: (613) 730 1196

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