

Meet... Hudson Freeze

GLYCOBIOLOGIST and BIOCHEMIST, *La Jolla, California*



BORN IN

Garrett, Indiana

JOB SITE

Burnham Institute for Medical Research

FAVORITE PLACE TO TRAVEL

Touring around the Mediterranean and Europe at international meetings

HOBBIES

Cycling, acting and singing in a gospel church choir

WHAT DID YOU WANT TO BE WHEN YOU WERE A KID?

A scientist. I loved astronomy and science fiction..

What He's Doing

Sugars are most famous for giving us energy. But did you know that sugar chains called glycans help cells talk to each other while they build our organs? Sticky glycan-and-protein molecules act like foremen at a construction site. They tell cells to stay put or move two steps to the right, add scaffolding here, or slap on some plaster over there. If everything goes well, you end up with a healthy kidney, or a brain.

Hudson Freeze studies glycans, what they do in our cells, and how they're made, a process known as glycosylation. He wants to know why glycosylation sometimes goes wrong—and how he can fix it. His driving goal is to help children whose cells don't make enough glycans or put those glycans in the wrong place. These glycosylation disorders are rare but devastating since they damage mental abilities, coordination and organ function.

Many years ago, Freeze was one of only a few scientists who focused on glycosylation. Doctors would often come to him for help in understanding what was wrong with their patients and deciding how to treat them. Freeze soon identified six new diseases. Today, he is at the forefront of a burgeoning field that includes as many as 30 distinct glycosylation disorders.

"I wouldn't have these perspectives if it weren't for remembering my high school chemistry. I use chemistry every day."

His Findings

A solid grounding in basic science has allowed Freeze to make unexpected connections in his research. For example, he noticed similarities between glycosylation disorders, an intestinal condition, and a complication of heart surgery. Looking closer, he found that patients were losing a glycan called heparan sulfate. Now he is investigating an unusual form of a similar molecule, heparin, as a possible treatment for the life-threatening intestinal problems.

In the 1990s, Freeze discovered that a sugar called mannose fixed glycosylation problems in cells cultured from patients. He did a clinical study that showed mannose was safe for people. Soon after, a German boy with a glycosylation disease recovered completely after his doctor consulted Freeze on giving a proper mannose dose. Freeze is now experimenting with mannose with the hope of treating children who suffer from other rare glycosylation disorders.

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