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THIS WEEK'S CLOSEUP

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Carb-trapping device aids research

04/26/2004 07:45 AM

By [Dyke Hendrickson](#)

The battle to co-exist with carbohydrates is often waged on the bathroom scale.

But imbalance in carbohydrate makeup can lead to grave abnormalities, especially in children.

In the database of Vernon Reinhold, director of the University of New Hampshire's Center for Structural Biology, are numerous photos of youngsters who cannot walk or digest food.

Reinhold and a team at the Durham campus are studying the structure of carbohydrates and why improper makeup can doom some youngsters.

UNH was recently issued a patent for the GlycoTrap, a small device that separates carbohydrates from other tissue components and is being used to learn more.

After working through this field for three decades, Reinhold appears to be making progress in understanding the structure of carbohydrates. At the least, he is seeing greater attention to the field in both academic and pharmaceutical laboratories.

In the past 10 years, 13 genetic disorders have been linked to how carbohydrates are added to other molecules.

"There's an increasing awareness about the importance of the structure of carbohydrates, from embryonic development to alcoholism," said Reinhold, who came to UNH from MIT.

"The GlycoTrap tool we have developed is very simple but could be useful in understanding this field."

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Industry analysts say that for years, scientists thought carbohydrates did little more than provide energy for the body. But it is now known that some carbohydrates play a key role in processes as diverse as recognizing pathogens, blood clotting and directing embryonic development.

Reinhold is an authority in the field of glycomics, which seeks to understand the function of these carbohydrate attachments. Glyco is the suffix used to indicate carbohydrates attached to other molecules.

Genomic studies have determined the entire sequence of DNA in humans, but genes are only the blueprints for proteins, the chemical messengers that direct the actual work in the body. So to understand how genes give rise to function, researchers began looking at proteins, an endeavor dubbed proteomics.

They discovered that the instructions carried by most proteins were altered by the addition of carbohydrates and that without the carbohydrate the protein could not do its job. The same was also found to be true for some fat molecules.

One major advantage of the GlycoTrap over other methods, according to UNH spokesmen, is that it can capture a complete carbohydrate rather than just pieces. It can also be used with the robotic procedures currently employed in the study of proteins.

"It can remove the background material in a biological sample," Reinhold said, "which is extremely important for sensitivity and getting the molecules you are interested in."

Understanding the details of carbohydrate structure could give pharmaceutical companies new targets for drug development, he said.

Reinhold said UNH has signed a nondisclosure agreement with a company interested in developing his invention.

"The GlycoTrap would be something that everyone working in this area would love to have," said Reinhold, also a professor of molecular biology, biochemistry and chemistry at UNH. "First, the device has to be packaged so it can be easily marketed."

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