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LESSONS LEARNED

# FROM CHOLERA

**FOCUS:** *Developing an oral application for a therapeutic peptide that normally has to be given by injection.*

To safeguard against the world, our bodies have barriers that only small molecules like single sugars or single amino acids are able to cross into our gastrointestinal tract, lungs and sinuses, for example. But over time, some microbes have learned how to exploit pathways that get past these barriers, enter our bloodstream and cause disease.

"In studying the cholera toxin, we saw that it breaches the barrier by binding to a particular lipid," Dr. Lencer says. "We found that we could fuse a peptide to a lipid that we engineered, and this fusion could cross the cell into the bloodstream." The ability to deliver drugs in this novel way to normally impossible to reach tissues would be a real breakthrough, as small therapeutic peptides can treat diabetes, infertility and obesity, and therapeutic proteins have been applied to many inflammatory diseases and cancer.

"In addition to the GI tract, lungs and bloodstream, our platform may work to cross the blood brain barrier—that would be another significant achievement, as getting antibiotics into the brain from the bloodstream isn't easy," Dr. Lencer says.

"Harrington is helping us organize the studies, to streamline the chemistry, and they're assisting us with the commercial application," Dr. Lencer says. "There I was, simply trying to cure cholera, and now we have an incredible team of experts with a chance at making a huge contribution to clinical medicine."

**IMPACT WISH:**

*"To develop an easier way to deliver therapies to the lungs, GI tract, heart, muscles and brain, is one of the holy grails of medicine."*

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