Meet...

Amy Palmer BIOCHEMIST, *Boulder, Colorado*

What She's Doing

Some metals are essential for health. Calcium ensures strong bones and is necessary for muscles to move, brains to send signals and hearts to beat. Iron helps carry oxygen to tissues and is important for cells to produce energy, make DNA and grow.

But an excess of metals in our bodies can cause problems, including organ failure, nerve damage, cancer or even death.

As a result, there must be careful controls on how metals get where they need to go in our bodies. Amy Palmer uses creative chemistry to track the movement of metals in living cells to better understand their roles in health and disease.

One of Palmer's specialties is zinc, a metal used throughout our bodies to ensure proper immune responses and a healthy nervous system. Zinc also regulates the function of some genes, enables many proteins to carry out their vital roles and helps speed chemical reactions in our bodies. A zinc imbalance is linked to Alzheimer's disease, diabetes and prostate cancer.

Palmer hopes her research on zinc will ultimately have medical applications. She envisions a zinc-tracking technique that would enable early disease diagnosis and lead to drugs that could control the level or location of zinc to prevent or treat such diseases.

She also plans to develop fluorescent sensors for other biologically important metals such as copper, which in high levels can cause liver damage, kidney failure, coma and death.

JOB SITE
University of Colorado at Boulder

HOBBIES
Rock climbing and snowboarding

FAVORITE FOOD
Cilantro—just about everything tastes better with cilantro on it.

FAVORITE BOOK
The Power of One by Bryce Courtenay

HIDDEN TALENT
Knitting

"As a scientist, you create knowledge; you don't just learn what's been done before."

Her Findings

When Palmer was in college, no one knew how to track metals inside living cells. Once she had a lab of her own, she developed four fluorescent sensors to do just that for zinc. These sensors allow Palmer and other scientists to detect different levels of zinc in various parts of a cell and follow its flow during processes like nerve signaling, bacterial invasion and disease progression.

In her latest zinc experiments, Palmer has turned to a part of the brain called the hippocampus, which helps mammals store memories and is the first brain area damaged by Alzheimer's disease. By tracking the movement of zinc in hippocampus cells, Palmer hopes to learn what role the metal might play in forming memories and developing Alzheimer's.

Meet more interesting chemists at http://www.nigms.nih.gov/ChemHealthWeb.

NIH National Institute of General Medical Sciences