

Environmental Influences on our Health



B. PAIGE LAWRENCE, PH.D.

*Professor of Environmental Medicine
and Microbiology and Immunology
and Director, Toxicology
Training Program*

How do environmental chemicals influence the way our bodies work? This is the question Dr. Paige Lawrence hopes to answer through her study of orphan receptors, molecules on the surface of cells that receive chemical signals from outside the cell, but that do not have an identified purpose.

Peptides, neurotransmitters, or hormones normally bind to receptors, telling the cell to allow these substances to enter. Orphan receptors, however, do not bind to these molecules. Until recently, scientists could not be sure what function these unaffiliated receptors performed in the body.

Dr. Lawrence took on this question in her University of Rochester Medical Center laboratory. “It turns out that these orphan receptors bind to pollutants in the environment,” she said. “That really intrigued me. How do these pollutants bind to these receptors? How do they control our biology? I’m getting more interested in immunology and how our body deals with infectious diseases.”

***“There is evidence
that things in the
environment change the
baby’s health.”***

Specific receptors bind to specific environmental chemicals, Dr. Lawrence noted. The aryl hydrocarbon receptor (AhR), for example, binds with dioxins and polychlorinated biphenyls (PCBs), two highly toxic byproducts of industrial processes. “We want to figure out how this works, because then we can help prevent it,” she said.

One of the most significant propositions of this research deals with a mother’s exposure to industrial pollutants while she is pregnant, and how that ill influences her unborn child. “There is evidence that things in the environment change the baby’s health,” said Dr. Lawrence. “This has all sorts of implications.”

So far, Dr. Lawrence’s lab has isolated certain cell types that are directly affected by maternal exposure. “We’re honing in on a smaller and smaller box, like Russian nesting dolls,” she said. “We’re working our way to the tiny doll in the middle. We’re maybe halfway.”



UR
MEDICINE

MEDICINE of THE HIGHEST ORDER