

# Meet...

## Vincent Rotello

ORGANIC CHEMIST, *Amherst, Massachusetts*



**BORN IN**  
Chicago, Illinois

**JOB SITE**  
University of Massachusetts, Amherst

**HOBBIES**  
I like to cook and I'm promiscuous in my cuisine—  
adventurous and spicy

**GOOD READING**  
Patrick O'Brian's Aubrey/Maturin series. It relates to  
running a research group: the things that go into  
making a happy ship are many the same as the  
things that go into making a happy research group.

**CANINE COMPANION**  
Gracie, a Weimaraner. She's 100 dog years old,  
but still excited by everything around her.  
I hope I maintain the same sense of  
wonder when I hit that age!

### What He's Doing

**Vincent Rotello works with tiny compounds called nanomaterials. Even though they are far too small to be seen with the naked eye, they could have a big impact on human health problems.**

In the human body, proteins interact with other proteins and sugars on a regular basis. Rotello is investigating exactly how some of these interactions occur by taking a close-up, microscopic-level look at the way their surfaces attach to each other. The technique is called supramolecular assembly, or “the chemistry beyond the molecule,” because it depends on interactions between molecules—in other words, their stickiness.

Rotello is even developing tiny particle systems that can act like real biological proteins and engage in some of the same interactions with proteins and sugars. To make them, his team starts off with a chain of basic non-interacting particles. “If you put it into cells or biofluids, it floats around and doesn't do anything,” Rotello explains.

**“I wanted to be a chemist in elementary school after my uncle, a chemical engineer, visited. I started drawing carbon structures. I love the idea of being able to connect things together.”**

### His Findings

Figuring out how microscopic parts of the cell interact has helped Rotello develop sensors that can identify different types of cancer cells—and not just whether they're cancer cells or healthy cells, but their precise genetic patterns and characteristics.

“Take prostate cancer, for instance,” he says. “Many men will die *with* prostate cancer, but very few will die *of* it.” Some types of prostate cancer are invasive, but others with molecular-level differences are not. When deciding what treatment options to use, it helps to know which is which.

Rotello has also developed a test strip that can detect bacteria in the water. The sensor is made of a protein with a nanoparticle bound to it, which keeps the protein inactive. If certain bacteria are present, they will kick off the nanoparticle and activate the protein—which is designed to generate a color. Rotello's team is working on producing a low-cost version of the sensor for use in developing nations, which he anticipates will happen in the next few years.

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



National Institute of  
General Medical Sciences