

DMNS FAIR

Queens College, City University of New York
Division of Mathematics and Natural Sciences
Faculty Achievement In Research

MY NAME: Zahra Zakeri, Professor

MY DEPARTMENT: Biology

SOMETHING INTERESTING ABOUT ME (OPTIONAL, MAY BE LEFT BLANK):

As an immigrant to this country, I feel deeply committed to helping others. Because of this, by branching from an international society that for which I serve as president, and organize meetings all over the world, I have also built an organization named “Scientists Without Borders,” which teaches in 3rd-World countries and am active in organizations promoting women in science.

MY RESEARCH (IN LAY TERMS):

I study many things. Most of my research has examined something that may seem surprising—how cells die—but which has become a very important medical issue. Cells almost never die by accident. They usually commit suicide under very controlled conditions. Many cancers become a problem not because the cells multiply too much but because they fail to die on schedule, and patients with diseases such as Alzheimer’s and even heart attacks can be helped if we can prevent cells from dying. My research lab has found that there are very specific signals that cause a cell to die by eating itself (autophagy) or by destroying vital components (apoptosis). Our findings will help clinicians to adjust treatments to get better responses to treatments.

These studies led us to another very interesting line of research. Viruses grow within cells, and they consequently work hard to prevent cells from committing suicide before they have reproduced, while the cell tries to commit suicide to rid the body of the virus. We have found the mechanism by which a deadly flu virus and dengue virus fight to keep cells alive. If we interfere with that mechanism, the virus is much less successful at reproducing, producing less than 1% the expected number of virus particles. Thus our research suggests new mechanisms of fighting viruses.

Finally, while thinking about diseases that affect one sex more than another, we realized that the most common explanations for these differences, the sex hormones, did not explain why the disease was just as severe, though less frequent, in one sex. We went back to the drawing board and looked at cells taken from mouse embryos before they even had a defined sex. We found that cells from genetically male and genetically female mice were different even before there were hormones. This novel finding opens the question of whether some diseases should be treated differently in men and women.

MY RESEARCH IN 140 CHARACTERS (OPTIONAL, MAY BE LEFT BLANK):

When and how a cell dies is important to understanding birth defects, autoimmune disease, cancer, viral disease, and neurodegeneration.