

WHEN GOOD CELLS GO BAD: K-STATE SCIENTIST RESEARCHES CELLULAR STRUCTURE

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MANHATTAN -- While some biological research may not directly provide cures for major diseases, it can provide the scientific basis for research that might.

Work by Kansas State University's Jeroen Roelofs is one such example.

Roelofs, assistant professor in K-State's Division of Biology, studies a cellular structure called the proteasome, which is a large complex that degrades damaged or misfolded proteins. Removal of defective proteins is critical for normal cellular functions.

The 26S proteasome has been shown to control various essential biochemical processes, including DNA synthesis and repair, transcription, translation and cell signal transduction. Several human diseases can be traced to its malfunction, Roelofs said.

"We're interested in that complex because it is the garbage machine of the cell. For the cell to perform well it needs to get rid of proteins that are either not needed anymore or damaged because they could become toxic," he said.

Roelofs was invited to write a research review about his work, which was published in the July issue of Trends in Cell Biology. The article, "Assembly, Structure, and Function of the 26S Proteasome," is his first publication as a principal investigator since he joined K-State in November 2009. The research was supported by a \$40,000 grant from K-INBRE, the Kansas IDeA Network of Biomedical Research Excellence.

Roelofs said he is not necessarily looking to find the cure for disease; instead he is trying to uncover details of normal cellular functions. His investigation is the type that often creates unexpected pathways for further scientific discoveries, techniques or cures for diseases.

"I'm not trying to fix something that's broken; I'm just trying to understand how it works," he said. "It could be that it doesn't directly translate into a drug, but even then the added knowledge is still very valuable and could lead directly or indirectly to something else."

Roelofs was recently awarded a three-year grant from the National Institutes of Health, Centers of Biomedical Research Excellence. The grant, which is for a maximum of \$214,600 a year, will be used to hire a lab technician or postdoctoral worker to help with experiments, buy materials and generate preliminary data that should help him get a larger National Institutes of Health grant in the future.

Roelofs earned his doctorate from the University of Groningen in the Netherlands. He did postdoctoral research at Harvard Medical School.

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