



## DNA discovery could aid organ transplants

By Sharon Schmickle | Published Tue, Jan 12 2010 5:21 am

Foreign DNA can infiltrate our cells to cause real mischief in our bodies. It even can weave itself permanently into human genomes so that genetic disorders are passed on to future generations.

Among other concerns, that threat has posed a barrier to prospects for using pigs and other animals to grow organs for transplant into humans.

But human cells do have some defenses against invading DNA. Now, researchers at the University of Minnesota have discovered the mechanisms behind that natural security system for deactivating and degrading foreign DNA.

The discovery is expected to open new pathways not only for organ transplantation but also for gene therapies and genetic engineering. By understanding how the mechanism works, scientists now should be able to manipulate it and hopefully swap bad genes for good ones.

Prof. Reuben Harris in the U of M's College of Biological Sciences led the research which is reported this week in [Nature Structural & Molecular Biology](#).

In the study, Harris and colleagues show how APOBEC3A, an enzyme in human immune cells, disables foreign DNA by changing one of its four main chemical bases, cytosines, to organic compounds called uracils.

The researchers also found other enzymes that degrade the uracil-containing foreign DNA and sweep its remains out of the cell.

"Scientists have known for a long time that some human cells take up DNA better than others, but we haven't had good molecular explanations," Harris said in a statement about the finding. "This is definitely one of the reasons. Foreign DNA restriction is a fundamental process that could have broad implications for a variety of genetic diseases."

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