RESEARCH

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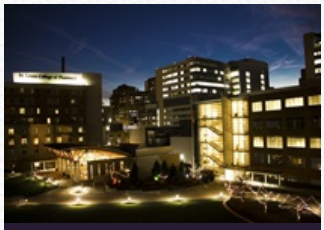


Faculty Impact-Highlighting Research at the College

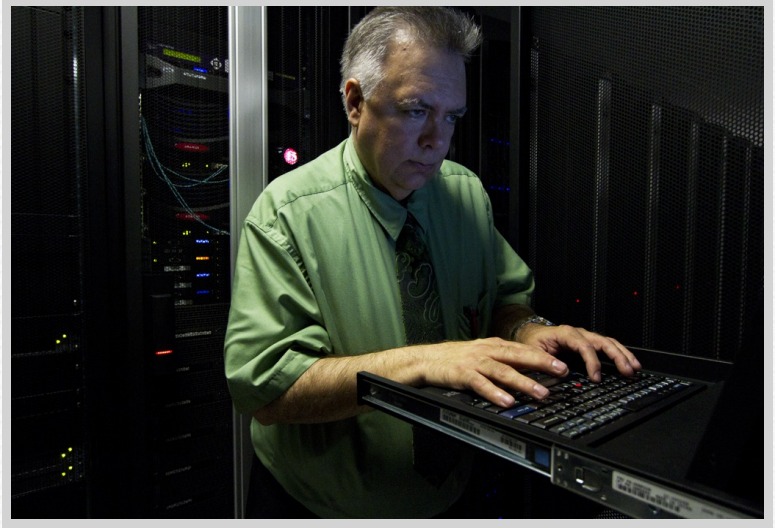
Researching Ways to Detect Alzheimer's Before It Happens

Alzheimer's disease afflicts more than five million Americans, and experts predict that number will jump as our population ages. While existing treatments cannot cure Alzheimer's, early detection can make a world of difference—providing time to plan for the future and medications that could lessen symptom severity.

John Beale, professor of medicinal chemistry, has teamed up with Washington University and the University of Wisconsin-Madison to find a way to detect Alzheimer's long before symptoms are apparent. Beale is using computer modeling to search for small, drug-like molecules that will bind themselves tightly to the beta-amyloid dimer, which is a protein molecule found in pre-Alzheimer's patients as many as 20 years before symptoms appear.

"If we can come up with a drug or drugs that could detect that dimer early, then we would have a window of about 20 years during which we could try to block the disease," Beale says.

Beale's work builds on a relatively recent medical realization that dimers—as opposed to larger clumps of amyloid plaques—may cause the neuron damage that is the hallmark of Alzheimer's disease.



In hopes of uncovering a way to detect and possibly block development of the dimers, Beale started screening some 20,000 molecules earlier this year using supercomputers at Washington University School of Medicine. Beale's experiments call for the potential binding molecules to virtually search the dimer model for a docking site, or a place where they will fit and stick. While Beale expects to find only a handful of molecules that bind to the dimer out of the thousands of molecular candidates he's studying, any matches would be a huge payoff using a method that's far speedier and less costly than traditional biological sample testing.

The research team's other members will take the molecules that Beale finds through his work with computer models and physically test them. Nigel Cairns, a Washington University School of Medicine research professor in neurology and pathology and immunology, will test the binding of those molecules to brain tissue. Michael A. Gitcho, an assistant scientist in the University of Wisconsin-Madison School of Pharmacy, will conduct nerve cell culture experiments to see how those compounds work in living tissue.

Beale believes the project may be the first step in an ongoing research effort. "This research may lead to the development of completely new agents for the early detection of Alzheimer's disease, and novel agents for the treatment of the disease," Beale says.