

KEEPING

## CELLS ALIVE

**FOCUS:** *Identifying molecules that can prevent cell death and potentially treat a wide range of retinal degenerative diseases and other conditions.*

From a young age Dr. Matsuyama was fascinated by what is perhaps the most fundamental question in all of life science: why is there death? His pursuit of answers has guided his career path and is revealing insights into cell behavior that could one day have a significant impact on the human condition.

“Rice has a one-year lifespan, yet cedar trees have unlimited lifespans. The cells of mice and humans look nearly the same, yet humans live 25 times longer,” Dr. Matsuyama says. “I am fascinated by evolutionary theory, how lifespans are controlled. One practical way to study that mechanism was to understand programmed cell death, and in turn to try and invent technology to prevent it.”

BAX (BCL2-Associated X Protein) and BAK (Bcl-2 homologous antagonist killer) are proteins that regulate mitochondria to control the death and survival of cells.

With support and funding from the Gund-Harrington award, Dr. Matsuyama’s team is developing clinically-effective small compounds that inhibit BAX and BAK in order to protect retinal cells from death.

If successful, his drug could be applicable to many forms of retinal disease, independent of the underlying genetic mutation. In addition, these new cell-death inhibitors are expected to protect other cell types in the body, including neuron and hematopoietic stem cells.



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**IMPACTWISH:**

*“Our aim is to develop compounds that can prevent degenerative retinal diseases and ultimately, some causes of blindness. There is even potential for this technology to reduce the number of deaths or catastrophic effects of a range of pathological conditions, such as stroke, infections, traumatic injuries, and others.”*

**Harrington Discovery Institute**

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