

Is cancer the evolutionary 'price' complex animals pay for living in an oxygen rich environment?

Like many biologists, [Emma] Hammarlund wondered why it took so long for complex animals to emerge — and why, when they finally did, it happened so suddenly. One of the leading theories about this hotly debated question holds that a skyrocketing rise in atmospheric oxygen around that time triggered what's known as the Cambrian explosion.

...

[Stem cells] reside in more oxygen-rich niches, such as the retina and the skin. Cancers have stem cells, too, which help drive a tumor's formation and growth, and those cells are resilient in the face of oxygen. Pålman and Hammarlund figured that if they could determine how our bodies and malignancies preserve those stem cells despite the oxygen, they might be able to explain how early animals solved their own oxygen problems millions of years ago.

So they focused on a family of proteins called hypoxia-inducible factors (HIFs), chief among them the protein HIF-2?. Its activity is heavily implicated in cancers of the kidneys.

...

[T]he link between HIF-2? and tumor formation is rooted in the protein's evolutionary role in maintaining the states of stem cells. "Maybe cancer is the price vertebrates, which develop cancer more often than invertebrates, pay for the ability to live well in an oxic environment," Hammarlund said.

...

Clinical trials are currently testing whether inhibiting HIF-2? might be effective in treating certain cancers.

Read full, original post: [Oxygen and Stem Cells May Have Reshaped Early Complex Animals](#)