A new soldier in the war on cancer: The blind mole rat

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If someone ever calls you a "dirty rat," consider it a compliment. A new discovery published online in the *FASEB Journal* shows that cellular mechanisms used by the blind mole rat to survive the very low oxygen environment of its subterranean niche are the same as those that tumors use to thrive deep in our tissues. The net effect of this discovery is two-fold: first the blind mole rat can serve a "living tumor" in cancer research; and—perhaps more important—that unique gene in the blind mole rat becomes a prime target for new anti-cancer drugs that can "suffocate" tumors.

"President Obama said in his February 24 address to the U.S. Congress that he wants to put an end to cancer, and the boost to basic science in the stimulus package is a great start," said Gerald Weissmann, M.D., Editor-in-Chief of the *FASEB Journal*. "But if he wants to end the longest ongoing war in U.S. history--a War on Cancer we've been fighting since before Nixon declared it in 1971—then building on this discovery is a good place to start."

To reach their finding, American and Israeli scientists from the Universities of Illinois and Haifa conducted experiments in multiple groups of "dirty" mole rats and "regular" rats. For each type of animal, a control group was exposed to normal levels of oxygen while the experimental groups were exposed to oxygen levels ranging from 3 percent to 10 percent. In the regular rats exposed to low levels of oxygen, the gene that becomes active to protect their bodies from low oxygen (BNIP3) was shown to be active in heart and skeletal muscles. In

the mole rats, however, it was discovered that their version of the BNIP3 gene was much more effective at helping them tolerate low levels of oxygen than the version of the gene in "regular" rats.

"In show biz and politics, people make comebacks all the time," Weissmann added, "but rodents aren't usually that lucky. Since the bubonic plague in the 1300s, the reputation of rats has been in the sink. If the blind mole rat ultimately helps us cure cancer, it will be the greatest comeback of all time in public health and in public relations."

More information: Mark Band, Alma Joel, Alvaro Hernandez, and Aaron Avivi. Hypoxia-induced BNIP3 expression and mitophagy: in vivo comparison of the rat and the hypoxia-tolerant mole rat, Spalax ehrenbergi. FASEB J. doi:10.1096/fj.08-122978. www.fasebj.org/cgi/content/abstract/fj.08-122978v1

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