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Enzyme shows therapeutic potential for breast cancer and other diseases

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Aspirin's reign as "the wonder drug" may have a serious challenger if new research by a team of scientists from the United States and Brazil pans out. That's because they have identified an enzyme, called "soluble guanylate cyclase" or "sGC," which shows potential for treating a range of illnesses from breast cancer to erectile dysfunction. The complete research report, which is co-authored by Nobel laureate Ferid Murad, has been published online in *The FASEB Journal*.

"The quantity of sGC is reduced or even absent in several pathological conditions," said Ka Bian, M.D., Ph.D., M.B.A., a researcher involved in the work from the George Washington University School of Medicine and Health Sciences in Washington, D.C. "Our study sheds light to propose a novel therapeutic target to increase the expression of sGC through the blocking of histone deacetylase."

To make their discovery, Bian and colleagues treated human breast cancer cells in the laboratory with different types of chemicals that inhibit the enzymes called histone deacetylases. In cells that received these chemicals, the quantity of sGC was measured. Results showed that inhibition of histone deacetylase elevated sGC in human breast cancer cells. Increased levels of sGC in breast cancer cells led to the production of higher levels of cyclic GMP. Cyclic GMP may decrease the growth of cancer cells. Additionally, the activation of sGC relaxes smooth muscle cells, suggesting that histone deacetylase inhibitors have the potential to be useful for treating other diseases, such as erectile dysfunction, overactive bladder, pulmonary hypertension and cardiovascular diseases.

"These findings reveal a role of chromosome remodeling factors in regulating the expression of this particular form of guanylate cyclase" said Thoru Pederson, Ph.D., Editor-in-Chief of *The FASEB Journal*. "The authors' suggestion of therapeutic applications, while entirely speculative, is not implausible."

More information: A. Sotolongo et al, Epigenetic regulation of soluble guanylate cyclase (sGC) 1 in breast cancer cells, *The FASEB Journal* (2016). DOI: 10.1096/fj.201600339R