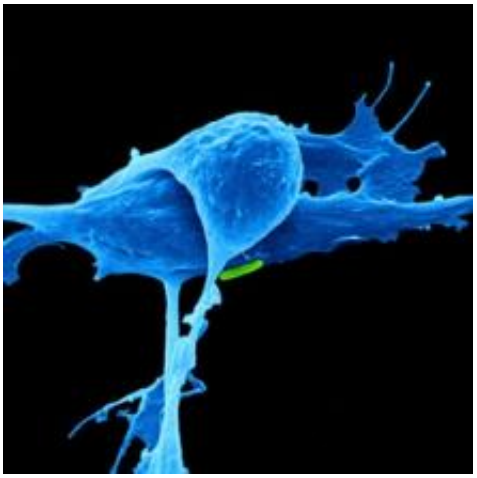
A bad penny: Cancer's thirst for copper can be targeted

April 9 2014



Drugs used to block copper absorption for a rare genetic condition may find an additional use as a treatment for certain types of cancer, researchers at Duke Medicine report.

The researchers found that cancers with a mutation in the BRAF gene require copper to promote tumor growth. These tumors include melanoma, the most dangerous form of skin cancer that kills an estimated 10,000 people in the United States a year, according to the National Cancer Institute.

"BRAF-positive cancers like melanoma almost hunger for copper," said

Christopher M. Counter, Ph.D., professor of Pharmacology & Cancer Biology at Duke University School of Medicine and senior author of the study published April 9, 2014, in *Nature*.

The BRAF gene is involved in regulating cell division and differentiation. When mutated, the gene causes cells to grow out of control. Using animal models and cells, Counter and colleagues found that when they experimentally inhibited copper uptake by tumors with the BRAF mutation, they could curb tumor growth.

They achieved similar results with drugs used to treat patients with Wilson disease, a genetic disorder in which copper builds up in the tissue, primarily the brain and liver, causing damage.

"Oral drugs used to lower copper levels in Wilson disease could be repurposed to treat BRAF-driven cancers like melanoma, or perhaps even others like thyroid or lung cancer," said Donita C. Brady, Ph.D., lead author of the study.

Already, a clinical trial has been approved at Duke to test the copper-reducing drugs in patients with melanoma, although enrollment has not yet begun.

"This is a great example of how basic research moves from the laboratory to the clinic," Counter said.

More information: Copper is required for oncogenic BRAF signalling and tumorigenesis, *Nature*, dx.doi.org/10.1038/nature13180

Provided by Duke University Medical Center