Team discovers how drug prevents aging and cancer progression

March 27 2013

University of Montreal researchers have discovered a novel molecular mechanism that can potentially slows the aging process and may prevent the progression of some cancers. In the March 23 online edition of the prestigious journal *Aging Cell*, scientists from the University of Montreal explain how they found that the antidiabetic drug metformin reduces the production of inflammatory cytokines that normally activate the immune system, but if overproduced can lead to pathological inflammation, a condition that both damages tissues in aging and favors tumor growth.

"Cells normally secrete these inflammatory cytokines when they need to mount an immune response to infection, but chronic production of these same cytokines can also cause cells to age. Such chronic inflammation can be induced, for example by smoking" and old cells are particular proficient at making and releasing cytokines says Dr. Gerardo Ferbeyre, senior author and a University of Montreal biochemistry professor. He adds that, "We were surprised by our finding that metformin could prevent the production of inflammatory cytokines by old cells ".

In collaboration with Michael Pollack of the Segal Cancer Centre of the Jewish General Hospital, McGill University, Dr. Ferbeyre and his team discovered that metformin prevented the synthesis of cytokines directly at the level of the regulation of their genes. "The genes that code for cytokines are normal, but a protein that normally triggers their activation called NF-?B can't reach them in the cell nucleus in metformin treated cells", Dr. Ferbeyre explained.

"We also found that metformin does not exert its effects through a pathway commonly thought to mediate its antidiabetic effects", he added. "We have suspected that metformin acts in different ways on different pathways to cause effects on aging and cancer. Our studies now point to one mechanism", noted lead authors of the study Olga Moiseeva and Xavier Deschênes-Simard. Dr. Ferbeyre emphasized that, "this is an important finding with implications for our understanding on how the normal organism defends itself from the threat of cancer and how a very common and safe drug may aid in treatment of some cancers and perhaps slow down the aging process.

He adds, "It remains that determining the specific targets of metformin would give us an even better opportunity of profit from its beneficial effects. That's what we want to figure out next".

More information:
http;//onlinelibrary.wiley.com/doi/10.1111/acel.12075/

Provided by University of Montreal