Medical Xpress

Common diabetes drug may 'revolutionize' cancer therapies

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Researchers at McGill University and the University of Pennsylvania have discovered that a widely used anti-diabetic drug can boost the immune system and increase the potency of vaccines and cancer treatments. Their findings will be published June 3 in the journal *Nature*.

The discovery was made by Dr. Russell Jones, an assistant professor at McGill's Goodman Cancer Centre and the Department of Physiology, Faculty of Medicine, Yongwon Choi, PhD, professor of pathology and laboratory medicine, and postdoctoral fellow Erika Pearce, PhD, of the University of Pennsylvania. They discovered that the widely prescribed diabetes treatment metformin increases the efficiency of the immune system's T-cells, which in turn makes cancer and virus-fighting vaccines more effective.

The specialized white blood cells of the human immune system known as "T-cells" remember pathogens they have encountered from previous infections or vaccinations, enabling them to fight subsequent infections much faster. This "immunological memory" has been the subject of intense study for many years, but until now the underlying cellular mechanisms behind it were not well understood. Now, the researchers say, they can use diabetic therapies to manipulate T-cell response and enhance the immune system's response to infections and cancer alike.

"Many genes involved in diabetes regulation also play a role in cancer progression," Jones explained. "There is also a significant body of data suggesting that diabetics are more prone to certain cancers. However,

our study is the first to suggest that by targeting the same metabolic pathways that play a role in diabetes, you can alter how well your immune system functions."

"We serendipitously discovered that the metabolizing, or burning, of fatty acids by T-cells following the peak of infection is critical to establishing immunological memory," Pearce added. "We used metformin, which is known to operate on fatty-acid metabolism, to enhance this process, and have shown experimentally in mice that metformin increases T-cell memory as well as the ensuing protective immunity of an experimental anti-cancer vaccine."

Few talk about cancer and diabetes in the same breath. However, recent advances have uncovered common links between cancer and diabetes, in particular how metabolic pathways, the basic chemical reactions that happen in our cells, are controlled in these diseases. The recent findings suggest a new link between the metabolic pathways deregulated in cancer and diabetes and their role in immune cell function. The results suggest that common diabetic therapies which alter cellular metabolism may enhance T-cell memory, providing a boost to the immune system. This could lead to novel strategies for vaccine and anti-cancer therapies.

"Our findings were unanticipated, but are potentially extremely important and could revolutionize current strategies for both therapeutic and protective vaccines," Choi said.

Source: McGill University (news : web)