Using CD47's protection to deliver anti-cancer drugs directly to tumor cells

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Ching-An Peng with students in his lab. Peng is studying new ways to get chemotherapy drugs to the site of a tumor.

(Medical Xpress)—For most of their natural lives, red blood cells hide safely under the radar of the body's immune system, thanks to a cloak of "don't eat me" protein called CD47. Ching-An Peng of Michigan Technological University wants to co-opt that clever trick to fight cancer.

Voracious white blood cells called macrophages normally protect

organisms by engulfing cell debris and pathogens. However, if they encounter something covered with CD47, such as a red blood cell, they tend to leave it alone. "I thought, 'Why not use CD47 to help deliver drugs?" said Peng. "We could camouflage them and avoid the immune response."

Nanoparticles hold great promise for delivering anti-cancer drugs directly to the site of a tumor. Getting them there, however, has been problematic, since macrophages stand at the ready to scoop the particles out of the blood stream before they can get to the the tumor and drop their cargo. Peng theorizes that if drug-bearing nanoparticles were coated with CD47, they could make it to the tumor unmolested.

CD47 also brings another weapon to the war against cancer. It binds to a special kind of protein found on tumors called an integrin. This integrin is involved with the network of abnormal blood vessels that form around the tumor, blood vessels that provide the cancer with nutrients to fuel its out-of-control growth.

Thus, properly designed CD47-coated nanoparticles might deliver a one-two punch to cancer by 1) delivering chemotherapy drugs and 2) choking off its food supply.

Research by Peng and his colleagues is in its early stages. They are using E. coli bacteria to mass produce CD47 in the lab using recombinant DNA technology. The next step will be to attach it to nanoparticles and expose them to macrophages, to see if the macrophages eat them up or—hopefully—ignore them.

Provided by Michigan Technological University