

Green tea as a therapeutic delivery system for anticancer drugs

April 15 2015



Credit: AI-generated image ([disclaimer](#))

The humble cup of tea has long been regarded as a cure-all for the hustle and bustle of modern life. Now, researchers from the A*STAR Institute of Bioengineering and Nanotechnology have identified another benefit of tea—they have successfully used a major component of green tea, a catechin derivative, as the basis for a delivery system for anticancer

drugs.

Delivering a drug to a targeted site in the body requires a 'carrier'—a compound that encases the drug. However, optimizing the drug-to-carrier ratio can be a major challenge. "This ratio is a stumbling block in carrier design because the carrier itself provides no therapeutic effect," explains Jackie Ying. "Furthermore, high quantities of the carrier may lead to problems associated with drug toxicity and metabolism."

To overcome this problem, Ying, along with Joo Eun Chung, Motoichi Kurisawa and other co-workers, have designed a drug carrier that possesses therapeutic effects.

The scientists identified a catechin derivative in green tea known as epigallocatechin gallate (EGCG), which has documented [anticancer effects](#), as the most promising carrier candidate. They used EGCG as the basis for 90-nanometer-diameter micellar nanocomplexes to deliver the anticancer protein drug Herceptin directly to tumors. The researchers did this by oligomerizing EGCG and then binding it to Herceptin, which formed the core of the micellar nanocomplexes. Finally, they formed the outer shells of the micellar nanocomplexes by binding polyethylene glycol–EGCG to the cores.

The team then tested the anticancer efficacy of the micellar nanocomplex both in vitro and in the body against a human breast cancer cell line and compared it with that of free Herceptin. The results were encouraging. "The carrier-delivered protein drugs significantly reduced tumor growth and were more effective against tumors than the [drug](#) by itself," Chung reports.

Cancer is not the only potential target for this [drug delivery system](#). "EGCG binds to many biological molecules, such as proteins, peptides and genes, and this is responsible for its many beneficial activities,"

notes Kurisawa. In particular, EGCG is known to be beneficial for cardiovascular and metabolic health; it also exhibits anti-HIV effects as well as neuro- and DNA-protective effects. "Our [green-tea](#)-based nanocarrier has the potential to deliver a variety of proteins, genes or drugs to improve the treatment of other diseases besides cancer," remarks Chung.

The team now intends to conduct clinical trials so that it will benefit cancer patients.

More information: "Self-assembled micellar nanocomplexes comprising green tea catechin derivatives and protein drugs for cancer therapy." *Nature Nanotechnology* 9, 907–912 (2014).
[dx.doi.org/10.1038/NNANO.2014.208](https://doi.org/10.1038/NNANO.2014.208)

Provided by Agency for Science, Technology and Research (A*STAR), Singapore

Citation: Green tea as a therapeutic delivery system for anticancer drugs (2015, April 15) retrieved 24 April 2024 from
<https://phys.org/news/2015-04-green-tea-therapeutic-delivery-anticancer.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.