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Singapore develops swallowable nanocage for targeted gastric cancer therapy

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Researchers from the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), have developed a swallowable nanoscale delivery platform designed to transport therapeutic enzymes through the stomach's acidic environment and activate a cancer-killing reaction at tumour sites.

Early preclinical findings suggest that the approach may offer a new strategy for treating gastric cancer more precisely while reducing damage to healthy tissue.

According to the Global Cancer Statistics, gastric cancer is the fifth most common cancer worldwide and the fourth leading cause of cancer-related death globally . It remains one of the hardest cancers to treat, as it is often found late, can spread quickly, and may not always respond well to surgery or chemotherapy. One longstanding challenge has been how to deliver treatment directly to tumours in the stomach without degrading the therapy or affecting surrounding healthy tissue.

The acid and digestive enzymes in the stomach can break down fragile protein-based treatments before they reach their target. To overcome this, the team engineered disulfide linked thermostable exoshells, or DS-tES, which are hollow protein nanocages about 15 nanometres in diameter, strengthened with carefully designed chemical links.

The team's approach activates necroptosis, a regulated form of cell death that may help overcome some forms of treatment resistance.

The team's next steps include further investigation into the safety profile of necroptosis-based therapy, optimisation of the platform, and additional studies to assess its potential for future clinical translation.