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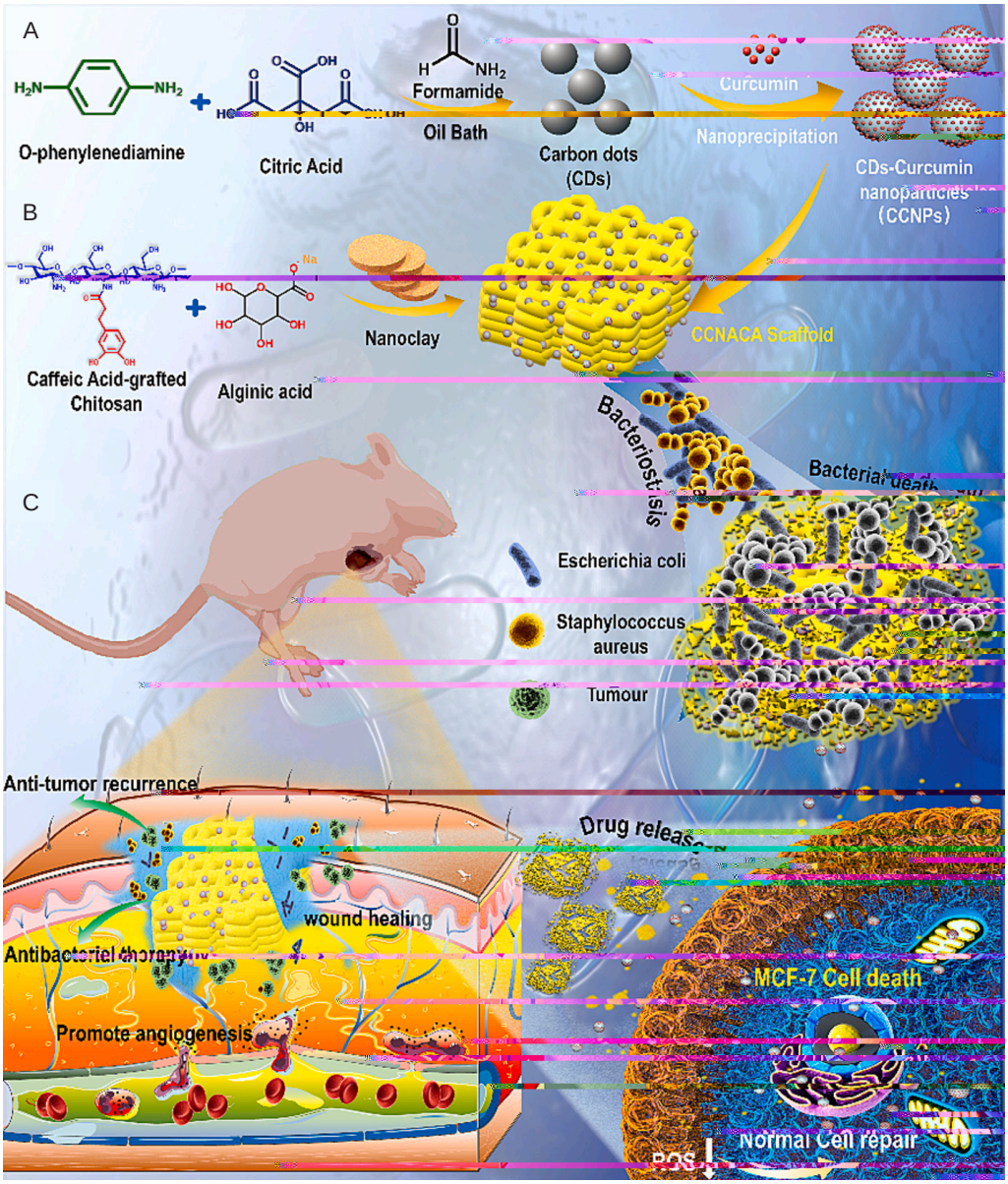
Fan, J.; Wang, M.; Wang, X. The potential of three-dimensional printed stents in post-operative treatment of breast cancer. *Biomater Transl.* , *5*(3), 331-333.

Breast cancer is among the most frequent cancers; it mostly strikes women and ranks second in female cancer fatality rates, behind only lung cancer.[1] There is a need to create efficient treatments to eradicate leftover tumor cells because, although surgery has been the predominant clinical treatment technique for cancer, local tumor recurrence and metastasis may still occur following surgery.[2] Typically prescribed as a neoadjuvant or auxiliary treatment to surgery, chemotherapy is a frequent and successful method of treating many cancer types.[3] Systemic chemotherapy for breast cancer typically involves high dosages, which is associated with unpleasant side effects that are particularly noticeable, and chemotherapy treatment efficacy is poor. Chemotherapy resistance is easy to relapse.[4] Based on patient requirements, local chemotherapy can help reconstruct after breast cancer surgery, which is one area where systemic chemotherapy falls short. The biomedical area, particularly medication distribution, has benefited greatly from the advancements made possible by three-dimensional (3D) printing technology, a relatively new manufacturing technique. The ability to quickly and precisely customise one-of-a-kind things is the main selling point of 3D printing.[5, 6]

In a recent paper published in *Carbohydrate Polymers*, Su et al.[7] utilised a straightforward nanoprecipitation technique to create the nanotherapeutic medication carbon dots-curcumin nano-drug release from carbon dots and curcumin as inputs. By combining carbon dots-curcumin nanoparticles with chitosan, sodium alginate, and nanoclay, they created a novel local drug delivery system. The stent's luminescence performance and biocompatibility are both excellent. The 3D printed composite scaffold based on drug delivery scaffold (McF.7) not only considerably increased the tumor suppression rate of breast cancer cells, but it also demonstrated this in the 14-day *in vitro* drug release assay. Its antimicrobial activity is also excellent in the long run. Furthermore, this scaffolds have demonstrated in animal studies that they may increase angiogenesis, decrease inflammation, and inhibit postoperative residual cancer cells when implanted in surgical defects. This allows for the repair of surgically-caused tissue abnormalities. Furthermore, there have been reports of 3D printing being used to treat breast cancer in other publications.[4, 8-11]

However, some concerns remain. Firstly, the biocompatibility and degradability of this material are important issues to be considered in practical applications. If the biocompatibility of the material is poor, it may lead to local inflammation or rejection, which will affect the therapeutic effect. In addition, if the degradation rate of the material is too fast or too slow, it may affect the release rate of the drug and the therapeutic effect. Second, the precise control of drug release is also a challenge. After breast cancer surgery, the physiological environment and drug requirements of local tissues can change, so there is a need for a stent that can precisely control the rate and dosage of drug release. However, current 3D printing technology may not yet be able to achieve this highly precision control.

3D printing was initially used for process optimisation and industrial prototyping and was developed from stereolithography in the late 1980s. With the development of various additive manufacturing, 3D printing has become more prominent in biomedical research and has gradually become an interdisciplinary research field for bioengineering and pharmaceutical majors. Proving the ability of 3D printing technology to provide complex and personalised dosage forms, Spritam® was the first 3D printed



Schematic diagram of CCNACA scaffolds for postoperative treatment of breast cancer and antibacterial performance evaluation. (A) Preparation of CDs and CCNPs. (B) Preparation of CCNACA scaffolds and their antibacterial properties *in vitro*. (C) Effects of CCNACA scaffolds on wound healing, tumour recurrence, and angiogenesis after tumour implantation in mice. Reprinted from Su et al.[7] Copyright 2023 Published by Elsevier Ltd. CCNACA: a local drug delivery platform synthesised by CCNPs, sodium alginate, nanoclay and caffeic acid grafted chitosan; CCNP: carbon dots-curcumin nanoparticle; CD: carbon dot; ROS: reactive oxygen species.

drug approved by the U.S. Food and Drug Administration in 2015.[12] Based on these advantages, 3D printed polymer scaffolds for breast reconstruction and wound healing also offer great potential for the development of multi-functional implantable devices, ultimately enabling efficient and harmless cancer treatment. Despite the many advantages of using implantable drug delivery devices to treat breast cancer, they are still not used in clinical practice. The study shows that our experimental results are relevant to devices implemented in two-dimensional and 3D tumour models. So, need to further study better animal models, such as animals and humanised mice immune function. In addition, more research is needed on the selection of materials. Getting the right material for implantable devices so that they do not cause adverse effects on the body, do not react with drugs, make the device easier to remove, or make the final device easily absorbed by the body remains a challenge. Therefore, the realisation of 3D printing implantable drug delivery devices has more profound significance in the accurate control of drug release dynamics, improved drug efficiency, and targeted drug delivery.

JF conceived and draft the manuscript; MW, and XW reviewed and edited the manuscript. Both authors approved the final version of the manuscript.

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None.

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