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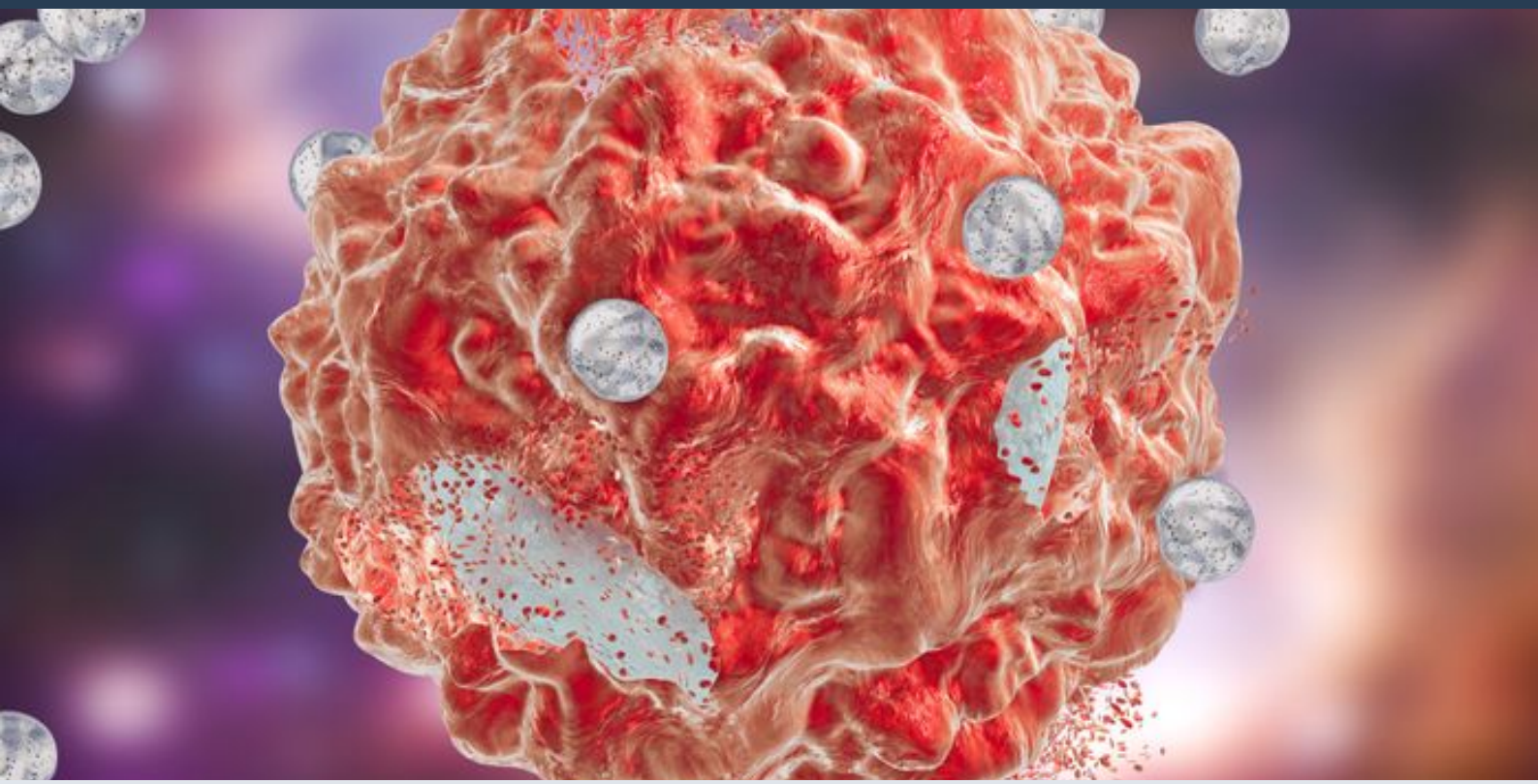
Calcium-phosphate-citrate Nanoparticles as Anticancer-agents

Therapy for pleural tumors based on calcium phosphate and citrate administered as amorphous nanoparticles

Reference: CPCs



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IP Status

Patent application submitted, Patented

Seeking

Development partner, Commercial partner, Licensing, Seeking investment

About **LMU Munich**

Ludwig-Maximilians-Universität München is the University in the heart of Munich. LMU is recognized as one of Europe's premier academic and research institutions. The LMU Munich community is engaged in generating new knowledge for the benefit of society at large.

Background

Conventional chemotherapy leads to severe adverse effects since it involves systemic administration of toxic drugs at high dosage. Unlike traditional chemotherapeutics, calcium phosphate and citrate have both been discussed as very promising anticancer agents and are not inherently toxic. Yet, their breakthrough has been hampered by the lack of an administration approach that overcomes the strict regulatory mechanisms of the cell. To address this, LMU researchers developed a combinatorial administration of calcium phosphate and citrate as colloidal, amorphous nanoparticles (CPCs)) that selectively kill cancer cells without the involvement of inherently toxic drugs.

Such selectivity is important in the treatment of pleural tumors. They are often highly aggressive and rapidly growing. Their proximity to the lung requires highly selective anticancer agents to avoid adverse effects. Such a selective anticancer agent is an urgent, yet unmet clinical need. This need is addressed here with the calcium-phosphate-citrate nanoparticles.

Tech Overview

The technology describes the synthesis of mesoporous, amorphous calcium-phosphate-citrate nanoparticles, which are taken up by cancer cells via endocytosis mediated by a lipid-coating of the nanoparticles. After cellular uptake, the nanoparticles degrade readily due to their amorphous, mesoporous character. Subsequently, they are released into the cytosol of cancer cells, where they induce apoptosis. This happens selectively in cancer cells.

One application of the described nanoparticles is the treatment of pleural tumors. Their efficacy and the absence of side effects upon pleural injection could be confirmed in proof-of-concept mouse experiments (details see publication). In principle, the application is not limited to pleural tumors, but can be extended to the treatment of other tumors as well.

Further Details:

- C. von Schirnding, I. Giopanou, A. Hermawan, L. Wehl, G. Ntaliarda, B. Illes, S. Datz, F. Geisslinger, K. Bartel, A. Sommer, M. Lianou, V. Weiß, J. Feckl, A. M. Vollmar, C. Bräuchle, G. T. Stathopoulos, E. Wagner, A. Roidl, T. Bein, H. Engelke, (2021), “Synergistic Combination of Calcium and Citrate in Mesoporous Nanoparticles Targets Pleural Tumors”, Chem, 7, 480-494 https://doi.org/10.1016/j.chempr.2020.11.021

Stage of Development

- Proof of Concept (efficacy and toxicity) confirmed in mice

Benefits

- Treatment of pleural tumors possible
- Very low side effects due to absence of inherently toxic materials
- Not limited to pleural tumors
- No further screening for leads/hits necessary

Applications

- Treatment of pleural cancers
- Treatment of other types of cancer possible (confirmed *in vitro*, not *in vivo*)

Opportunity

- Seeking opportunities for pre-clinical and clinical studies
- Licensing or cooperation agreement

Patents

- Patent family: WO2017025359A1

For further information, please contact us.

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