Cinnamaldehyde-based nanomedicine platform for rheumatoid arthritis treatment

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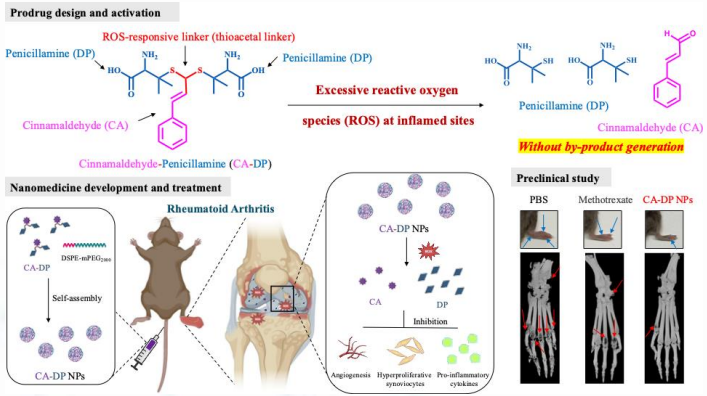

Technology

The application of traditional anti-rheumatic medicines for rheumatoid arthritis management faces challenges from the limited therapeutic efficacy and unfavorable systemic adverse effects due to the lack of targeting ability, poor stability and solubility. Here, we invented a reactive oxygen species-responsive cinnamaldehyde-penicillamine prodrug. The prodrug can self-assemble into nanoparticles, which target inflamed joints and release two drug molecules without byproduct generation. The combination therapy exhibits superior therapeutic efficacy against rheumatoid arthritis compared to conventional drugs. The prodrug strategy ensures the stability and safety of the two drugs.

Key Advantages

- The prodrug uses cinnamaldehyde, a food additive, as an antirheumatic agent.
- The prodrug consists of two drug molecules only and forms nanoparticles for targeted delivery to inflamed sites.
- Activation of the prodrug releases two drugs without byproducts. The combination therapy exhibits superior therapeutic efficacy against rheumatoid arthritis compared to conventional drugs.

Intellectual Property

US Provisional Patent (No. 63/723,216, 2024)
US Patent (No. 18/569,361, 2023)
CN Patent (No. 202280048951.9, 2022)

Stage of Development

- Injection system: Animal studies completed
- One start-up company established based on the platform

Opportunities

- New therapeutic agent for rheumatoid arthritis treatment
- Development of oral dosage form
- Potential to treat other diseases including obesity, cancer, and more.

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