Virus-mimetic nanoparticles for diabetic nephropathy

Reference No: B79122

CHALLENGE

Poor target cell specificity is currently a major shortcoming of nanoparticles used for biomedical applications. It causes significant material loss to off-target sites and poor availability at the intended delivery site. To overcome this limitation, designed nano-particles that identify cells in a virus-like manner could provide a solution to this problem.

INNOVATION

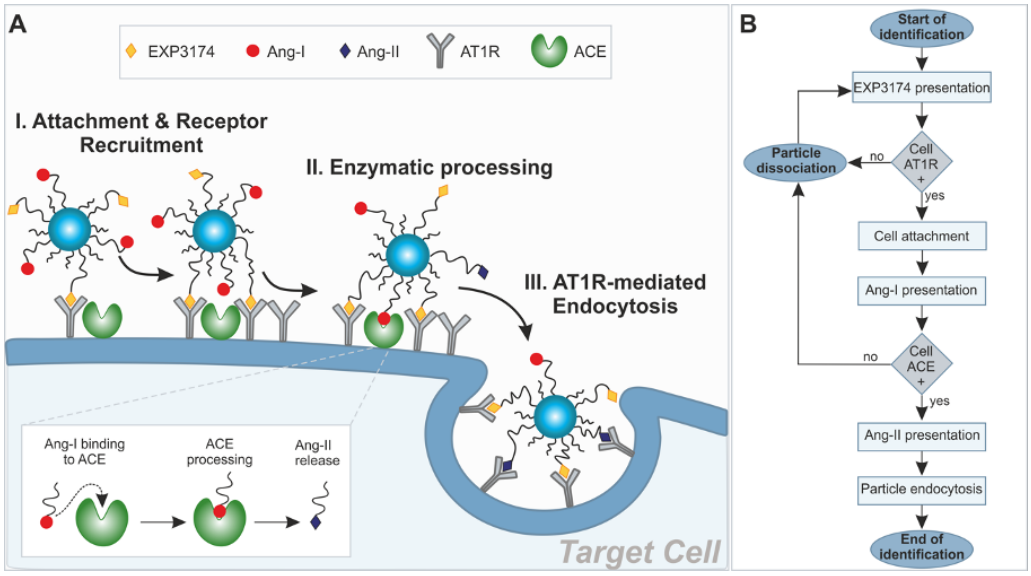
The invention described here involves virus-mimetic nanoparticles that are able to transport drugs into the mesangium of the kidney. The nanoparticles use a novel sequential recognition process that is used in a similar way by viruses to recognize their target cells. In contrast to other nanomaterials, the virus-mimetic particles are able to effectively accumulate in the cells of the mesangium. By encapsulating drug candidates such as pirfenidone or cinaciguat, a rational treatment of diabetic nephropathy can be promised for the first time, which occurs in 40% of the more than 400 million people with diabetes worldwide and for whom there is currently no treatment option other than dialysis and organ transplantation.

COMMERCIAL OPPORTUNITIES

Drug Delivery for Diabetic Nephropathy

DEVELOPMENT STATUS

Proof of Concept with mesangial cells



Virus-mimetic attachment and target cell recognition. NPs carrying EXP3174 and Ang-I on their corona (NPEXPAng-I) attach to the cell membrane through EXP3174-mediated AT1R-binding. Specific recognition is triggered through enzymatic Ang-I processing and Ang-II-mediated internalization.

REFERENCES:

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2 Maslanka Figueroa, S., Fleischmann, D., Beck, S., Tauber, P., Witzgall, R., Schweda, F., & Goepferich, A. (2020). *Nanoparticles Mimicking Viral Cell Recognition Strategies Are Superior Transporters into Mesangial Cells. Advanced Science,*

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