

Coating of Catheter-based Cardiac Devices using TRPC6 Inhibitors for Prevention of Restenosis

Reference No: B79124

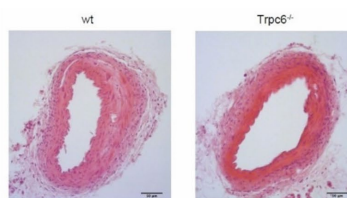
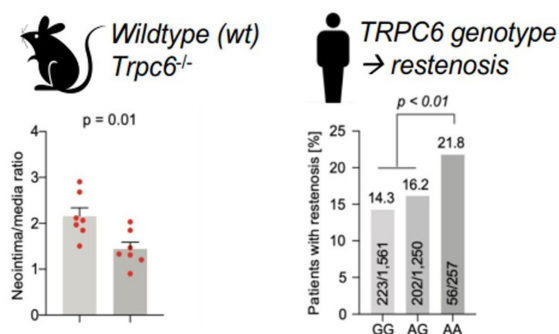
CHALLENGE

Stent implantation and balloon angioplasty constitute the most commonly used interventional coronary procedures in cardiovascular medicine. A central problem of, e.g., coronary and peripheral vascular interventions is the consecutive re-narrowing of the previously opened vessel area due to excessive formation of scar tissue. A narrowing of more than 50% of the vessel diameter is called restenosis, which occurs in 15-20% of patients using contemporary balloon and stent technologies. To prevent this from happening, stents and balloons are coated with compounds such as the chemotherapy medication paclitaxel or those related to the immunosuppressant rapamycin all of which have an anti-proliferative effect on the vascular cells, for example vascular smooth muscle cells. However, these compounds have non-specific inhibitory effects on proliferation on all surrounding cell types including endothelial cells. In addition to cell proliferation, migration is also a crucial pathophysiological process that is inadequately represented by coatings currently in use.

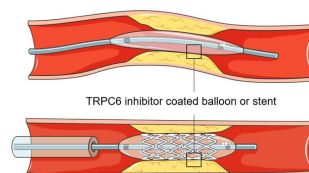
INNOVATION

The invention describes the local application of inhibitors of the calcium channel TRPC6 (transient receptor potential channel 6) to stents, balloons, and microcatheters. Apart from preventing the proliferation of vascular smooth muscle cells, they also inhibit their migration, which is a prerequisite for restenosis. Expression of TRPC6 is only increased in vessels in early acute phases of vascular injury. The local application of TRPC6 inhibitors on coronary devices therefore facilitates a specific and local therapeutic application on injured vascular tissue and prevents the formation of scar tissue (neointima).

Validation of TRPC6 as a target



Reduced formation of scar tissue after wire injury in femoral arteries of female $Trpc6^{-/-}$ mice compared to wild-type mice.



COMMERCIAL OPPORTUNITIES

Coating catheter-based cardiovascular devices, e.g. stents or balloons, with TRPC6 inhibitors is a promising strategy to prevent restenosis secondary to vascular injury and stent implantation.

- Dual anti-proliferative and anti-migratory effect on vascular smooth muscle cells
- Increased specificity compared to current pharmacologic approaches with reduced side effects on surrounding tissue
- Applicable together with coating currently in use for improved efficacy

DEVELOPMENT STATUS

Proof-of-concept

REFERENCES:

- 1 doi: 10.1093/eurheartj/ehab140