Novel coating of catheter-based cardiac devices

Stent implantation and balloon angioplasty constitute the most commonly used interventional coronary procedures in cardiovascular medicine. A central problem 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.

Preventing instent-restenosis by inhibiting TRPC6

IP RIGHTS
Nationalization phase in EP and US
2022

Coating catheter-based cardiovascular devices with TRPC6 inhibitors is a promising strategy to prevent restenosis by blocking proliferation and migration of vascular smooth muscle cells.

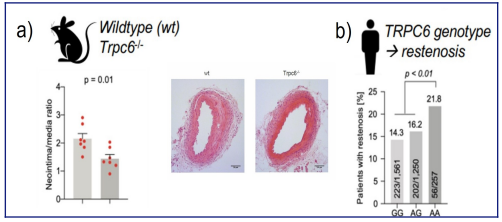
01 Dual anti-proliferative and anti-migratory effect on vascular smooth muscle cells

02 Complementary with currently-used coatings for improved efficacy

03 Increased specificity and reduced side effects on surrounding tissue

04 Proof-of-concept shown, in vivo data using a rabbit model planned

REFERENCES:
Wierer et al., 2021, European Heart Journal



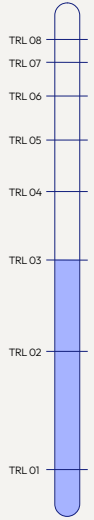
a) Trpc6 –/– mice present reduced formation of scar tissue compared to wild-type mice after wire injury in femoral arteries b) Homozygous carriers of a common genetic variant associated with elevated TRPC6 expression are at increased risk of restenosis after coronary stenting.

CHALLENGE

Compounds such as the chemotherapy drug paclitaxel or the immunosuppressant rapamycin are used to coat stents and balloons. They all have an anti-proliferative effect on the vascular cells, e.g. vascular smooth muscle cells, but a non-specific inhibitory effects on proliferation on surrounding cells including endothelial cells. In addition, migration is also a pathophysiological process that is inadequately represented by coatings in use but a prerequisite for scar tissue formation.

INNOVATION

To detect key drivers of vascular remodelling and to develop new strategies for prevention and therapy of restenosis, high-accuracy proteomic measurement of single femoral arteries in mice after wire-induced injury was used to identify the classical transient receptor potential channel 6 (TRPC6) as a protein driving restenosis formation. Expression of TRPC6 is only increased in vessels in early acute phases of vascular injury. Local application of TRPC6 inhibitors on coronary devices therefore facilitates a specific therapeutic application on injured vascular tissue and prevents formation of scar tissue.



01 Basic principles observed · **02** Technology concept formulated · **03** Experimental proof of concept · **04** Technology validated in lab · **05** Technology validated in relevant environment · **06** Technology demonstrated in relevant environment · **07** System prototype demonstrated in operational environment · **08** System complete and qualified

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