Ex-vivo endothelium-stent contact model

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Organisation

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Country Belgium

Geographical Area Brussels Region

Partners and collaborations

Université Catholique de Louvain (UCL)

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Rat
Type of cells/tissues/organs	Thoracic aorta

DESCRIPTION

Method keywords

endothelial dysfunction

coronary stent

reactive oxygen species

oxidative stress

nitric oxide

corrosion

biodegradable materials

vascular tissue

Scientific area keywords

Material Science

Toxicology

cardiovascular

biomaterials

biocompatible

Method description

The *ex-vivo* endothelium-stent contact model allows measuring the impact of implants on the arterial tissue. The endothelium is directly exposed by inserting a wire made of the investigated material into the lumen of the aortic ring to mimic the contact between the coronary stent and the endothelium. The impact of degradation and corrosion products is evaluated by measuring the vasorelaxation induced by carbachol. Many fundamental aspects, such as endothelium dysfunction, oxidative stress and nitric oxide levels, can be evaluated with this assay. This method was developed for iron-based materials, but it may act as a point of reference for similar studies in other systems.

Lab equipment

Organ bath (for vasorelaxation analysis) ;

PCR (for gene oxidative stress expression analysis) ;

EPR (for nitric oxide production) ;

WB (for protein analysis).

Method status

Internally validated

PROS, CONS & FUTURE POTENTIAL

Advantages

- Simple ;

- Minimises the number of animals used per experiment ;

- Avoids other variables such as the structure of the stent ;

- There is a margin for the creativity as many changes can be made such as adding inducers/inhibitors to the system, using healthy or diseased tissue, or indirect exposure to the material.

Challenges

Rat aortic rings can be maintained alive for a limited time (~10h).

Future & Other applications

- Other materials ;

- Similar studies in other systems.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

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