

# Ex-vivo endothelium-stent contact model

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## SCOPE OF THE METHOD

<b>Alternative method relates to</b>	Human health
<b>Alternative method is situated in</b>	Basic Research
<b>Type of alternative method</b>	In vitro - Ex vivo
<b>This method makes use of</b>	Animal derived cells / tissues / organs
<b>Species from which cells/tissues/organs are derived</b>	Rat
<b>Type of cells/tissues/organs</b>	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

### Associated documents

## PARTNERS AND COLLABORATIONS

### Organisation

**Name of the organisation** UCLouvain

**Department** IREC, LTAP

**Country** Belgium

**Geographical Area** Brussels Region

*Coordinated by*



*Financed by*

