

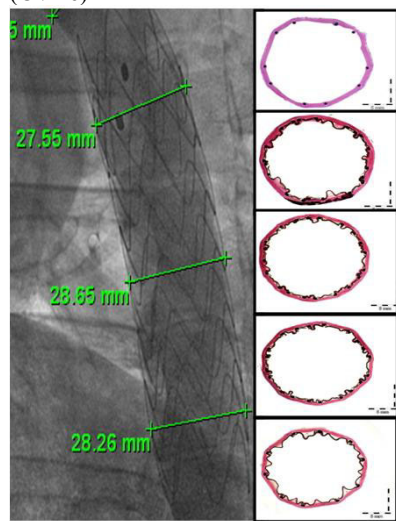
Evaluation of Emerging technologies (Stents and Valves) in Animal Models: Biological Responses, Time Points and Beyond

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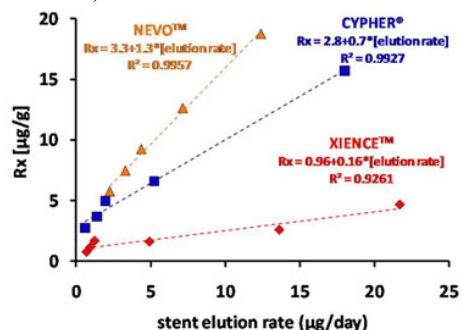
Introduction: The proof of performance concept, safety and efficacy of emerging technologies is best evaluated in animal models. Though increasing sophistication in device development, animal medicine, and model design has provided sophisticated tools preclinical models for endovascular stents and percutaneous valves remain a challenge. Accepted models are limited as evolving technology is extended into arteries of smaller diameter, increased tortuosity, bifurcations and use with multiple stents. Percutaneous valves present structural and geometric demands as well. Quantification of effect creates further needs with far greater attention paid than ever before to precise definition of device performance.

For all technologies biological responses must be evaluated acutely and chronically. Thus, the animal model choice will depend on the device and the parameters that need to be evaluated.

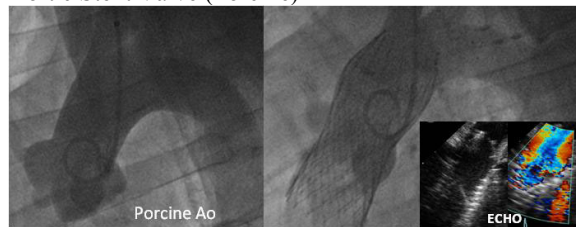
Aortic Aneurysm Stent Graft 30 day Vascular Response (Ovine)



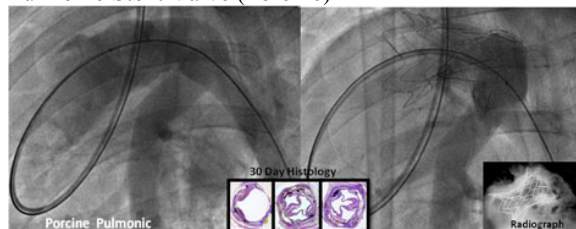
Tissue Drug Content vs. In-Vivo Stent Elution (Porcine or Rabbit)



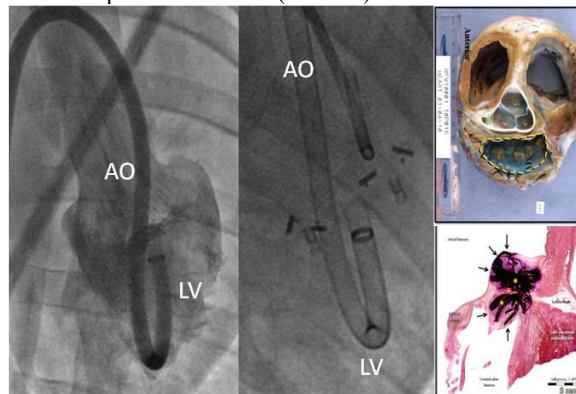
Aortic Stent Valve (Porcine)



Pulmonic Stent Valve (Porcine)



Mitral Repair Stent Valve (Porcine)



Conclusions: Cardiovascular sciences and device development demand precise, reproducible animal models with quantifiable metrics. These systems do not mimic human disease – they allow for examination of mechanism of action and provide assurance of safety and insight into efficacy. As device development and innovation accelerate the challenges and demands on models rise as well. We live in a golden age of inspiration and development and exciting time for biomedical sciences.

References:

- B. Falatico et al., EuroInterven 2009
- Groothuis., TCT 2010
- L. Perkins et al., J Interven Cardiol 2009
- Tzafiriri , TCT 2010