Swine (Sus scrofa) have been used as a model for the human disease and medical advancement dating back to the 2nd century C.E. Given the anatomic and physiologic similarities to humans, research in pigs has contributed to the development of interventional devices and therapies. With the recent decoding of the swine genome and improving tools of genetic manipulation, we are entering an era where customized porcine models of disease can be efficiently produced. Utilization of transgenic swine may provide an ideal preclinical platform to drive the next generation of image-guided interventions.

### Pigs in Classical Medicine

Medical research in swine dates back to the works of Galen, whose studies defined medical knowledge for a millennium and a half. Through vivisection of pigs, Galen determined that the brain, spinal cord, and nerves controlled sensation, and movement (Figure 1). In the 18th century, Leonardo da Vinci visited slaughtermen where he observed that a knife driven down the heart of the pig moved in synchrony with pulsating blood. Da Vinci surmised that the heart was a muscle, a theory he later demonstrated with detailed anatomic drawings and functional studies using a glass model of the heart and aorta (Figure 2).

After the discovery of insulin, purification of the hormone from swine and bovine pancreas in industrial quantities became the primary source of medicinal insulin for much of the 20th century. Given the anatomic and physiologic similarities, pigs have been used as a model for the human disease and medical responses of the human analog.[7, 8]

### Porcine Comparative Anatomy and Physiology

Swine as an animal model in interventional radiology in the post-genomic era

#### Swine and the Growth of Interventional Radiology

Interventional radiology emerged as a specialty in the 1960s. Classically, the pig liver has six anatomic segments. By Couinaud functional definition of hepatic segments, the porcine liver can be broken down into eight functional segments with individual biliary drainage, venous outflow, and arterial supply. Similar to the human physiological response, perfusion of the porcine liver by the dominant hepatic portal versus blood flow is inversely proportion to hepatic arterial flow. [12]

### Conclusion

Pigs have played an important role in the history of medicine and more recently to many innovations in the growth of Interventional Radiology. In the post-genomic era of swine, we now have the opportunity to efficiently produce customized swine genetic models that more faithfully recapitulate human disease anatomically, physiologically and genetically. It is important for Interventional Radiology to recognize the importance and utility of porcine genetic models and become involved in the tailoring of genetic models to our clinical interests. Genetic porcine models of human cancer (“oncopigs”) are currently under development and may provide a crucial preclinical platform to the development of the next generation of interventional therapies in oncology. Additional potential genetic models of interest to Interventional Radiology include liver fibrosis, hereditary hemorrhagic telangiectasia and vascular disease.

### Literature Cited


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**Swine and the Growth of Interventional Radiology**


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