

According to the statistics of the American Heart Association (AHA), coronary artery disease (CAD) remains the leading cause of death for men and women in the United States. The current gold standard for the diagnosis of hemodynamically significant CAD in vivo is selective X-ray coronary angiography. However, X-ray coronary angiography has a few disadvantages. X-ray coronary angiography only describes luminal vessel alterations. Relevant information about the coronary artery vessel wall can not be obtained. Furthermore, a small but significant risk of complications exists: invasiveness, radiation exposure for both the patient and physician have to be considered, iodinated contrast agents are needed and the procedure is expensive. In addition, up to 40% of patients who undergo X-ray coronary angiography are found to have no significant coronary artery lumen stenosis. For these reasons, there is a strong need for alternative non-invasive techniques which are more cost effective, and which provide not only information about the vessel lumen but also about the vessel wall without the need for ionizing radiation. Coronary magnetic resonance imaging (coronary MRI) offers several advantages. It has a relatively high spatial resolution, high soft-tissue contrast and the ability to generate images in any three-dimensional plane without the need for ionizing radiation. Other advantages of coronary MRI are the possibility for repeated measurements and the ability to simultaneously assess the coronary lumen, the coronary vessel wall and even blood-flow in the coronary circulation.

Objectives:

- 1.) Understand the rationale why coronary MRI provides a valuable alternative.
- 2.) Understand the challenges associated with MRI of the coronary arteries.
- 3.) Learn about the current status of coronary MRI in comparison to the gold standard