Background

The spectrum of cardiovascular disorders can only be understood at a higher level by assessing blood flow dynamics, wall mechanics, and tissue characterization which are sensitive to the complex abnormalities at play. Unfortunately, the majority of non-invasive imaging approaches available today are limited to the assessment of morphology, while invasive approaches only provide local measures. This severely hampers cardiovascular diagnostics and our understanding of cardiovascular physiology.

The group

The multidisciplinary Cardiovascular Magnetic Resonance (CMR) research group at Linköping University aims through its work to gain incremental insight into the cardiovascular system in health and disease by development and application of novel imaging methods for quantification of blood flow, wall motion, and tissue characterization. The group is headed by professor Tino Ebbers, Ph.D., adjunct professor Jan Engvall, M.D., Ph.D. and associate professor Carl-Johan Carlhäll, M.D., Ph.D.

Over the years, we have extended the diversity of magnetic resonance imaging and utilized it to study blood flow patterns, turbulence intensity, myocardial deformation, and tissue characterization, but we also make use of other imaging modalities like ultrasound and computer tomography. By combining these unique imaging data, both clinical and experimental, with biomechanical modeling principles, and molecular biology data, novel assessments approaches and new insights into cardiovascular function and disease are obtained. Current collaborations are with CMR groups at, amongst others, Oxford University and at UCSF.

Significance

Advanced assessment of cardiovascular blood flow, wall motion, and tissue characterization has the potential to provide earlier and more accurate detection, improved treatment planning and follow-up of a spectrum of cardiovascular disorders, leading to optimized treatment of the individual patient, a better patient quality of life and reduced healthcare spending.

Our clinical focus lies on heart failure, valvular heart disease and congenital heart disease. Some selected papers are listed chronologically to the left!