PRECESSING AT MILE HIGH:
Cardiac MRI at Children’s Hospital Colorado, Aurora, CO

FUN FACTS ABOUT US

- Children’s Hospital Colorado, Aurora:
  - Ranked in top 10 Best Children’s Hospital by US News
  - Pediatric Cardiology ranked #15
  - We are the largest children’s hospital in Colorado, and are the major referring centers for Wyoming, Montana, and New Mexico
- Cardiac MRI Program Founding year: 2004
- How many MRIs do we do per year? Over 400 and counting!

Facilities:
- Located 5,471 feet above sea level
- MRI Program
  - Four scanners at the main campus
  - Three outreach scanners
  - One dedicated research scanner
  - Dedicated MRI technicians
- Thriving research program located on the University of Colorado Hospital and Research Complex on the Anschutz Medical Campus

THE TEAM

The Clinicians
- Brian Fonseca, MD, Director of Cardiac MRI
- Uyen Truong, MD
- Lorna Browne, MB, MRCP, FRRCSCI
- Michael DiMaria, MD
- Chad Stewart, MD
- LaDonna Malone, MD

The Bioengineers
- Kendall Hunter, PhD
- Vitaly Kheyfets, PhD
- Michel Schafer
- Melanie Dufva
- Kyle Kenyon
- Frank Aygiet-nim

RESEARCH FOCUS

- Characterization of vascular function in pediatric pulmonary hypertension
- Comparison of hemodynamic data by MRI vs right heart catheterization in pediatric pulmonary hypertension
- Ventricular mechanics in pediatric pulmonary hypertension through the combination of non-invasive MR, invasive hemodynamics and computational modeling.
- Determination of ventricular-vascular coupling ratio by MRI in pediatric pulmonary hypertension
- Use of 4D Flow in Pediatric Pulmonary Hypertension
- The role of vascular maturation in the progression of pulmonary hypertension
- Development of MRI-possible exercise ergometer
- Detection of early cardiovascular changes in adolescents with type 1 diabetes
- Demonstrating small vessel disease in high risk Kawasaki patients using myocardial reserve perfusion index
- Stroke volume analysis using phase sensitive inversion recovery in fetuses with Twin Twin Transfusion and congenital heart disease.

RESEARCH COLLABORATORS

- University of Colorado
  - Bioengineering
  - Endocrinology
  - Pathology
  - Pulmonology
  - Veterinary School
- National Jewish Health
- Philips Cardiac and Pediatric Excellence Team
- United Therapeutics
- Northwestern University—Radiology
- University of Linkoping
- Ohio State
- Lisbon Hospital, Portugal
- Boston University
- Baylor University
- Stanford University
- Children’s Hospital and Medical Center, NE
- Hospital for Sick Children

CLINICAL FOCUS

- International referral center for Pediatric Pulmonary hypertension
- National referral center for twin-to-twin transfusion syndrome
- Care of the single ventricle patient

REFERENCES


VISION FOR CMR in 20 years

- Increased use of CMR for routine follow-up of patient with congenital heart disease.
- Improved patient experience with fast 3D cine CMR exams.
- Use of MRI in serial monitoring of children with pulmonary hypertension.
- Use of artificial intelligence to optimize scan parameters and automate exams.
- Universal participation in a pediatric/congenital CMR registry

GRANT FUNDING

- Colorado Clinical Translational Institute Pilot Grant CR500000502.
- Children’s Hospital Colorado Research Scholar Award.
- Actelion ENTRELLIGENCE Young Investigator Award.
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Dr. Brian Fonseca is a member of the SCMR Executive Committee of the Pediatric/Congenital Working Group!