Heart Institute Annual Report, 2009-10

Institute Photo

Center: J. Towbin and J. Robbins

Institute Data Summary

<table>
<thead>
<tr>
<th>Research and Training Details</th>
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<tbody>
<tr>
<td>Number of Faculty</td>
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<tr>
<td>Number of Joint Appointment Faculty</td>
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<td>Number of Research Fellows</td>
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<tr>
<td>Number of Research Students</td>
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<td>Number of Support Personnel</td>
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<td>Direct Annual Grant Support</td>
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<td>Direct Annual Industry Support</td>
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<td>Peer Reviewed Publications</td>
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<tr>
<th>Clinical Activities and Training</th>
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<tr>
<td>Number of Clinical Staff</td>
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<tr>
<td>Number of Clinical Fellows</td>
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<td>Number of Other Students</td>
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<td>Outpatient Encounters</td>
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Highlights

Faculty

Cardiology
Jeffrey A. Towbin, MD, FAAP, FACC, FAHA, Professor Clinical; Executive Co-Director, The Heart Institute; Director and Chief, Division of Cardiology
Research Interests: Cardiomyopathy and Genetics

Jeffrey B. Anderson, MD, MPH, Assistant Professor Clinical;
Research Interests: Syncope, nutritional failure in congenital heart disease, quality improvement

Robert Beekman, MD, Professor Clinical; Co-Medical Director, Cardiology
Research Interests: Cardiac Catheterization & Intervention, Quality Improvement, Coarctation of the Aorta

D. Woodrow Benson, MD, PhD, Professor Clinical; Director, Cardiovascular Genetics
Research Interests: Cardiovascular Genetics

Randal Claytor, PhD, Adjunct Associate Professor;

James F. Cnota, MD, Associate Professor Clinical;
Research Interests: Fetal Cardiology

Linda H. Cripe, MD, Associate Professor Clinical;
Research Interests: Cardiomyopathies, Neuromuscular Disorders, Echocardiography

Richard Czosek, MD, Assistant Professor Clinical;
Research Interests: Cardiac pacing devices in pediatric and congenital heart disease patients and arrhythmia risk stratification in the pediatric population

Allison Divanovic, MD, Assistant Professor Clinical;
Research Interests: Fetal Echocardiography

William M. Gottliebson, MD, MS, Associate Professor Clinical; Director, MRI Cardiology; Director, Heart Institute Informatics
Research Interests: Cardiac MRI Techniques to Evaluate myocardial Synchrony Energetics, and Regional Function.

Michelle Grenier, MD, Associate Professor Clinical; Director, 3 Dimensional Echocardiography
Research Interests: Cardiomyopathy, Heart Failure, 3 Dimensional Echocardiography

Haleh Heydarian, MD, Instructor Clinical;
Research Interests: Echocardiography Synchrony/Strain Imaging and Quality Improvement

Robert B. Hinton, MD, Assistant Professor Clinical;
Research Interests: Cardiovascular Genetics & Developmental Biology

Russel Hirsch, MD, Associate Professor Clinical; Director, Cardiac Catheterization Lab
Research Interests: Cardiac Catheterization & Intervention, Device Development

Kan Hor, MD, Assistant Professor Clinical;
Research Interests: MRI technology to diagnose and follow heart disease, in particular DMD cardiomyopathy.

Holly M. Ippisch, MD, MS, FAAP, Assistant Professor Clinical;
Research Interests: Echocardiography, preventive cardiology, exercise and pediatric obesity.

Beth Ann Johnson, MD, MA, Assistant Professor Clinical;
Research Interests: Premature infants with congenital heart defects, Fetal diagnosis

Thomas R. Kimball, MD, Professor Clinical; Co-Medical Director, Cardiology; Director, Cardiac Ultrasound; Director, Cardiovascular Imaging Core Research Lab
Research Interests: Echocardiography, Ventricular function, Cardiovascular Effects of Obesity and Type II Diabetes.

Shelley Kirk, PhD, RD, LD, Assistant Professor Clinical;
Research Interests: The efficacy, safety and feasibility of interventions for the management of pediatric obesity.

Timothy Knilans, MD, Professor Clinical; Director, Clinical Cardiac Electrophysiology and Pacing; Director, Pediatric Cardiac Electrophysiology Fellowship
Research Interests: Identification and risk stratification of causes of sudden death.

Catherine Krawczeski, MD, Associate Professor Clinical; Director, Quality Improvement and Clinical Effectiveness; Co-Director, Center for Acute Care Nephrology
Research Interests: Bypass associated acute kidney injury (biomarkers, epidemiology, early therapy

Ryan Leahy, MD, Instructor Clinical;

Cong Liu, PhD, Research Assistant Professor; Associate Director of HIDL
Research Interests: Genetic etiology of cardiomyopathy, congenital heart disease and cardiovascular diseases. New technology development in clinical genetic testing and clinical viral testing.

Angela Lorts, MD, Assistant Professor Clinical;
Research Interests: Heart failure and myocardial remodeling

Bradley S. Marino, MD, MPP, MSCE, Associate Professor Clinical; Director, Heart Institute Research Core

Research Interests: Outcomes Research

Richard A. Meyer, MD, Professor Clinical;
Research Interests: Adult Congenital Heart Disease and Marfan/EDS

Erik Michelfelder, MD, Associate Professor Clinical; Director, Fetal Cardiology
Research Interests: Fetal Cardiology and Echocardiography

David Nelson, MD, PhD, Professor Clinical; Medical Director, CICU
Research Interests: Inflammatory injury after cardiac surgery

Enkhsaikhan Purevjav, MD, PhD, Research Assistant Professor;
Research Interests: Genetics of Cardiovascular Disease

Robert Siegel, MD, Professor Clinical; Medical Director, The Center for Better Health and Nutrition

Robert Spicer, MD, Professor Clinical; Director Fellowship Program; Medical Director, Cardiac Transplantation Program
Research Interests: Heart Failure Transplant

Arnold Strauss, MD, Professor Clinical; BK Rachford Professor and Chair, Department of Pediatrics, University of Cincinnati College of Medicine; Director, Cincinnati Children's Research Foundation; Chief Medical Officer, Cincinnati Children's Hospital Medical Center

Elaine Urbina, MD, MS, Associate Professor Clinical; Director, Preventive Cardiology
Research Interests: Non-invasive assessment of vascular structure and function and relationship to CV risk factors, obesity, diabetes, renal disease and sleep disorders. Treatment of high blood pressure and cholesterol.

Karen Uzark, PhD, CPNP, Associate Professor Clinical; Director of Process Improvement and Outcomes Research
Research Interests: Heart Transplant, Quality of Life, Outcomes in Children with Heart Disease

Gary Webb, MD, FRCP(C), FACC, FAHA, Professor Clinical; Director, Adolescent and Adult Congenital Heart Disease Clinic

Cardiothoracic Surgery

Peter B. Manning, MD, Professor; Director, Cardiothoracic Surgery; Co-director The Heart Center

Jodie Duffy, PhD, Research Associate Professor;
Research Interests: Reoxygenation and Reperfusion Injury with Cardiopulmonary Bypass

Pirooz Eghtesady, MD, Associate Professor; Surgical Director, Cardiac Transplantation
Research Interests: Fetal Cardiac Surgery

Jeffrey Shuhaiber, MD, Assistant Professor;

Molecular Cardiovascular Biology

Jeffrey Robbins, PhD, Professor; Executive Co-Director, The Heart Institute; Associate Chair of the CCHMC; Endowed Chair for Molecular Cardiovascular Biology
Research Interests: Mechanisms of Normal and Abnormal Cardiovascular function

James Gullick, MS, Research Instructor;
Research Interests: Molecular interactions between certain cardiac contractile proteins and how such interactions can be altered by mutations that are associated with cardiomyopathies

Jeanne James, MD, Research Associate Professor; Director, Mouse Echocardiography Core
Research Interests: Manifestations and etiologies of misfolded protein response and echocardiography

Zaza Khuchua, PhD, Research Associate Professor;
Research Interests: Congenital cardiac disorders caused by inborn errors in mitochondrial energy-producing enzymes, and model systems to study molecular mechanisms of these diseases

Marjorie Maillet, PhD, Research Instructor;
Research Interests: Understanding signaling pathways that lead to heart disease

Jeffery Molkentin, PhD, Professor; Howard Hughes Medical Institute Investigator
Research Interests: Molecular pathways that underlie heart disease

Hiroyuki Nakayama, MD, PhD, Research Instructor;
Research Interests: Role of calcium in cardiac pathogenesis

Sakthivel Sadayappan, PhD, Research Instructor;
Katherine Yutzey, PhD, Assistant Professor; Director of Research and Development, Associate Medical Director, The Heart Institute Diagnostic Laboratory; Co-Director, Cardiovascular Genetics

Research Interests: Molecular Genetics of Heart Development

Joshua Waxman, PhD, Assistant Professor

Research Interests: Heart development and disease mechanisms

Research Interests: Effects of muscle protein structure on heart function and how certain proteins protect the heart from injury

Publications

Cardiology


Cardiothoracic Surgery


Molecular Cardiovascular Biology


Distinct sarcomeric substrates are responsible for protein kinase D-mediated regulation of cardiac myofilament Ca2+ sensitivity and cross-bridge cycling. J Biol Chem. 2010; 285: 5674-82.


Grants, Contracts, and Industry Agreements

Cardiology
Grant and Contract Awards

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<thead>
<tr>
<th>Grant and Contract Awards</th>
<th>Annual Direct / Project Period Direct</th>
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<tr>
<td>Benson, D</td>
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<td>Genetic Mechanisms of Cardiac Disease in the Young</td>
<td>$161,893 / $808,223</td>
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<td>National Institutes of Health</td>
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<td>K24 HL 069712</td>
<td>06/01/06 - 05/31/11</td>
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<td>Preoperative Therapy for Prevention of Postoperative Low Cardiac Output Syndrome</td>
<td>$194,200 / $976,800</td>
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<td>National Institutes of Health</td>
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<td>U01 HL 085057</td>
<td>09/04/06 - 08/31/11</td>
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<td>Pediatric Heart Disease Clinical Research Network</td>
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<tr>
<td>The New England Research Institute (National Institutes of Health)</td>
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<td>U01 HL 68270</td>
<td>12/01/06 - 12/31/12</td>
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<tr>
<td>Benson</td>
<td>Trial of Beta Blocker vs Angiotensin</td>
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<td>Krawczeski</td>
<td>Receptor Blocker</td>
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<tr>
<td>Krawczeski</td>
<td>Single Ventricle Reconstruction</td>
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<tr>
<td>Study (SVR II)</td>
<td>Extension</td>
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<tr>
<td>Krawczeski</td>
<td>Single Ventricle Reconstruction</td>
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<tr>
<td>Study (SVR I)</td>
<td>Extension</td>
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<td>Musculoskeletal Ancillary Study</td>
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<td>The Johns Hopkins University (National Marfan Foundation)</td>
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<td>01/01/08 - 06/30/12</td>
<td>$1,250 / $18,750</td>
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Hinton Jr., R

Genetic & Developmental Basis of Pediatric Aortic Valve
National Institutes of Health
K23 HL 085122                                                                                      $122,831 / $614,420
08/03/06 - 04/30/11                                                                                   |

Ippisch, H

Effects of Dietary Fat on Post-Prandial Vascular Function
National Institutes of Health
K23 HL 091174                                                                                      $126,007 / $627,746
09/01/08 - 07/31/13                                                                                   |

Kimball, T
### Chronic Kidney Disease in Children

Children's Mercy Hospital (National Institutes of Health)

U01 DK 066143 08/01/08 - 07/31/13 $55,222 / $276,110

### Schmidt, M

**CALERIE Phase II**

Duke University (National Institutes of Health)

U01 AG 022132 09/30/09 - 08/31/12 $48,389 / $86,885

### Towbin, J

**Pediatric Cardiomyopathy Specimen Repository**

National Institutes of Health

RO1 HL 087000 09/01/09 - 04/30/11 $399,859 / $399,859

### Urbina, E

**Mechanisms of Vascular Dysfunction in Obesity & the Metabolic Syndrome**

National Institutes of Health

K23 HL 080447 06/01/06 - 05/31/11 $120,329 / $613,194

**Modifying Dietary Behavior in Adolescents with Elevated Blood Pressure**

University of Cincinnati (National Institutes of Health)

R01 HL 088567 02/01/08 - 01/31/13 $37,095 / $152,609

### Kirk, S

**Healthworks! Steps Out**

Saucony Run for Good Foundation

09/01/09 - 08/31/10 $10,000 / $10,000

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**Current Year Direct** $1,323,429

### Industry Contracts

**Beekman, R**

AGA Medical, LLC

$ 7,641

**Hirsch, R**

AGA Medical, LLC

$ 12,473

**Current Year Direct Receipts** $ 20,114

**Total** $1,343,543

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### Cardiothoracic Surgery

**Grant and Contract Awards**

**Duffy, J**

**Student Undergraduate Research Fellowships**

American Heart Association

06/01/2010 - 05/31/2012 $20,000 / $40,000

**Eghtesady, P**

**Mechanisms of Vasopressin-Mediated Placental Vascular Resistance after Fetal Bypass**

National Institutes of Health

R21 HL 093683 04/01/2009 - 03/31/2011 $125,000 / $275,000

**Mechanism of Vasopressin-Mediated Placental Vascular Resistance after Fetal Bypass**

National Institutes of Health

R21 HL 093683 07/15/2009 - 06/30/2011 $120,259 / $120,259
## Hypoplastic Left Heart Syndrome: Expression of RHD in the Fetus?

**National Institutes of Health**

R01 HL 098634  
01/15/2010 - 12/31/2014  
$269,012 / $1,346,611

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<th>Current Year Direct</th>
<th>$ 534,271</th>
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<td><strong>Total</strong></td>
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### Molecular Cardiovascular Biology

**Grant and Contract Awards**

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<tr>
<th>Name</th>
<th>Project Title</th>
<th>Funding Agency</th>
<th>Start Date - End Date</th>
<th>Total Direct</th>
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<tr>
<td>Braitsch, C</td>
<td>Tbx18 Regulation of Epicardial-Derived Cell Proliferation, Migration, and Differentiation in Cardiac Development</td>
<td>American Heart Association</td>
<td>07/01/09 - 06/30/11</td>
<td>$23,000 / $46,000</td>
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<tr>
<td>Chakraborty, S</td>
<td>Twist1 and Tbx20 Function in Heart Valve Development</td>
<td>American Heart Association</td>
<td>07/01/08 - 06/30/10</td>
<td>$45,000 / $88,000</td>
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<td>Correll, R</td>
<td>Regulation of Cardiac Gene Expression by the L-Type Calcium Channel, CaV1.2</td>
<td>National Institutes of Health</td>
<td>09/07/09 - 09/06/12</td>
<td>$47,210 / $115,809</td>
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<td>Davis, J</td>
<td>The Non-Hypertrophic Role of Calcineurin in Regulating Cardiac Structure-Function</td>
<td>National Institutes of Health</td>
<td>12/15/08 - 12/14/11</td>
<td>$49,646 / $149,454</td>
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<td>Elrod, J</td>
<td>Defining the Role of Necrotic Cell Death in the Progression of Heart Failure</td>
<td>National Institutes of Health</td>
<td>07/28/08 - 07/27/10</td>
<td>$50,054 / $96,880</td>
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<td>Goonasekera, A</td>
<td>Role of Cardiac L-type Calcium Channels in the Pathophysiology of Cardiac Hypertrophy and Heart Failure</td>
<td>American Heart Association</td>
<td>07/01/08 - 06/30/10</td>
<td>$45,000 / $88,000</td>
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<td>Khuchua, Z</td>
<td>The shRNA-Mediated Tafazzin Knockdown Mouse Model of Barth Syndrome</td>
<td>Barth Syndrome Foundation, Inc.</td>
<td>01/01/10 - 12/31/11</td>
<td>$20,001 / $36,362</td>
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<td>Krishnamurthy, V</td>
<td>Valve Tissue Mechanics and Cell Phenotype in a Mouse Model of Aortic Valve Disease</td>
<td>American Heart Association</td>
<td>07/01/09 - 06/30/11</td>
<td>$23,000 / $46,000</td>
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<td>Liu, Q</td>
<td>Role of TAK1 Signaling Network in Cardiac Hypertrophy</td>
<td>National Institutes of Health</td>
<td>03/01/10 - 02/29/12</td>
<td>$89,574 / $181,085</td>
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<td>McLendon, P</td>
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### Training in Cardiovascular Biology

**University of Cincinnati** (National Institutes of Health)

**T32 HL 007382**  
**02/11/10 - 08/31/10**  
**$20,241 / $20,241**

#### Molkentin, J

- **Adaptive and Maladaptive Signaling in Cardiac Growth and Regeneration**
  
  Fondation Leducq  
  **10/01/05 - 09/30/10**  
  **$296,584 / $1,183,370**

- **Calcium as a Molecular Signal in the Heart**
  
  Temple University School of Medicine (National Institutes of Health)  
  **R01 HL 089312**  
  **08/15/07 - 06/30/12**  
  **$244,186 / $1,235,879**

- **Role of Calcium Influx in Miyoshi Myopathy**
  
  Jain Foundation, Inc.  
  **05/01/07 - 10/31/10**  
  **$70,000 / $209,986**

#### Nakayama, H

- **Role of T-Type Calcium Current Reappearance in Cardiac Hypertrophy**
  
  American Heart Association  
  **01/01/10 - 12/31/13**  
  **$70,000 / $280,000**

#### Robbins, J

- **Cardiac Myosin Binding Protein-C: Structure, Function and Regulation**
  
  University of Vermont (National Institutes of Health)  
  **P01 HL 059408**  
  **02/01/10 - 01/31/15**  
  **$362,669 / $362,669**

- **Signaling Processes Underlying Cardiovascular Function**
  
  National Institutes of Health  
  **P01 HL 069779**  
  **01/11/08 - 12/31/12**  
  **$2,216,836 / $3,670,750**

- **Cardiomyocyte Toxicity and Heart Failure in Desmin Related Cardiomyopathy**
  
  National Institutes of Health  
  **R01 HL 087862**  
  **02/01/08 - 01/31/11**  
  **$100,000 / $400,000**

#### Ware, S

- **Role of the Embryonic Node in Cardiac Development and Congenital Heart Disease**
  
  National Institutes of Health  
  **R01 HL 088639**  
  **04/01/07 - 03/31/12**  
  **$250,000 / $1,250,000**

- **Uncovering Novel Genetic Causes and Risks in Congenital Heart Disease Patients**
  
  University of Cincinnati (Burroughs Wellcome Foundation)  
  **07/01/09 - 06/30/15**  
  **$75,000 / $750,000**

- **Genetic Causes of Congenital Heart Defects**
  
  March of Dimes - National  
  **06/01/10 - 05/31/13**  
  **$89,790 / $279,301**

- **Genes and Modifiers in Pediatric Cardiomyopathy**
  
  Children's Cardiomyopathy Foundation  
  **01/01/10 - 01/01/12**  
  **$86,735 / $86,735**

- **Role of the Embryonic Node in Cardiac Development and Congenital Heart Disease**
  
  National Institutes of Health  
  **R01 HL 088639**  
  **07/15/09 - 06/30/11**  
  **$55,920 / $113,134**

#### Wu, X

- **Regulation of Calcineurin & Cardiac Hypertrophy by PMCA**
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<th>Source</th>
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<td>American Heart Association</td>
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<td><strong>Yutzey, K</strong></td>
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<td>The Function of Notch1 in Heart Valve Development</td>
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<td>Notch Signaling in Heart Valve Development and Disease</td>
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