

Raymond H. Chen, MD, DPhil

Current Positions

Senior Cardiac Surgeon, Regional Department of Cardiac Surgery, SCPMG	2004- present
Assistant Chief, Regional Department of Cardiac Surgery, SCPMG	2014- present
Clinical Investigator, SCPMG	2015-2017

Education and Training

Degree Programs

BA, Biochemical Sciences, Harvard University, Cambridge, MA	1984-1988
MD, Stanford University, Stanford, CA	1988-1995
DPhil, Immunology, Oxford University, Oxford, England	1991-1993
Thesis title: Cellular Infiltration in Transplanted Organs: Detection of Cytotoxic Granule-Associated Proteins	
Advisor: Sir Peter J. Morris	

Certificates

Wilderness Medicine Search and Rescue, Idyllwild, CA	2021
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Post-Doctoral Training

Internship, Brigham & Women's Hospital, Harvard Medical School, Boston, MA	1995-1996
Residency, General Surgery, Brigham & Women's Hospital, Harvard, Boston, MA	1996-2001
Chief Resident, General Surgery, Brigham & Women's Hospital, Harvard, Boston, MA	2001-2002
Cardiothoracic Surgery Resident, Brigham & Women's Hospital, Harvard, Boston, MA	2002-2003
Chief Cardiothoracic Surgery Resident, Brigham & Women's Hospital, Harvard, Boston, MA	2003-2004
Chief Cardiothoracic Surgery Resident, Boston Children's Hospital, Harvard, Boston, MA	2004

Academic Activities: Appointments and Educational Roles

Academic Appointments

Clinical Fellow in Surgery, Harvard Medical School, Boston, MA	1995-1998
Research Fellow in Surgery, Harvard Medical School, Boston, MA	1998-2000
Clinical Fellow in Surgery, Harvard Medical School, Boston, MA	2000-2004

Academic Committee Service

Stanford Medical School Admissions Committee	1989-1994
Education Committee, Brigham & Women's Hospital	2002
Education Committee, MGH-Brigham Hospitals/Partners	

Clinical Teaching and Supervision

Train medical students during clinical clerkship, Harvard Medical School, 20 hrs/week	1995-2004
Train Physician Assistants and Nurse Practitioners, Regional Department of Cardiac Surgery, Kaiser Permanente, Los Angeles Medical Center, 15 hrs/week	2004- present
Train and mentor new cardiac surgeons, Los Angeles Medical Center, 10 hrs/week	2018- present

Clinical Practice

Certification and Licensure

California State Medical Licenses	1995-present
General Surgery Board	2006-2016
Thoracic Surgery Board	2007-present

Clinical Practice

Adult Cardiac Surgery, Southern California Permanente Medical Group	2004-present
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Clinical Committee Work

Medication Use Improvement Task Force, Brigham & Women's Hospital	2000
Medical Informatics Committee, Brigham & Women's Hospital	2001
Quality Committee, Kaiser Permanente, Los Angeles Medical Center	2006-2015
Surgical Services Committee, Kaiser Permanente, Los Angeles Medical Center	2007-2014

Clinical Leadership

Assistant Chief, Regional Department of Cardiac Surgery, Southern California Medical Group, Los Angeles Medical Center, CA	2014-present
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Professional Development Activities

Homograft Aortic Replacement Course, Cryolife, Los Angeles, CA	2019
Surgical Ablation Course, Atricure, San Diego, CA	2021

Professional Honors and Awards

John Harvard Scholarship for Academic Achievement of Highest Distinction	1985-1988
American Academy of Allergy and Immunology Research Fellowship	1990
American Federation of Clinical Research Award	1991
Kolos Fellowship, Stanford Medical School	1991-1992
The Peter Emge Travel Scholarship	1991-1992
The Wolfson Research Grant Award, Oxford University	1992
The Oxford University Award for Special Research	1991-1993
The British Overseas Research Award	1991-1993
The Winston Churchill Scholar at Oxford University	1991-1993
Surgical Intern of the Year, Brigham & Women's Hospital	1995-1996
American College of Surgeons Resident Research Scholarship	1998-2000
Young Investigator's Award, International Xenotransplantation Association	2000
Invited Participant, "Scientific Frontiers in Cardiothoracic Surgery", NIH	2000
Young Investigator's Award, International Society for Applied Cardiovascular Biology	2000
John Mannick Resident Research Award, Brigham & Women's Hospital	2000
The Francis Moore Award for Best Chief Surgery Resident, Brigham & Women's Hospital	2002
Outstanding Clinical Teacher/Mentor Award, Voted by Harvard Medical School Class of 2003	2003
Royal Society of Medicine, United Kingdom	2016- present

Community Activities

Healthcare Provision, Education, and Outreach

Volunteer Healthcare Provision

World Health Organization (WHO), Project HOPE, Adult Cardiovascular Surgery Program in China	
Educated surgeons and physicians from over 30 hospitals across China in post-CABG ICU care	1999-2000

Community-Based Presentations

First Aid and Emergency Rescue, Boy Scouts of America, Los Angeles, CA 2017-2020

Community-Based Mentorship

Merit Badge Counselor, Boy Scouts of America, Los Angeles, CA 2017-2019

Community Leadership

Greater Los Angeles Area Boy Scouts Regional Committee 2004-2020

Community Health Committee Activities

Stanford Premedical Advisor Program 1989-1993

Stanford Medical School Big-Sibling Program 1989-1993

Stanford Summer Youth Science Program Advisor 1990

Other Community Activities

Coach, Wolfson Squash Team, Oxford University 1991-1993

Coach, Oxford Fencing Club 1991-1992

Coach, US Archery Association 2016- present

Scholarly Activities

Grant Funding

Completed

Howard Hughes Medical Research Fellowship 1990-1991

Title: Is the Expression of Granzyme A and Perforin Associated with Heart Transplant Rejection?

Description: assess the relationship between T cell cytotoxic granules to acute cardiac transplant rejection

Primary Investigator

1 FTE

NIH Individual National Research Service Award (NRSA) 1998-2000

Title: Can In Situ mRNA PCR Amplification of Cytotoxic Granule-Associated Enzymes Predict Porcine-to-Primate Cardiac Xenotransplant Rejection?

Description: used the PCR technique I developed to assess the possibility of detecting xenotransplant rejection

Primary Investigator

1 FTE

SCPMG Clinical Investigator Program 2015-2017

Title: "Does Video Telemedicine Consultation Reduce the Frequency of Hospital Readmission after Cardiac Surgery?"

Description: showed the utilization of video telemedicine visits can significantly reduce the incidences of hospital readmissions after cardiac surgery

Primary investigator

0.1 FTE

Current Unfunded Projects

Evaluation of whether pre-operative abdominal CT scans can reduce the incidences of mesentery ischemia after cardiac surgery 2021

Invited Academic Presentations

National

1. **Chen, RH**, "Pig-to-primate heart xenotransplantation," American College of Surgeons, Research Council. Chicago, IL. 2000

International

1. **Chen, Raymond**, "ICU Management of Post-Operative CABG patients," WHO/Project HOPE Adult Cardiovascular Surgery Program. Guangdong Cardiovascular Center, Guangdong Provincial People's Hospital, Guangzhou, China. 1999
2. **Chen, Raymond**, "ICU Management of Post-Operative CABG patients," WHO/Project HOPE Adult Cardiovascular Surgery Program: ICU Management of Post-Operative CABG patients. Anzhen Hospital, Beijing, China. 1999
3. **Chen, Raymond**, "Management of Patients Undergoing Coronary Artery Bypass Surgery," China Adult Cardiovascular Surgery Program: Moderated Session. Anzhen Hospital, Beijing, China. 2000

Other Academic Presentations, Posters, and Abstracts Presentations

1. **Chen RH**, Griffiths G, Ivens K, Alpert S, Shizuru J, Seydel K, Flavin T, Fathman G, Billingham M, Weissman I. Granzyme A as a marker of rejection in CsA-treated heart transplants. American Federation for Clinical Research. Carmel, California. February 6-9, 1991
2. **Chen RH**, Griffiths G, Ivens K, Alpert S, Shizuru J, Seydel K, Flavin T, Fathman G, Billingham M, Weissman I. Granzyme A as a marker of rejection in heart transplants treated with anti-CD4 monoclonal antibody. XIV International Society for Heart Transplantation. Paris, France. April 7-9, 1991
3. **Chen RH**. Granzyme A expression in heart transplants. Stanford Research Symposium. Stanford University Medical Center, Stanford, CA. May 9, 1991
4. **Chen RH**. The detection of cardiac graft rejection by in situ hybridization. National Institutes of Health. Bethesda, Maryland. May 21-23, 1991
5. **Chen RH**, Fuggle SV. The infiltration of serine protease+ cells in heart transplants. The British Transplant Society. London, England. October 1992
6. **Chen RH**. The mechanism of delayed xenograft rejection in pig-to-primate cardiac transplantation. The Special Cardiovascular Grand Rounds: The Thomas W. Smith Cardiovascular Fellow's Presentation. Brigham & Women's Hospital, Boston, Massachusetts. June 10, 1999.
7. **Chen RH**, Mitchell RN, Kadner A, Adams DH. Differential Galactose * (1,3) galactose expression by porcine cardiac vascular endothelium. The 5th Congress of the International Xenotransplantation Association. Nagoya, Japan. October 24-28, 1999
8. **Chen RH**, Mitchell RN, Kadner A, Adams DH. Mechanism of delayed rejection in transgenic pig-to-primate cardiac xenotransplantation. Association for Academic Surgery: 33rd Annual Meeting. Philadelphia, Pennsylvania. November 18-20, 1999
9. **Chen RH**, Kadner A, Mitchell RN, Adams DH. Cardiac valves are privileged in pig-to-primate cardiac xenotransplant rejection. 7th Biennial Meeting of the International Society for Applied Cardiovascular Biology (ISACB). Tucson, Arizona. March 9-11, 2000
10. Adams DH, **Chen RH**, Byrne JG, Filsoufi F, Cohn LH, Aklog L. Improving outcomes in patients with moderate ischemic mitral regurgitation undergoing combined CABG and mitral annuloplasty. Societe de Chirurgie Thoracique et Cardio-Vasculaire de Langue Francaise: "Chirurgie 2000". Hopital Europeen Georges Pompidou, Paris, France. June 26-28, 2000

11. **Chen RH.** Human and porcine valves do not express carbohydrate antigens. John Mannick Resident Research Award. Brigham & Women's Hospital, Boston, MA. October 18, 2000
12. **Chen RH,** Kadner A, Mitchell RN, Logan JS, Adams DH. Fresh porcine cardiac valves are not rejected in primates. VIII International Symposium - Cardiac Bioprosthesis. Yucatan, Mexico. November 3-5, 2000
13. **Chen RH,** Kadner A, Tracy J, Mitchell RN, Adams DH. Decreased porcine valve antigenicity with in vitro culture. VIII International Symposium - Cardiac Bioprosthesis. Yucatan, Mexico. November 3-5, 2000
14. Adams DH, **Chen RH,** Byrne JG, Filsoufi F, Aklog L. Improved outcomes in patients with moderate ischemic mitral regurgitation undergoing combined CABG and mitral annuloplasty. American Heart Association. New Orleans, Louisiana. November 12-15, 2000

Posters

1. **Chen RH,** Griffiths G, Ivens K, Alpert S, Shizuru J, Seydel K, Flavin T, Billingham M, Weissman I. The use of granzyme A as a marker of rejection in rat heart transplants. XIII International Congress of the Transplantation Society. San Francisco, California. August 19-24, 1990
2. Fuggle SV, **Chen RH,** Morris PJ. The detection of granzyme A and perforin in renal transplant biopsies using in situ cDNA polymerase chain reaction. XV International Congress of the Transplantation Society. Kyoto, Japan. September 1994
3. Adams DH, **Chen RH,** Aranki SF, Allred EN, Cohn LH. Influence of size 19mm aortic valve replacement on survival. American Association of Thoracic Surgery. New Orleans, Louisiana. April 18-21, 1999
4. Kadner A, **Chen RH,** Adams DH. Maturation of anti-gal humoral response in delayed pig to primate xenograft rejection. The 3rd Joint Meeting of the German, the Austrian and the Swiss Societies for Thoracic and Cardiovascular Surgery. Luzern, Switzerland. February 11, 2000
5. Kadner A, **Chen RH,** Mitchell RN, Tracy J, Adams DH. Does blood group incompatibility contribute to homograft degeneration? 7th Biennial Meeting of the International Society for Applied Cardiovascular Biology (ISACB). Tucson, Arizona. March 9-11, 2000
6. **Chen RH,** Kadner A, Mitchell RN, Santerre D, Adams DH. Diagnosing pig-to-primate cardiac xenograft rejection with an implantable telemetric monitoring device: histological and immunological correlations. 20th Annual Meeting of the International Society for Heart and Lung Transplantation. Osaka, Japan. April 5-8, 2000
7. **Chen RH,** Kadner A, Tracy J, Mitchell RN, Adams DH. Human and porcine valves do not express carbohydrate antigens. Societe de Chirurgie Thoracique et Cardio-Vasculaire de Langue Francaise: "Chirurgie 2000". Hopital Europeen Georges Pompidou, Paris, France. June 26-28, 2000.
8. Aklog L, Flores KQ, **Chen RH,** Byrne JG, Nathan NS, Adams DH. Does coronary artery bypass grafting alone correct moderate ischemic mitral regurgitation? Societe de Chirurgie Thoracique et Cardio-Vasculaire de Langue Francaise: "Chirurgie 2000". Hopital Europeen Georges Pompidou, Paris, France. June 26-28, 2000
9. Filsoufi F, Kadner A, Aklog L, **Chen RH,** Couper GS, Byrne JG, Adams DH. Acute fulminant myocarditis - BIVAD experience correlated with histopathology in four patients. Society of Thoracic Surgery, Circulatory Support Meeting. New York, New York. September 15-17, 2000
10. **Chen RH,** Kadner A, Mitchell RN, Adams DH. Porcine valvular endothelium does not express galactose α -1,3 galactose (α -Gal) and does not undergo either hyperacute or delayed xenograft rejection. XVIII International Congress of the Transplantation Society. Rome, Italy. August 27 – September 1, 2000

11. **Chen RH**, Kadner A, Mitchell RN, Adams DH. Acute Vascular Rejection in pig-to-primate cardiac xenografts is preceded by disappearance of α -Gal. XVIII International Congress of the Transplantation Society. Rome, Italy. August 27 – September 1, 2000
12. Kadner A, **Chen RH**, Logan JS, Diamond LE, Adams DH. Membrane cofactor protein confers protection from hyperacute rejection in the transgenic porcine-to-primate heterotopic heart transplant model. XVIII International Congress of the Transplantation Society. Rome, Italy. August 27 – September 1, 2000
13. Kadner A, **Chen RH**, Tracy J, Mitchell RN, Adams DH. Blood group antigens are not expressed on cardiac valve endothelium - Is homograft ABO-matching necessary? European Association for Cardiothoracic Surgery. Frankfurt, Germany. October 7-11, 2000
14. Kadner A, **Chen RH**, Tracy J, Mitchell RN, Adams DH. Human cardiac valve endothelium does not express blood group antigens. VIII International Symposium - Cardiac Bioprosthesis. Yucatan, Mexico. November 3-5, 2000
15. **Chen RH**, Kadner A, Byrne JG, Aklog L, Adams DH. Women have higher operative mortality after coronary artery bypass surgery: is it sex or something else? Association for Academic Surgery. Tampa, Florida. November 2-4, 2000
16. **Chen RH**, Filsoofi F, Goldhaber SZ, Byrne JG, Aklog L, Adams DH. Women have higher operative mortality after coronary artery bypass surgery: why? American College of Cardiology. Orlando, Florida. March 18-21, 2001

Professional Association Activities

Professional Memberships

American Federation of Clinical Research	1988
International Union of Immunological Societies (IUIS)	1995
Federation of American Societies for Experimental Biology (FASEB)	1995
American Association of Immunologists (AAI)	1995
International Association of Heart and Lung Transplantation	1998
New York Academy of Sciences	1998
International Xenotransplantation Association	1999
American College of Surgeons	1999
International Society for Minimally Invasive Cardiac Surgery	1999
International Society for Applied Cardiovascular Biology	2000
The Transplantation Society	2000
American Society of Transplant Surgeons	2000
Association for Academic Surgery	2000
The Society for Heart Valve Disease	2000

Editorial Responsibilities

Journal Review Activities

Transplantation, 25-50 articles reviewed	1992-2004
Journal of Thoracic and Cardiovascular Surgery, 5-10 articles reviewed	1999-2004
Journal of Surgical Research, 1-5 articles reviewed	1999-2004
Circulation, 1-5 articles reviewed	1999-2004
The German Federal Ministry of Education and Research (BMBF), 10 grants reviewed	1999
Annals of Thoracic Surgery, 10-15 articles reviewed	1999-2010
Journal of Heart and Lung Transplantation, 5-10 articles reviewed	1999-2004
International Society of Heart & Lung Transplantation meeting, 50 abstracts reviewed	2007

Scholarship – Peer-Reviewed Published Research

Published and Forthcoming Research Articles – Print Journals

1. Schwaber J, Payne J, **Chen RH**. B Lymphocytes from X-linked agammaglobulinemia. *J Clin Invest* 1988;81:514-22.
2. Schwaber J, **Chen RH**. Premature termination of variable gene rearrangement in B lymphocytes from X-linked agammaglobulinemia. *J Clin Invest* 1988;81:2004-9.
3. **Chen RH**, Ivens KW, Alpert S, Billingham ME, Fathman CG, Flavin TF, Shizuru JA, Starnes VA, Weissman IL, Griffiths GM. The use of granzyme A as a marker of heart transplant rejection in cyclosporin A- or anti-CD4 monoclonal antibody-treated rats. *Transplantation* 1993;55:146-53.
4. **Chen RH**, Fuggle SV. In situ cDNA polymerase chain reaction: A novel technique of detecting mRNA expression. *Am J Path* 1993;143:1527-34.
5. **Chen RH**, Fuggle SV. In situ cDNA polymerase chain reaction: Research and clinical application. *Progress in Pathology* 1995;2:209-25.
6. **Chen RH**, Bushell A, Fuggle SV, Wood KJ, Morris PJ. The expression of granzyme A and perforin in mouse heart transplants immunosuppressed with donor-specific transfusion and anti-CD4 monoclonal antibody either alone or in combination. *Transplantation* 1996;61:625-9.
7. **Chen RH**, Fuggle SV. In situ polymerase chain reaction amplification of intracellular message. *Methods Mol Biol* 1997;71:123-32.
8. **Chen RH**, Naficy S, Logan JS, Diamond LE, Adams DH. Hearts from transgenic pigs constructed with CD59/DAF genomic clones demonstrate improved survival in primates. *Xenotransplantation* 1999;6:194-200.
9. **Chen RH**, Kadner A, Adams DH. Surgical techniques in heart transplantation. *Graft* 1999;2:119-22.
10. Adams DH, **Chen RH**, Naficy S, Kadner K. Technique for heterotopic pig heart xenotransplantation in primates. *Ann Thorac Surg* 1999;68:265-8.
11. **Chen RH**, Mitchell RN, Kadner A, Adams DH. Differential galactose *(1,3) galactose expression by porcine cardiac vascular endothelium. *Xenotransplantation* 1999;6:169-72.
12. Adams DH, **Chen RH**, Kadner A, Aranki SF, Allred EN, Cohn LH. Impact of small prosthetic valve size on operative mortality in the elderly following aortic valve replacement for aortic stenosis: Does gender matter? *J Thorac Cardiovasc Surg* 1999;118:815-22.
13. Adams DH, **Chen RH**, Kadner A. Cardiac xenotransplantation: Clinical experience and future direction. *Ann Thorac Surg* 2000;70:320-326.
14. Kadner K, **Chen RH**, Adams DH. Heterotopic heart transplantation: experimental development and clinical experience. *Eur J Cardiothorac Surg* 2000;17:474-81.
15. **Chen RH**, Kadner A, Mitchell RN, Santerre DH, Adams DH. α -gal and β -gal are preferentially expressed on porcine cardiac microvascular endothelium. *Transplant Proc* 2000;32(5):877-8.
16. **Chen RH**, Kadner A, Mitchell RN, Adams DH. Mechanism of delayed rejection in transgenic pig-to-primate cardiac xenotransplantation. *J Surgical Research* 2000;92:119-25.

17. **Adams DH**, Kadner A, Chen RH. Mycotic pseudoaneurysm of the ascending aorta following aortic valve replacement. *Heart* 2000;84(2):124.
18. **Chen RH**, Kadner A, Mitchell RN, Adams DH. Fresh porcine cardiac valves are not rejected in primates. *J Thorac Cardiovasc Surg*, 2000; 119:1216-20.
19. **Chen RH**, Kadner A, Adams DH. Monitoring pig-to-primate cardiac xenografts with live internet images of recipients and xenograft telemetric signals: Histological and immunohistochemical correlations. *J Heart Lung Transplant* 2000;19(6):591-7.
20. Kadner A, **Chen RH**, Mitchell RN, Adams DH. Lack of ABH-antigen expression on human cardiac valves: implications for tissue valve engineering. *J Heart Valve Disease* 2000;9:512-6.
21. Kadner A, **Chen RH**, Adams DH. Heart transplantation in the setting of post-cardiotomy Esmarch closure. *Graft* 2000; 3:214-5.
22. **Chen RH**, Kadner A, Mitchell RN, Adams DH. Cardiac valves are privileged in pig-to-primate cardiac xenotransplant rejection. *Cardiovasc Pathol* 2000;9:205.
23. Kadner A, **Chen RH**, Collard CD, Adams DH. Isolated left atrial tamponade following circumflex artery angioplasty. *Heart* 2000;84(5):514-9.
24. **Chen RH**, Fuggle SV. In situ PCR amplification of intracellular mRNA. *Nucleic Acid Protocols Handbook*. 2000;1023-30.
25. Kadner A, **Chen RH**, Mitchell RN, Adams DH. Homograft crossmatching is unnecessary due to the absence of blood group antigens. *Ann Thorac Surg* 2001;71:S349-52.
26. **Chen RH** and Adams DH. Transgenic porcine valves do not undergo delayed xenograft rejection. *Ann Thorac Surg* 2001;71:S389-92.
27. Kadner A, **Chen RH**, Tracy J, Adams DH. Transplantation of MCP cardiac xenografts into baboon recipients. *Transplantation Proc* 2001;33:770-2.
28. Santerre D, **Chen RH**, Kadner A, Lee-Parritz D, Adams DH. Anesthetic and intraoperative management of baboons undergoing heterotopic porcine cardiac xenotransplantation. *Vet Res Commun* 2001;25:251-9.
29. Adams DH, Kadner A, **Chen RH**. Artificial mitral valve chordae replacement made simple. *Ann Thorac Surg* 2001;71:1377-9.
30. **Chen RH**, Kadner A, Tracy J, Santerre D, Adams DH. Differential detection of α -Gal and human CD59 molecules on pig-to-primate cardiac xenotransplantation: a marker of delayed rejection. *Transplantation Proc* 2001;33:723-5.
31. **Chen RH** and Adams DH. Decreased porcine valve antigenicity with in vitro culture. *Ann Thorac Surg* 2001;71:S393-5.
32. **Chen RH** and Adams DH. Transgenic porcine valves show no signs of delayed cardiac xenograft rejection. *Ann Thorac Surg* 2001;71:S389-2.
33. Adams DH, Kadner A, Farivar RS, **Chen RH**. Human membrane cofactor (MCP, CD46) protein protects transgenic pig hearts from hyperacute rejection in primates. *Xenotransplantation* 2001;8:36-40.
34. Aklog L, Filsoufi F, Flores KQ, **Chen RH**, Cohn LH, Nathan NS, Byrne JG, Adams DH. Does coronary artery bypass grafting alone correct moderate ischemic mitral regurgitation?

Circulation 2001;104:168-75.

35. **Chen RH**, Farivar RS, Adams DH. Why complement attacks cardiomyocytes in hyperacute heart rejection – Reply. J Thorac Cardiovasc Surg 2001;121: 401.
36. Filsoufi F, Farivar RS, Aklog L, Anderson CA, Chen RH, Lichtenstein S, Zhang J, Adams DH. Automated distal coronary bypass using a novel magnetic coupler (MVP). J Thorac Cardiovasc Surg 2004;127:185.

Published and Forthcoming Publications – Other, Print

Book chapters

1. **Chen RH**, Kadner A, Adams DH. Bridging with Solid Organ Xenotransplants. Transplantation Reviews. Editors Peter J. Morris and Nicholas Tilney, Harcourt Brace Jovanovich, Philadelphia, 1999;13:1-12.
2. Byrne JG, **Chen RH**, Adams DH. Principles and Applications of Cardiac Surgery. Kelley's Textbook of Internal Medicine, 4th ed, Editor H. David Humes, Lippincott, Philadelphia, 2000;92:684-91.
3. **Chen RH**, Adams DH. Hyperacute vascular rejection: lessons from pig-to-primate xenotransplantation. Vascular Disease and Injury: Preclinical Research, Editors Daniel I. Simon and Campbell Rogers, Humana Press, Totowa, 2000:231-44.
4. **Chen RH**, Kadner A, Adams DH. Xenotransplantation. Heart Transplantation. Editors Gilbert H. Mudge, John A. Jarcho, and Richard N. Mitchell. W.B. Saunders, 2002.

Online (including books, book chapters, and book reviews if peer-reviewed)

1. Adams DH, **Chen RH**, Kadner A. Endocarditis and mitral valve repair. Webpage content, www.yourDoctor.com. June, 2000.

Scholarship – Educational/Technological Development and Innovations

Technological Development, Patents, and Innovations

Patents

1. **Chen RH**, Adams DH. In vitro modification of cardiac valvular xenografts. Patent granted by the U.S. Patent and Trademark Office February 27, 2003. Serial number 60/185747. Showed how to decrease porcine valve inflammation in humans
2. **Chen RH**, Adams DH. Fresh, cryopreserved, or minimally fixed cardiac valvular xenografts. Patent filed with the U.S. Patent and Trademark Office October 16, 2000. Serial Number 09/688492. Showed how to synthesize unfixed porcine tissue grafts for clinical use