CURRICULUM VITAE

Christopher K. Breuer, M.D.

PRESENT TITLE AND AFFILIATION

Christopher K. Breuer, MD
Nationwide Endowed Chair in Surgical Research
Director, Center for Regenerative Medicine
Research Institute at Nationwide Children's Hospital
Professor of Surgery, Deputy Vice Chair, Research
Co-Director, Tissue Engineering Program, CRMCBT
Professor, Department of Surgery
The Ohio State University
Columbus, Ohio

CITIZENSHIP AND VISA STATUS

US Citizen

OFFICE ADDRESS

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EDUCATION

UNDERGRADUATE EDUCATION

1986	College of the Holy Cross Worcester, MA	BA

GRADUATE EDUCATION

1990	Brown-Dartmouth Medical Program Providence, RI	M.D.

POST-GRADUATE EDUCATION & TRAINING

1990-1991	Brown Medical School Providence, RI	Intern, General Surgery
1991-1992	Brown Medical School Providence, RI	Resident, General Surgery
1992-1993	The Children's Hospital Boston, MA	Junior Resident, Pediatric Surgery
1993-1995	Harvard Medical School Boston, MA	Postdoctoral Fellow in Surgical Research
1995-1996	Brown Medical School Providence, RI	Resident, General Surgery
1996-1997	Brown Medical School Providence, RI	Chief Resident, General Surgery
1997-1998	Hasbro Children's Hospital Providence, RI	Resident, Pediatric Surgery
1998-1999	Hasbro Children's Hospital Providence, RI	Chief Resident, Pediatric Surgery

ACADEMIC APPOINTMENTS

1999-2000	Pediatric Surgeon Wilford Medical Center Lackland AFB, TX
2000-2003	Chief Pediatric Surgery Wilford Medical Center Lackland AFB, TX
2000-2003	Associate Scientist Southwest Primate Facility San Antonio, TX
2003-2009	Assistant Professor, Department of Surgery Yale University, School of Medicine New Haven, CT
2009-2012	Associate Professor, Department of Surgery Yale University, School of Medicine New Haven, CT
2012-Present	Professor with Tenure, Department of Surgery The Ohio State University Columbus, Ohio

2012- Present	Pediatric Surgeon Department of Surgery Nationwide Children's Hospital Columbus, Ohio
2012- 2017	Co-Director. Tissue Engineering and Surgical Research Research Institute Nationwide Children's Hospital Columbus Ohio
2017-Present	Director, Center for Regenerative Medicine Research Institute Nationwide Children's Hospital Columbus Ohio

STATE LICENSURE AND CERTIFICATIONS

LICENSURE

2019	Ohio (Active)

CERTIFICATIONS

1999	General Surgery
2000-Present	Pediatric Surgery

SERVICE

ACADEMIC ADMINISTRATIVE RESPONSIBILITIES

2017-Present	Director, Center for Regenerative Medicine Nationwide Children's Hospital Columbus, Ohio

REGIONAL/NATIONAL ACTIVITIES

2006-Present	Member New England Surgical Society
2010	Study Section (Bioengineering-Clinical) American Heart Association
2010, 2014	Scientific Review Group NIH Director's Transformative Research Award Special Emphasis Panel

2010	Ad Hoc Grant Reviewer NIH Fogarty International Research Collaboration Award Program
2012-Present	Ad Hoc Grant Reviewer NIH Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)
2012	Study Section California Institute for Regenerative Medicine
2012-2016	Pediatric Surgery In-Training Examination Exam Developer American Board of Surgery
2013	Clinical and Translational Research Steering Committee International Society for Stem Cell Research
2014	Study Section California Institute for Regenerative Medicine
2016	Study Section NIH Biotechnology and Surgical Sciences
2017	Invited Lecturer: Regenerative Medicine Forum The National Academies of Sciences Engineering and Medicine
2018	Expert Evaluation Panel PACT
2018-2020	NIH Review Panel Member Small Business: Cardiovascular Sciences
2018- Present	FDA Member Cellular Tissue and Gene Therapy Advisory Committee
2020	Invited Participant Science Technology & Society Forum

MILITARY OR OTHER GOVERNMENT SERVICE

1986-2003	Second Lieutenant- Lieutenant Colonel Officer United States Air Force San Antonio, TX

HONORS AND AWARDS

1985	Honors Program College of the Holy Cross
1986	Health Professions Scholarship United States Air Force
2001	Achievement Medal United States Air Force
2004	Foundation Award American Pediatric Surgical Foundation
2005	Research Fellowship Award American Surgical Association
2006	Mentored Clinical Scientist Development Award NIH
2007	Clinical Scientist Development Award Doris Duke Charitable Foundation
2008	Jacobson Promising Investigator Award American College of Surgeons
2013-2019	Top Doctors Castle Connolly
2014	Distinguished Researcher of the Year Landacre Honors Society
2015	Endowed Chair in Surgical Research Nationwide Children's Hospital
2022	Allen Scholar Award Nationwide Children's Hospital

RESEARCH SUPPORT

1) Title: Preclinical study evaluating and comparing the efficacy of tissue engineered vascular grafts to polytetrafluoroethylene grafts.
Grant #: R01HL163065
Principal Investigator: Breuer
Funding Period: 6/15/2022-5/31/2026
The goal of this study is to evaluate and compare the performance of tissue engineered vascular grafts to native blood vessels using an ovine model.

(2) Title: Preclinical evaluation and translation of a tissue engineered vascular patch designed for use in RVOT reconstruction.
Grant #: Wyss Institute University of Zurich
Principal Investigator: Breuer
Funding Period: 1/1/22-12/31/24
The goal of this study is to perform the preclinical assessment and regulatory filing required to obtain FDA-approval to investigate the use of a novel tissue engineered vascular patch in RVOT reconstruction.

(3) Title: Comparison of the long-term efficacy of tissue engineered vascular grafts versus polytetrafluoroethylene conduits using and established preclinical model.
Grant #: W81XWH-22-1-0597
Principal Investigator: Breuer
Funding Period: 10/1/2021-9/30/2025
The purpose of this study is to compare the performance of the TEVG to PTFE conduit using an ovine model.

(4) Title: Elucidating the molecular mechanisms underlying LYST-mediated tissue engineered vascular graft stenosis.
Grant #: R01HL157491
Principal Investigator: Breuer
Funding Period: 4/1/2021-3/31/2025
The goal of this project is the determine the cellular and molecular mechanisms by which mutations in the LYST gene prevent the formation of TEVG stenosis using single cell RNA sequencing and pathway analysis and a novel mutant LYST cre-lox mouse model.

(5) Title: A study evaluating the safety and efficacy of second-generation tissue engineered vascular grafts for use in congenital heart surgery
Grant#: NIH UG/UH3HL148693
Principal Investigator: Breuer
Funding Period 9/11/2019-9/10/2025
Single institution clinical trial evaluating the safety and growth potential of a second-generation tissue engineered vascular graft in congenital heart surgery.

(6) Title: Development of a curative strategy for treating patients with single ventricle disease using a regenerative medicine approach.
Grant #: Additional Ventures Cures Collaborative

Principal Investigator: (MPI) Breuer
Funding Period: 1/1/2020-12/31/2025
The primary goal of this study is to develop a ovine survival model for evaluating the hemodynamic impact of pulsatile conduits manufactures from iPS-derived cardiomyocytes.

(7) Title: Improving tissue engineered vascular graft performance via computational modeling
Grant #: NIH R01HL139796
Principal Investigator: (MPI) Breuer, Humphrey, Marsden
Funding Period 1/1/18-3/33/26
The goals of this study are to develop a computational model that can accurately describe and predict the natural history of TEVG stenosis. Then using the model, develop new indications for performing angioplasty.

PATENTS

SYSTEMS AND METHODS FOR OPTIMIZED PATIENT SPECIFIC TISSUE ENGINEERING VASCULAR GRAFTS

Publication number: 20180353649
Abstract: It has been established that optimizing cell seeding onto tissue engineering vascular grafts (TEVG) is associated with reduced inflammatory responses and reduced post-operative stenosis of TEVG. Cell seeding increased TEVG patency in a dose dependent manner, and TEVG patency improved when more cells were seeded, however duration of incubation time showed minimal effect on TEVG patency. Methods of engineering patient specific TEVG including optimal numbers of cells to maintain graft patency and reduce post-operative stenosis are provided. Closed, single-use customizable systems for seeding TEVG are also provided. Preferably the systems are custom designed based on morphology of the patient specific graft, to enhance the efficacy of cell seeding.
Type: Application
Filed: December 12, 2016
Publication date: December 13, 2018
Applicant: Research Institute at Nationwide Children's Hospital
Inventors: Christopher Breuer, Cameron Best, Robert Strouse, Narutoshi Hibino, Yong Ung-Lee

COMPOSITIONS AND METHODS FOR PROMOTING PATENCY OF VASCULAR GRAFTS

Publication number: 20180193529
Abstract: Methods for increasing the patency of biodegradable, synthetic vascular grafts are provided. The methods include administering one or more cytokines and/or chemokines that promote outward tissue remodeling of the vascular grafts and vascular neotissue formation. The disclosed methods do not require cell seeding of the vascular grafts, thus avoiding many problems associated with cell seeding. Biodegradable, polymeric vascular grafts which provide controlled release of cytokines and/or chemokines at the site of vascular graft implantation are also provided.
Type: Application
Filed: December 21, 2017
Publication date: July 12, 2018
Inventors: Christopher Breuer, Themis Kyriakides, Jason Roh

Compositions and methods for promoting patency of vascular grafts

Patent number: 9855370
Abstract: Methods for increasing the patency of biodegradable, synthetic vascular grafts are provided. The methods include administering one or more cytokines and/or chemokines that promote outward tissue remodeling of the vascular grafts and vascular neotissue formation. The disclosed methods do not require cell seeding of the vascular grafts, thus avoiding many problems associated with cell seeding. Biodegradable, polymeric vascular grafts which provide controlled release of cytokines and/or chemokines at the site of vascular graft implantation are also provided.
Type: Grant
Filed: January 8, 2009
Date of Patent: January 2, 2018
Assignee: Yale University
Inventors: Christopher Breuer, Themis Kyriakides, Jason Roh

Compositions and methods for treating and preventing neointimal stenosis
Patent number: 9782522
Abstract: Methods for treating or preventing neointima stenosis are disclosed. The methods generally involve the use of a TGF-B inhibitor, a SMAD2 inhibitor, an FGF Receptor agonist, a Let-7 agonist, or a combination thereof, to inhibit endothelial-to-mesenchymal transition (Endo-MT) of vascular endothelial cells into smooth muscle cells (SMC) at sites of endothelial damage. The disclosed methods can therefore be used to prevent or inhibit neointimal stenosis or restenosis, e.g., after angioplasty, vascular graft, or stent. Also disclosed are methods for increasing the patency of biodegradable, synthetic vascular grafts using a composition that inhibits Endo-MT. A cell-free tissue engineered vascular graft (TEVG) produced by this method is also disclosed.
Type: Grant
Filed: July 5, 2016
Date of Patent: October 10, 2017
Assignee: Yale University
Inventors: Christopher Breuer, Tarek Fahmy, Michael Simons, Pei-Yu Chen, Daniel Rowe Duncan, Joseph Patterson

COMPOSITIONS AND METHODS FOR ANTI-LYST IMMUNOMODULATION
Publication number: 20170073401
Abstract: Excessive or repeated activation of inflammatory and pro-coagulant mechanisms at the site of tissue injury contributes to the development scar tissue that can lead to intimal hyperplasia and fibrotic disease. It has been established that inhibition of the LYST protein is associated with reduced inflammatory responses and reduced platelet activation at the site of tissue damage. Compositions and methods for inhibition of the expression and function of the LYST protein are described. The compositions and methods can be useful for the modulation of immune processes that contribute to formation of neointima and fibroproliferative disorders by altering macrophage, platelet and natural killer cell function to create a pro-regenerative immune response.
Type: Application
Filed: May 4, 2015
Publication date: March 16, 2017
Inventors: Christopher Breuer, Narutoshi Hibino, Vidu Garg, Cameron Best

Compositions and Methods for Treating and Preventing Neointimal Stenosis
Publication number: 20160310645
Abstract: Methods for treating or preventing neointima stenosis are disclosed. The methods generally involve the use of a TGF-B inhibitor, a SMAD2 inhibitor, an FGF Receptor agonist, a Let-7 agonist, or a combination thereof, to inhibit endothelial-to-mesenchymal transition (Endo-MT) of vascular endothelial cells into smooth muscle cells (SMC) at sites of endothelial damage. The disclosed methods can therefore be used to prevent or inhibit neointimal stenosis or restenosis, e.g., after angioplasty, vascular graft, or stent. Also disclosed are methods for increasing the patency of biodegradable, synthetic vascular grafts using a composition that inhibits Endo-MT. A cell-free tissue engineered vascular graft (TEVG) produced by this method is also disclosed.
Type: Application
Filed: July 5, 2016
Publication date: October 27, 2016

Inventors: Christopher Breuer, Tarek Fahmy, Michael Simons, Pei-Yu Chen, Daniel Rowe Duncan, Joseph Patterson

Compositions and methods for treating and preventing neointimal stenosis
Patent number: 9446175
Abstract: Methods for treating or preventing neointima stenosis are disclosed. The methods generally involve the use of a TGF? inhibitor, a SMAD2 inhibitor, an FGF Receptor agonist, a Let-7 agonist, or a combination thereof, to inhibit endothelial-to-mesenchymal transition (Endo-MT) of vascular endothelial cells into smooth muscle cells (SMC) at sites of endothelial damage. The disclosed methods can therefore be used to prevent or inhibit neointimal stenosis or restenosis, e.g., after angioplasty, vascular graft, or stent. Also disclosed are methods for increasing the patency of biodegradable, synthetic vascular grafts using a composition that inhibits Endo-MT. A cell-free tissue engineered vascular graft (TEVG) produced by this method is also disclosed.
Type: Grant
Filed: June 4, 2012
Date of Patent: September 20, 2016
Assignee: Yale University
Inventors: Christopher Breuer, Tarek Fahmy, Michael Simons, Pei-Yu Chen, Daniel Rowe Duncan, Joseph Patterson

System for seeding cells onto three dimensional scaffolds
Patent number: 9090863
Abstract: Systems are provided for convenient and sterile isolation, collection, and seeding of cells onto a scaffold or tissue graft. The systems may be closed. Methods for use of the disclosed systems for isolation, collection and seeding of cells and generation of tissue engineered vascular grafts are also provided. The systems may be supplied in kits for efficient and expeditious use.
Type: Grant
Filed: May 17, 2010
Date of Patent: July 28, 2015
Assignees: PALL CORPORATION, YALE UNIVERSITY
Inventors: Christopher Breuer, Edward L. Snyder, Keru O. Shafi, Martin A. Smith

Compositions and Methods for Treating and Preventing Neointimal Stenosis
Publication number: 20140348889
Abstract: Methods for treating or preventing neointima stenosis are disclosed. The methods generally involve the use of a TGF? inhibitor, a SMAD2 inhibitor, an FGF Receptor agonist, a Let-7 agonist, or a combination thereof, to inhibit endothelial-to-mesenchymal transition (Endo-MT) of vascular endothelial cells into smooth muscle cells (SMC) at sites of endothelial damage. The disclosed methods can therefore be used to prevent or inhibit neointimal stenosis or restenosis, e.g., after angioplasty, vascular graft, or stent. Also disclosed are methods for increasing the patency of biodegradable, synthetic vascular grafts using a composition that inhibits Endo-MT. A cell-free tissue engineered vascular graft (TEVG) produced by this method is also disclosed.
Type: Application
Filed: June 4, 2012
Publication date: November 27, 2014
Applicant: YALE UNIVERSITY

Inventors: Christopher Breuer, Tarek Fahmy, Michael Simons, Pei-Yu Chen, Daniel Rowe Duncan, Joseph Patterson

System For Seeding Cells Onto Three Dimensional Scaffolds
Publication number: 20110281358
Abstract: Systems are provided for convenient and sterile isolation, collection, and seeding of cells onto a scaffold or tissue graft. The systems may be closed. Methods for use of the disclosed systems for isolation, collection and seeding of cells and generation of tissue engineered vascular grafts are also provided. The systems may be supplied in kits for efficient and expeditious use.
Type: Application
Filed: May 17, 2010
Publication date: November 17, 2011
Applicants: PALL CORPORATION, YALE UNIVERSITY
Inventors: Christopher Breuer, Edward L. Snyder, Keru O. Shafi, Martin A. Smith

Compositions and Methods for Promoting Patency of Vascular Grafts
Publication number: 20100303889
Abstract: Methods for increasing the patency of biodegradable, synthetic vascular grafts are provided. The methods include administering one or more cytokines and/or chemokines that promote outward tissue remodeling of the vascular grafts and vascular neotissue formation. The disclosed methods do not require cell seeding of the vascular grafts, thus avoiding many problems associated with cell seeding. Biodegradable, polymeric vascular grafts which provide controlled release of cytokines and/or chemokines at the site of vascular graft implantation are also provided.
Type: Application
Filed: January 8, 2009
Publication date: December 2, 2010
Applicant: Yale University
Inventors: Christopher Breuer, Themis Kyriakides, Jason Roh

PUBLICATIONS

1. The importance of staging laparotomy in pediatric Hodgkin's disease. **Breuer CK**, Tarbell NJ, Mauch PM, Weinstein HJ, Morrissey M, Neuberg D, Shamberger RC. J Pediatr Surg. 1994 Aug;29(8):1085-9.

2. Fabricating tubular devices from polymers oflactic and glycolic Acid for tissue engineering. Mooney DJ, **Breuer C**, McNamara K, Vacanti JP, Langer R. Tissue Eng. 1995 Summer;l(2):107-18.

3. Tissue engineering heart valves: valve leaflet replacement study in a lamb model. Shinoka T, **Breuer CK**, Tanel RE, Zund G, Miura T, Ma PX, Langer R, Vacanti JP, Mayer JE Jr. Ann Thorac Surg. 1995 Dec;60(6 Suppl):S513-6.

4. Stabilized polyglycolic acid fibre-based tubes for tissue engineering. Mooney DJ, Mazzoni CL, **Breuer C**, McNamara K, Hem D, Vacanti JP, Langer R. Biomaterials. 1996 Jan;17(2):l 15-24.

5. Hypoxic stress alone does not modulate endothelial surface expression of bovine E- selectin and intercellular adhesion molecule-1 (ICAM-1). Zilnd G, Dzus AL, McGuirk DK, **Breuer C**, Shinoka T, Mayer JE, Colgan SP. Swiss Surg Suppl. 1996;Suppl l :41-5.

6. Tissue engineering lamb heart valve leaflets. **Breuer CK**, Shin'oka T, Tanel RE, Zund G, Mooney DJ, Ma PX, Miura T, Colan S, Langer R, Mayer JE, Vacanti JP. Biotechnol Bioeng. 1996 Jun 5;50(5):562-7.

7. Effects of nitric oxide on hyperinflation-induced pulmonary hypertension in the isolated-perfused lung. Ibla JC, Arnold JH, Thompson JE, **Breuer CK**, Benjamin PK, Lillehei CW. Crit Care Med. 1996 Aug;24(8):1388-95.

8. Tissue-engineered heart valves. Autologous valve leaflet replacement study in a lamb model. Shinoka T, Ma PX, Shum-Tim D, **Breuer CK**, Cusick RA, Zund G, Langer R, Vacanti JP, Mayer JE Jr. Circulation. 1996 Nov 1;94(9 Suppl):II164-8.

9. The in vitro construction of a tissue engineered bioprosthetic heart valve. Zund G, **Breuer CK**, Shinoka T, Ma PX, Langer R, Mayer JE, Vacanti JP. Eur J Cardiothorac Surg. 1997 Mar;l 1(3):493-7.

10. Surgical management of necrotizing Candida esophagi tis. Gaissert HA, **Breuer**

CK, Weissburg A, Menne} L. Ann Thorac Surg. 1999 Jan;67(1):231-

11. Incidence of contralateral inguinal hernia: a prospective analysis. Tackett LD, **Breuer CK**, Luks FI, Caldamone AA, Breuer JG, Deluca FG, Caesar RE, Efthemiou E, Wesselhoeft CW Jr. J Pediatr Surg. 1999 May;34(5):684-7; discussion 687-8

12. Evaluation of methods ofhepatotrophic stimulation in rat heterotopic hepatocyte transplantation using polymers. Kaufmann PM, Sano K, Uyama S, **Breuer CK**, Organ GM, Schloo BL, Kluth D, Vacanti JP. J Pediatr Surg. 1999 Jul;34(7):1118-23

13. Cost-effectiveness oflaparoscopy in children. Luks FI, Logan J, **Breuer CK**, Kurkchubasche AG, Wesselhoeft CW Jr, Tracy TF Jr. Arch Pediatr Adolesc Med. 1999 Sep;153(9):965-8.

14. The unpredictable character of congenital cystic lung lesions. Roggin KK, **Breuer CK**, Carr SR, Hansen K, Kurkchubasche AG, Wesselhoeft CW Jr, Tracy TF Jr, Luks Fl. J Pediatr Surg. 2000 May;35(5):801-5

15. Extracorporeal membrane oxygenation in piglets using a polymerized bovine hemoglobin-based oxygen-carrying solution (HBOC-201). York GB, DiGeronimo RJ, Wilson BJ, Cofer BR, **Breuer CK**, Josephs JD, Smith DL, Sorrells DL. J Pediatr Surg. 2002 Oct;37(10):1387-92

16. Potential tissue-engineering applications for neonatal surgery. **Breuer C**, Anthony T, Fong P. Semin Perinatol. 2004 Jun;28(3):164-73. Review

17. Neuroblastoma update. Henry MC, Tashjian DB, **Breuer CK**. Curr Opin Oncol. 2005 Jan;l 7(1):19-23. Review.

18. Application of tissue-engineering principles toward the development of a semilunar heart valve substitute. **Breuer CK**, Mettler BA, Anthony T, Sales VL, Schoen FJ, Mayer JE. Tissue Eng. 2004 Nov-Dec;IO(l l-12):1725-36. Review

19. A case report of midgut atresia and spontaneous closure of gastroschisis. Winter LW, Giuseppetti M, **Breuer CK** Pediatr Surg Int. 2005 May;21(5):415-6

20. Artificial blood vessel: the Holy Grail of peripheral vascular surgery. Kakisis JD, Liapis CD, **Breuer C**, Sumpio BE. J Vase Surg. 2005 Feb;41(2):349-54. Review

21. Development of a parathyroid hormone-controlled release system as a potential surgical treatment for hypoparathyroidism. Anthony T, Fong P, Goyal A, Saltzman WM, Moss RL, **Breuer C**. J Pediatr Surg. 2005 Jan;40(1):81-5

22. Effect of ductus ligation on cardiopulmonary function in premature baboons. McCumin DC, Yoder BA, Coalson J, Grubb P, Kerecman J, Kupferschmid J, **Breuer C**, Siler-Khodr T, Shaul PW, Clyman R. Am J Respir Crit Care Med. 2005 Dec 15;172 (12):1569-74

23. The appendix sign: a radiographic marker for irreducible intussusception. Henry MC, **Breuer CK**, Tashjian DB, Moss RL, McKee M, Touloukian R, Goodman TR, Miller C, Bokhari J. J Pediatr Surg. 2006 Mar;41(3):487-9.

24. Pediatric inflammatory bowel disease. Diefenbach KA, **Breuer CK**. World J Gastroenterol. 2006 May 28;12(20):3204-12. Review

25. Construction of an autologous tissue-engineered venous conduit from bone marrow- derived vascular cells: optimization of cell harvest and seeding techniques. Roh JD, Brennan MP, Lopez-Soler RI, Fong PM, Goyal A, Dardik A, **Breuer CK** J Pediatr Surg. 2007 Jan;42(1):198-202

26. Development of a mouse model for evaluation of small diameter vascular grafts. Lopez-Soler RI, Brennan MP, Goyal A, Wang Y, Fong P, Tellides G, Sinusas A, Dardik A, **Breuer C**. J Surg Res. 2007 May 1;139(1):1-6

27. Venous identity is lost but arterial identity is not gained during vein graft adaptation. Kudo FA, Muto A, Maloney SP, Pimiento JM, Bergaya S, Fitzgerald TN, Westvik TS, Frattini JC, **Breuer CK**, Cha CH, Nishibe T, Tellides G, Sessa WC, Dardik A. Arterioscler Thromb Vase Biol. 2007 Ju1;27(7):1562-71.

28. Development of PTH eluting microspheres for the treatment ofhypoparathyroidism. Fong P, Goyal A, Brennan M, Park J, Moss L, Saltzman WM, **Breuer CK** J Surg Res. 2007 Dec;143(2):195-9

29. Centrifugal seeding increases seeding efficiency and cellular distribution of bone marrow stromal cells in porous biodegradable scaffolds. Roh JD, Nelson GN, Udelsman BV, Brennan MP, Lockhart B, Fong PM, Lopez-Soler RI, Saltzman WM, **Breuer CK**. Tissue Eng. 2007Nov;l3(11):2743-9

30. Differentiated thyroid cancer in children: diagnosis and management. Dinauer CA, **Breuer C**, Rivkees SA. Curr Opin Oncol. 2008 Jan; 20(1):59-65 Review

31. Small-diameter biodegradable scaffolds for functional vascular tissue engineering in the mouse model. Roh JD, Nelson GN, Brennan MP, Mirensky TL, Yi T, Hazlett TF, Tellides G, Sinusas AJ, Pober JS, Saltzman WM, Kyriakides TR, **Breuer CK**. Biomaterials. 2008 Apr;29(10):1454-63

32. The development of tissue-engineered grafts for reconstructive cardiothoracic surgical applications. Mirensky TL, **Breuer CK**. Pediatr Res. 2008

May;63(5):559-68

33. Functional small-diameter human tissue-engineered arterial grafts in an immunodeficient mouse model: preliminary findings. Nelson GN, Mirensky T, Brennan MP, Roh JD, Yi T, Wang Y, **Breuer CK**. Arch Surg. 2008 May;143(5):488-94

34. A non-parametric vessel detection method for complex vascular structures. Qian X, Brennan MP, Dione DP, Dobrucki WL, Jackowski MP, **Breuer CK**, Sinusas AJ, Papademetris X. Med Image Anal. 2009 Feb;13(1):49-61.

35. Initial evaluation of the use of USPIO cell labeling and noninvasive MR monitoring of human tissue-engineered vascular grafts in vivo. Nelson GN, Roh JD, Mirensky TL, Wang Y, Yi T, Tellides G, Pober JS, Shkarin P, Shapiro EM, Saltzman WM, Papademetris X, Fahmy TM, **Breuer CK**. FASEB J. 2008 Nov;22(11):3888-95

36. Tissue-engineered vascular grafts demonstrate evidence of growth and development when implanted in a juvenile animal model. Brennan MP, Dardik A, Hibino N, Roh JD, Nelson GN, Papademitris X, Shinoka T, **Breuer CK**. Ann Surg. 2008 Sep;248(3):370-7

37. Effective visualization of complex vascular structures using a non-parametric vessel detection method. Joshi A, Qian X, Dione DP, Bulsara KR, **Breuer CK**, Sinusas AJ, Papademetris X. IEEE Trans Vis Comput Graph. 2008 Nov-Dec;14(6):1603-10

38. Tissue-engineered blood vessels in pediatric cardiac surgery. Shinoka T, **Breuer C**. Yale J Biol Med. 2008 Dec;81(4):161-6. Review

39. Development of decellularized human umbilical arteries as small-diameter vascular grafts. Gui L, Muto A, Chan SA, **Breuer CK**, Niklason LE. Tissue Eng Part A. 2009 Sep;15(9):2665-76.

40. Novel utilization of serum in tissue decellularization. Gui L, Chan SA, **Breuer CK**, Niklason LE. Tissue Eng Part C Methods. 2010 Apr;l6(2):173-84

41. Tissue-engineered arterial grafts: long-term results after implantation in a small animal model. Mirensky TL, Nelson GN, Brennan MP, Roh JD, Hibino N, Yi T, Shinoka T, **Breuer CK**. J Pediatr Surg. 2009 Jun;44(6):l 127-32; discussion 1132-3.

42. Cell-seeding techniques in vascular tissue engineering. Villalona GA, Udelsman 8, Duncan DR, McGillicuddy E, Sawh-Martinez RF, Hibino N, Painter C, Mirensky T, Erickson B, Shinoka T, **Breuer CK**. Tissue Eng Part B Rev. 2010

Jun;16(3):341-50

43. Late-term results of tissue-engineered vascular grafts in humans. Hibino N, McGillicuddy E, Matsumura G, Ichihara Y, Naito Y, **Breuer C**, Shinoka T. J Thorac Cardiovasc Surg. 2010 Feb;l39(2):431-6, 436.el-2

44. Tissue-engineered vascular grafts transform into mature blood vessels via an inflammation-mediated process of vascular remodeling. Roh JD, Sawh-Martinez R, Brennan MP, Jay SM, Devine L, Rao DA, Yi T, Mirensky TL, Nalbandian A, Udelsman B, Hibino N, Shinoka T, Saltzman WM, Snyder E, Kyriakides TR, Pober JS, **Breuer CK**. ProcNatl Acad Sci US A. 2010 Mar 9;107(10):4669-74.

45. Tissue-engineered lungs for in vivo implantation. Petersen TH, Calle EA, Zhao L, Lee EJ, Gui L, Raredon MB, Gavrilov K, Yi T, Zhuang ZW, **Breuer C**, Herzog E, Niklason LE. Science. 2010 Jul 30;329(5991):538-41

46. Tissue-engineered vascular grafts: does cell seeding matter? Mirensky TL, Hibino N, Sawh-Martinez RF, Yi T, Villalona G, Shinoka T, **Breuer CK**. J Pediatr Surg. 2010 Jun;45(6):1299-305.

47. American Pediatric Surgical Association New Technology Committee review on video-assisted thoracoscopic surgery for childhood cancer. Gow KW, Chen MK; New Technology Committee., Barnhart D, **Breuer C**, Brown M, Calkins C, Ford H, Harmon C, Hebra A, Kane T, Keshen T, Kokoska ER, Lawlor D, Pearl R. J Pediatr Surg. 2010 Nov;45(11):2227-33.

48. The development and translation of the tissue-engineered vascular graft. **Breuer CK**. J Pediatr Surg. 2011 Jan;46(1):8-l 7.

49. Development of an operator-independent method for seeding tissue-engineered vascular grafts. Udelsman B, Hibino N, Villalona GA, McGillicuddy E, Nieponice A, Sakamoto Y, Matsuda S, Vorp DA, Shinoka T, **Breuer CK**. Tissue Eng Part C Methods. 2011 Jul;17(7):731-6.

50. Vascular tissue engineering: towards the next generation vascular grafts. Naito Y, Shinoka T, Duncan D, Hibino N, Solomon D, Cleary M, Rathore A, Fein C, Church S, **Breuer C**. Adv Drug Deliv Rev. 2011 Apr 30;63(4-5):312-23. Review.

51. Serial nonrigid vascular registration using weighted normalized mutual information. Suh JW, Scheinost D, Qian X, Sinusas AJ, **Breuer CK**, Papademetris X. Proc IEEE Int Symp Biomed Imaging. 2010 Apr 14; 2010:25.

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152. Mouse Model of Tracheal Replacement With Electrospun Nanofiber Scaffolds. Dharmadhikari S, Best CA, King N, Henderson M, Johnson J, **Breuer CK**, Chiang T. Ann Otol Rhinol Laryngol. 2019 May;128(5):391-400.

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engineered vascular grafts.Agarwal R, Blum KM, Musgrave A, Onwuka EA, Yi T, Reinhardt JW, A Best C, **Breuer CK**. Regen Med. 2019 Jul;14(7):627-637.

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169. Biology and Biomechanics of the Heart Valve Extracellular Matrix. Kodigepalli KM, Thatcher K, West T, Howsmon DP, Schoen FJ, Sacks MS, **Breuer CK**, Lincoln J. J Cardiovasc Dev Dis. 2020 Dec 16;7(4):57.

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GJM, Reinhardt JW, Yi T, Barker JC, **Breuer CK.** Sci Rep. 2021 Apr 13;11(1):8037.

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190. Computational analysis of serum-derived extracellular vesicle miRNAs in juvenile sheep model of single stage Fontan procedure. Park HJ, Kelly JM, Hoffman JR, Takaesu F, Schwartzman W, Ulziibayar A, Kitsuka T, Heuer E, Yimit A, Malbrue R, Anderson C, Morrison A, Naguib A, Mckee C, Harrison A, Boe B, Armstrong A, Salavitabar A, Yates A, Shinoka T, Carrillo S, Breuer CK, Davis ME. Extracell Vesicle. 2022 Dec;1:100013.

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194. Evaluating Calcification in Tissue-Engineered Heart Valves: Much More Complicated Than Expected? Motta SE, **Breuer CK**, Zilla P, Hoerstrup SP, Emmert MY. JACC Basic Transl Sci. 2023 May 22;8(5):592-593.

195. Patch Materials for Pulmonary Artery Arterioplasty and Right Ventricular Outflow Tract Augmentation: A Review. Schwartzman WE, Jimenez M, Yates AR, Armstrong AK, Salavitabar A, Hor KK, Hoerstrup S, Emmert MY, Shinoka T, Carrillo SA, **Breuer CK**, Kelly JM. Pediatr Cardiol. 2023 Jun;44(5):973-995.

196. Regeneration of tracheal neotissue in partially decellularized scaffolds. Tan ZH, Dharmadhikari S, Liu L, Yu J, Shontz KM, Stack JT, **Breuer CK**, Reynolds SD, Chiang T. NPJ Regen Med. 2023 Jul 12;8(1):35.

197. Functional mechanical behavior of the murine pulmonary heart valve. Feng X, Liu Y, Kamensky D, McComb DW, **Breuer CK**, Sacks MS. Sci Rep. 2023 Aug 8;13(1):12852.

198. Assessing the Biocompatibility and Regeneration of Electrospun-Nanofiber Composite Tracheal Grafts. Kreber L, Liu L, Dharmadhikari S, Tan ZH, Chan C, Huddle J, Hussein Z, Shontz K, **Breuer CK**, Johnson J, Chiang T. Laryngoscope. 2023 Aug 14.

199. Successful Orthotopic Liver Transplantation in Mice Utilizing Microcomputed Tomography Angiography. Zeng Q, Gouchoe DA, Nabavinia M, Lee YG, Wang X, Shaffer TA, Stacy MR, Peterson BR, Whitson BA, **Breuer C**, Black SM. J Vis Exp. 2023 Sep 22;(199).

200. Development of Novel Sutureless Balloon Expandable Fetal Heart Valve Device Using Absorbable Polycaprolactone Leaflets. Bhat SS, Bui HT, Farnan A, Vietmeyer K, Armstrong AK, **Breuer CK**, Dasi LP. Ann Biomed Eng. 2023 Oct 20.

201. MG53 Mitigates Warm Ischemic Lung Injury in A Murine Model of Transplantation. Gouchoe DA, Yi T, Kim JL, Lee YG, Black SM, **Breuer C**, Ma J, Whitson BA. J Thorac Cardiovasc Surg. 2023 Nov 2:S0022-5223(23)01013-9.

202. Evaluation of tissue-engineered human acellular vessels as a Blalock-Taussig-Thomas shunt in a juvenile primate model. Nash KM, Boe BA, Carrillo SA, Harrison A, Iwaki R, Kelly J, Kirkton RD, Krishnamurthy R, Lawson JH, Matsuzaki Y, Prichard HL, Shah K, Shinoka T, **Breuer CK.** JTCVS Open. 2023 Aug 9;15:433-445.

203. CXCR5+CD8+ T Cell-Mediated Suppression of Humoral Alloimmunity and AMR in Mice Is Optimized With mTOR and Impaired With Calcineurin Inhibition. Han JL, Zimmerer JM, Zeng Q, Chaudhari SR, Hart M, Satoskar AA, Abdel-Rasoul M, **Breuer CK**, Bumgardner GL. Transplantation. 2023 Oct 24.

BOOK CHAPTERS

1. **Breuer CK**, Vacanti JP. Surgical Liver Disease. In Surgery oflnfants and Children, ed. KT Oldham, RP Foglia, and PM Colombani, Lippencott Co., Philadelphia, PA, 1997, pp. 1385-1394.

2. Tsoulfas G, **Breuer CK**. The Use of Small Bowel Transplantation in Necrotizing Enterocolitis. In Necrotizing Enterocolitis, ed. BF Gilchrist, Landes Bioscience Co., Georgetown, TX, 2000, pp. 85-90.

3. Sorrells DL, **Breuer CK**, Tracy TF. Meckels Diverticulum. In Principles of Surgery, ed. KI Bland, WB Saunders Co., 2002, pp. 939-944.

4. **Breuer CK**, Sorrells DL, Tracy TF. Anomalies of Bowel Rotation: Malrotation and Midgut Volvulous. In Principles of Surgery, ed. KI Bland, WB Saunders Co., 2002, pp. 918-922

5. Fong P, Park J, **Breuer CK**. Heart Valves. In Principles of Tissue Engineering, 3rd edition, ed. R Lanza, R Langer, and J Vacanti, Elsevier Co., New York, NY, 2007, pp. 585-597.

6. Sawh-Martinez R, McGillicuddy E, Villalona G, Shinoka T, **Breuer CK**. Cardiovascular System: Stem Cells in Tissue-Engineered Blood Vessels In Stem Cells and Tissue Engineering. Ed..Song Li, Nicolas L'Heureux, and Jennifer Elisseeff. World Scientific, 2011 pp.115-133

7. Tara S, Dean EW, Rocco KA, Udelsman BV, Kurobe H, Shinoka T, **Breuer CK**. Chapter 58; Vessel Bioengineering. In Regenerative Medicine Applications in Organ Transplantation ed. Orlando G. Elsevier Co., New York, NY, 2013 pp. 813-830.

8. Maxfield MW, Cleary MA, and **Breuer CK** Chapter 40: Tissue Engineering Heart Valves. In Principles of Tissue Engineering. ed. Robert Lanza, Robert Langer, and Joseph Vacanti. Elsevier Co., New York, NY, 2013, pp.813-833.

PRESENTATIONS

INTERNATIONAL

1. Invited speaker, International Conference on Stem Cell Engineering
   Toronto, Canada
   October 26, 2016

2. Invited participant, 9th World Congress of Biomechanics 2022 Taipei - Virtual
   Taipei, Japan
   July 10-14, 2022

3. Keynote speaker, Annual IREM Symposium
   Sils-Maria, Switzerland
   September 4-9, 2022

4. Invited participant, 19th Annual Science and Technology in Society Forum (STS)
   Kyoto, Japan
   October 2-4, 2022

5. Invited speaker, 17th Annual IREM Winter Symposium
   Sils-maria, Switzerland
   March 15, 2023

6. Invited participant, 20th Annual Science and Technology in Society Forum (STS)
   Kyoto, Japan
   October 1-3, 2023

NATIONAL

1. Invited Speaker, Society for Vascular Surgery Vascular Research Initiatives
   Minneapolis, MN
   May 2, 2017

2. Visiting Professor, John Hopkins University
   Baltimore, MD
   May 23, 2017

3. Invited Speaker, NAVBO Workshop in Vascular Matrix Biology and Bioengineering
   Asilomar, CA
   October 15, 2017

4. Invited Speaker, NASA Meeting
   San Francisco, CA
   March 6, 2018

5. Invited Speaker, Stanford Single Ventricle Summit
   Stanford University, Palo Alto, CA
   April 23, 2018

6. Invited Speaker, 10th Symposium for Biologic Scaffolds for Regenerative Medicine
   Napa Valley, CA
   May 4, 2018

7. Invited Lecturer, Brown University
   Providence, RI
   May 16, 2018

8. Invited Speaker, Healthcare 3.0: Interdisciplinary Collaboration
   Association of Nigerian Physicians in the Americas
   Dallas, TX
   June 28, 2018

9. Invited Speaker, Cardiovascular Engineering Track
   Biomedical Engineering Society Conference
   Atlanta, GA
   October 19, 2018

10. Invited Speaker, Stem Cell & Regenerative Medicine Center
    University of Wisconsin
    Madison, WI
    December 4, 2018

11. Invited Speaker, Transplantation & Cellular Therapy Meetings
    ASBMT & CIBMTR
    Houston, TX
    February 20, 2018

12. Invited Speaker, Stanford Single Ventricle Summit
    Stanford University, Palo Alto, CA
    April 30, 2019

13. Invited Speaker, The 6th International Conference on Clinical and Engineering Frontiers in Pediatric and Congenital Heart Disease
    Children's Hospital of Philadelphia
    Philadelphia, PA
    May 10, 2019

14. Invited Professor,
    "Translational Cardiovascular Tissue Engineering"
    Washington University
    St. Louis, Missouri
    November 19-22, 2019

15. Invited Professor
"Tissue Engineered Vascular Grafts"
Herma Heart Center
Milwaukee, Wisconsin
March 2-3, 2020

16. Invited Speaker, Additional Ventures Single Ventricle Workshop
Dallas, Texas
Virtual Meeting due to COVID-19
March 22-24, 2020

17. Invited Lecturer, Experimental Biology
"Tissue Engineered Vascular Grafts in Congenital Heart Surgery"
San Diego, California
Cancelled due to COVID-19
April 4-7, 2020

18. Invited participant, Additional Ventures PI Meeting
California
July 26-27, 2022

19. Invited Lecturer, Single Ventricle Investigator Meeting,
Baltimore, MD
October 6-9, 2022

20. Invited Lecturer, American Heart Association,
Chicago, IL
November 7, 2022

21. Invited Panelist, U.S. News & World Report
"Innovations in Pediatric Surgery: Improving Outcomes for Kids,"
January 26, 2023

22. Invited speaker, Surgical Grand Rounds
Baystate Medical Center
Springfield, MA
February 2, 2023

23. Invited speaker, 2023 Biomaterials and Tissue Engineering
Gordon Research Conference
July 16-17, 2023

24. Invited speaker, 8th World Congress of Pediatric Cardiology and Cardiac Surgery
"Tissue Engineered Vascular Grafts"
August 29, 2023

REGIONAL AND INSTITUTIONAL

25. Invited speaker, 2016 Technology Showcase
    Office of Technology Commercialization, Nationwide Children's Hospital
    December 5, 2016

26. Invited speaker, T2C Conference
    Center for Regenerative Medicine and Cell Based Therapies, Comprehensive Would Center, The Ohio State University, Columbus, Ohio
    March 9, 2017

27. Invited Speaker, Heart Valve Retreat
    The Ohio State University, Columbus, Ohio
    December 11, 2017

28. Invited Speaker, Board Presentation
    Nationwide Children's Hospital, Columbus, Ohio
    August 24, 2018

29. Invited Presenter, Nationwide Children Heart Foundation
    Nationwide Children's Hospital, Columbus, Ohio
    February 14, 2019

30. Invited Presenter, Entrepreneurs for Kids Everywhere
    Nationwide Children's Hospital, Columbus, Ohio
    May 15, 2019

31. Invited Presenter, BOSS Seminar Series
    Nationwide Children's Hospital, Columbus, Ohio
    October 1, 2019

32. Invited Speaker, SPR Pediatric Cardiovascular MR Symposium
    "Tissue Engineered Vascular Grafts in Children: Insights from CFD"
    Nationwide Children's Hospital, Columbus, Ohio
    October 18, 2019

33. Invited Speaker, Surgery Grand Rounds
    "Cardiovascular Tissue Engineering"
    Nationwide Children's Hospital, Columbus Ohio
    July 22, 2020

34. Invited Speaker, Signature Program Translational Science Curriculum
"Regenerative Medicine & Wound Healing"
February 16, 2023

35. Invited to speaker, Spring 2023 BME Tissue engineering class
The Ohio State University
April 4, 2023

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

2003-Present	Member Association for Academic Surgery
2004-Present	Member American Academy of Pediatrics
2004-Present	Member American Pediatric Surgical Association
2005-Present	Member American College of Surgeons
2005-2007	Publications Committee Member American Pediatric Surgical Association
2006-2008	Education Committee Member American Pediatric Surgical Association
2008-Present	Member Society of University Surgeons
2009-Present	New Technologies Committee Member American Pediatric Surgical Association
2012-Present	Member Surgical Biology Club II
2015-Present	Member American Surgical Association
2016-Present	Member North American Vascular Biology Organization
2016-Present	Member American College of Surgeons Professional Association
2016-Present	Member Interventional Society for Applied Vascular Biology

I have reviewed the curriculum vitae for completeness and accuracy and agree with its content.

Signature: _____ Date: 11/28/23