

CURRICULUM VITAE

Part I: General Information

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Name Seth J. Karp

Current Position Chairman, Section of Surgical Sciences, Vanderbilt University Medical Center
Surgeon-in-Chief, Vanderbilt University Medical Center
H. William Scott Jr. Chair in Surgery
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Place of Birth Mineola, New York, USA

Education

1988 A.B. Harvard College (Joint Degree in Physics and Astrophysics) with Honors
1989 M.A. Harvard Graduate School of Arts and Sciences (Astrophysics)
1994 M.D. Harvard-Massachusetts Institute of Technology (M.I.T) Division of Health Sciences and Technology with Honors

Postdoctoral Training

1994-1997 Resident, Surgery
Brigham and Women's Hospital, Boston, MA

1997-1999 Postdoctoral Fellow
Harvard University, Cambridge, MA

1999-2000 Resident, Surgery
Brigham and Women's Hospital, Boston, MA

2000-2001 Chief Resident, Surgery
Brigham and Women's Hospital, Boston, MA

2001-2003 Fellow in Transplantation
Johns Hopkins Hospital, Baltimore, MD

2016 Program for Chiefs of Clinic Services
Harvard School of Public Health, Boston, MA

Licensure

1994-2001 Massachusetts Medical License
2001-2004 Maryland Medical License
2004-2012 Massachusetts Medical License
2011-present Tennessee Medical License
2015-present Alabama Medical License

Certification

2002 American Board of Surgery
 2012 American Board of Surgery recertification

Academic Appointments

2001-2003 Instructor in Surgery, Johns Hopkins Medical School, Baltimore, MD
 2003-2004 Assistant Professor of Surgery, Johns Hopkins Hospital, Baltimore, MD
 2004-2011 Assistant Professor of Surgery, Harvard Medical School, Boston, MA
 2011-2013 Associate Professor of Surgery, Vanderbilt University School of Medicine, Nashville, TN
 2012-present Affiliated Faculty, Center for Biomedical Ethics & Society at Vanderbilt, Nashville, TN
 2013-present Professor of Surgery, Vanderbilt University School of Medicine, Nashville, TN

Hospital or Affiliated Institution Appointments

2001-2004 Attending Surgeon, Johns Hopkins Hospital, Baltimore, MD
 2004-2011 Attending Surgeon, Beth Israel Deaconess Medical Center, Boston, MA
 2005-2009 Admissions Committee, Harvard-MIT Health Sciences and Technology (M.D.)
 2008-2011 Director, Pancreas Transplant program
 2008-2011 Director, Transplant Fellowship training program
 2011-2015 Director, Vanderbilt Transplant Center
 2013-2015 Vice Chairman, Department of Surgery, Vanderbilt University Medical Center
 2015-2018 Chairman, Department of Surgery, Vanderbilt University Medical Center
 2017-present Director, Vanderbilt Transplant Center
 2018-present Chairman, Section of Surgical Sciences
 2018-present Surgeon-in-Chief, Vanderbilt University Hospital

Professional Societies and Service

Past

2003-2006 Member, Vanguard Committee, American Society of Transplant Surgeons (ASTS)
 2004-2011 Medical Advisory Committee, American Liver Foundation, New England Chapter
 2006-2010 Member, Cell Transplant Committee, ASTS
 2008-2010 Co-Chair, Cell Transplant Committee, ASTS
 2009-2013 Organizing Committee, American Transplant Congress
 2012 Co-Chair, American Transplant Congress Organizing Committee
 2013 Chair, American Transplant Congress Organizing Committee
 2013-2015 Region 11 Representative to United Network for Organ Sharing (UNOS) Liver Intestine Committee
 2014-2015 Co-Chair, UNOS Liver Intestine Subcommittee on Metrics for Liver Allocation

Present

2002-present Member, American Gastroenterological Society
 2003-present Member, Society for Developmental Biology
 2003-present Member, American Society of Transplant Surgeons
 2006-present Member, The Transplantation Society
 2007-present Member, American College of Surgeons
 2010-present Member, Surgical Biology Club
 2017-present Associate Councillor, UNOS Region 11
 2017-present Member, OPTN/UNOS Membership and Professional Standards Committee (MPSC)

Awards and Honors

1985	National Merit Scholarship Winner
1985	Valedictorian, Syosset High School
1986	Harvard College Scholar – Academic Achievement
1987	Harvard College Scholar – Academic Achievement
1988	Tutor Award Winner, Harvard Bureau of Study Council
1988	Harvard College Scholar – Academic Achievement
1989	John Harvard Scholarship – Highest Academic Achievement
1990	Paul Dudley White Traveling Fellowship
1991	M.I.T./Starr Fellowship
1994	James Tolbert Shipley Prize – Excellence and Accomplishment in Research
1995	Intern of the Year
1996	American College of Surgeons Research Fellowship
1997	Harvard Medical School Excellence in Teaching Award
1998	Best Abstract – American Society of Bone and Mineral Research
2001	Harvard Medical School Excellence in Teaching Award
2001	Francis Moore Sr. Chief Resident Award – Brigham and Women’s Hospital
2002	Johns Hopkins Van Wyk Fellow
2006	American Society of Transplant Surgeons Vanguard Prize
2011	James IV Travelling Fellowship
2014	Ingram Chair in Surgical Sciences, Vanderbilt University
2015	H. William Scott Jr. Chair in Surgery, Vanderbilt University
2017	Fellow, American Surgical Association

Part II: Research, Teaching, Clinical and Leadership Contributions

A. Report of Research, Teaching, Clinical and Leadership Contributions

Basic research

Research in my laboratory concerns the biology of how the liver responds to injury, with the goal of understanding the molecular basis of these processes and then applying this knowledge to strategies for liver renewal or replacement. A number of recent findings challenge existing paradigms, suggesting the liver is not the regenerative organ it was thought to be. Gene expression after global liver injury consists primarily of a proliferative signature, leading to the conclusion that after a major injury, the liver simply grows. This finding suggests simple strategies to enhance liver regeneration could be successful. In combination with the drug discovery team at Vanderbilt, we are developing new compounds to modulate the hepatocyte proliferative response to injury. Other studies demonstrate that after various types of injury, the liver forms a scar, similar to other tissues. This seems to be related to defects in the relationship between the extracellular matrix and the hepatocytes, which may be a fundamental paradigm in understanding the development of liver fibrosis and suggest therapeutic strategies.

Other work demonstrated the importance of inhibiting negative regulators of liver growth after liver injury. We demonstrated that both Tob1 and bone morphogenetic protein 4 (BMP4) are constitutive inhibitors of liver regeneration that must be down-regulated for normal regeneration.

Clinical research

Clinical contributions include liver, kidney, and pancreas transplantation, vascular access, and general surgery. We published a novel procedure for vascular access involving use of the renal vein for outflow that is particularly suitable for patients who present difficult access problems. Other clinical contributions include a novel method for diagnosing gastrointestinal bleeding under development, and demonstration that acute renal failure should not preclude use of kidneys for transplantation. Our group identified novel

methods for determining the suitability of livers for donation after cardiac death transplantation, and we are leading a multi-center consortium to examine this.

Teaching

Teaching contributions include mentoring students, residents, and fellows.

Leadership

At VUMC, I serve as the Chairman of the Section of Surgical Sciences, Surgeon-in-Chief, and Director of the Vanderbilt Transplant Center. In these roles I oversee the Cardiovascular, General, Oral and Maxillofacial, Pediatric, and Thoracic Surgical Services. There are more than 200 full time academic faculty in the Section and we are the major referral center for middle Tennessee. The position includes setting and achieving strategic goals and objectives for the tripartite clinical, research, and educational missions of the Section. Other responsibilities include budgeting, ensuring the financial health of the Section, and oversight of the efficient day-to-day operations of the Section.

As Director of the Transplant Center, I am responsible for the strategic direction, oversight and operation of one of the larger transplant programs in the country. In 2016, the center performed nearly 500 solid organ transplants with overall excellent outcomes.

At the national level, I have been active in transplantation as Chairman of the Cell Transplant Society of the ASTS, and Chairman of the Organizing Committee for the American Transplant Congress, a meeting of more than 5,000 transplant professionals. I was recently elected as Region 11 Associate Councillor which includes a position on the UNOS Board of Directors beginning in 2019.

I also serve as Deputy Editor of the *American Journal of Transplantation* and serve on the Editorial Board of *Cellular and Molecular Gastroenterology and Hepatology*.

B. Funding Information

Pending

2018-2025	National Institutes of Health – U34/U01 for April 2018	Role: Principle Investigator Title: Improving Use of Donation After Circulatory Determination of Death Livers: A Multicenter Consortium
2018-2023	National Institutes of Health – R01DK119291	Role: Principal Investigator Title: Increasing the Benefit of Liver Transplantation by Incorporating Outcome Measures into Allocation Decisions

Active

2016-current	National Institutes of Health—R41DK106779	Role: Co-Investigator Title: A simple and effective diagnostic test for gastrointestinal bleeding to improve patient outcomes
2015-current	National Institutes of Health – U01EB021214	Role: Co-Investigator Title: Building an Implantable Artificial Kidney

Completed

2014-2018	National Institutes of Health – U19CA179514	Role: Co-Investigator Title: Secreted RNA during CRC progression biogenesis function and clinical markers
2010-2015	National Institutes of Health – R01	Role: Principal Investigator Title: BMP signaling: A Therapeutic Target in Liver Disease

2010-2013	Roche Organ Transplant Foundation Title: Predicting Graft Failure when Using Extended Criteria Donors	Role: Principal Investigator
2009-2011	CIMIT (M.I.T.) Title: Collagen Scaffolds to Support Liver Regeneration	Role: Principal Investigator
2008-2010	ASTS Collaborative Scientist Award Title: AAV8 as a Delivery Vector for the Liver	Role: Principal Investigator
2005-2007	American Society of Transplant Surgeons Title: Lineage Analysis of the Developing and Regenerating Liver	Role: Principal Investigator
2003-2008	National Institutes of Health - K08 Title: Activin Signaling in Liver Development and Regeneration	Role: Principal Investigator
2003-2004	American College of Surgeons Title: Liver Development and Regeneration	Role: Principal Investigator
2002-2004	Johns Hopkins Hospital-Van Wyk Fund Title: Transplantation Research	Role: Principal Investigator
1997-1999	National Institutes of Health – F32 Title: Indian Hedgehog Modulates Cartilage Growth and Differentiation	Role: Principal Investigator
1997-1999	American College of Surgeons Title: Conditional Gene Inactivation in the Mouse Midbrain	Role: Principal Investigator
1993	International Society for Cardiovascular Surgery Title: Photodynamic Therapy Inhibits Intimal Hyperplasia via Extracellular Matrix	Role: Co-Investigator
1991	M.I.T./Starr Foundation Title: Cloning and Characterization of the Human NMDA Receptor	Role: Principal Investigator
1990	Johnson and Johnson Title: Tensegrity as a Mechanism for Cellular Signal Transduction	Role: Co-Investigator

C. Report of Current Research Activities

Basic research

Current investigation involves developing small molecule inhibitors of BMP signaling to enhance liver regeneration in humans. These compounds enhance liver regeneration and improve survival in acetaminophen overdose models in mice. We are in the process of screening compounds for efficacy and toxicity.

We are also examining the fundamental determinants of liver size, and further characterizing inhibitory pathways that control liver regeneration.

Our lab recently discovered a role for integrin interactions with extracellular matrix in liver patterning, stellate cell activation, and the development of fibrosis.

Clinical research

Ongoing clinical research studies parameters that determine subsequent function in the use of organs procured from non-heart beating donors. In addition, we are examining the molecular determinants of function of DCD and fatty livers in an effort to better predict which of these livers will be useable.

*D. Report of Teaching***Johns Hopkins Medical School**

- 2001-2003 Fellow in Transplantation; responsible for teaching medical students and residents. 10 students and 20 residents/year. Contact time averaged 5 hours/week.
- 2003-2004 Attending Surgeon; responsible for teaching medical students, residents, and fellows. 4 students/week. Contact time averaged 5 hours/week.

Harvard Medical School

- 2004-2011 Attending surgeon; responsible for teaching medical students, residents, and fellows.

Vanderbilt Medical School

- 2011-present Attending surgeon; responsible for teaching medical students, residents, and fellows.

Invited Presentations

- 2004 Transplant Conference—Current Trends in Gastroenterology, Hepatology, and Liver Transplantation—Maryland
- 2006 Current Opinion Leaders in Transplantation—Molecular Mechanisms of Liver Development and Regeneration—Buenos Aires, Argentina
- 2007 Negotiating Your First Job—American Society of Transplant Surgeons (ASTS) Fellows Meeting—Maui, HI
- 2008 New Paradigms in Liver Regeneration—King's College, London, England
- 2009 Cell Based Therapies for Liver Replacement—ASTS Winter Meeting—Fort Lauderdale, FL
- 2010 Cellular Therapies for Liver Replacement—8th World Congress on Trauma, Shock, Inflammation and Sepsis—Munich, Germany
- 2010 Liver Regeneration Mythology: Prometheus to the Present—Rhode Island Hospital Grand Rounds--Providence, RI
- 2011 Molecular Mechanisms of Liver Development and Regeneration—Saint Vincent's Hospital Grand Rounds--Dublin, Ireland
- 2011 Molecular Mechanisms of Liver Development and Regeneration—Royal Infirmary-- Edinburgh, Scotland, U.K.
- 2011 Molecular Mechanisms of Liver Development and Regeneration—Oxford Transplant Center, Oxford, England, U.K.
- 2011 What's New, What's Hot--American Transplant Congress, Philadelphia, PA
- 2011 Update on Transplantation 2011—Vanderbilt University Medical School Surgery Grand Rounds--Nashville, TN
- 2011 Use of Genomics to Study Liver Regeneration--American Association for the Study of Liver Diseases (AASLD) Annual Meeting, San Francisco, CA
- 2012 The Myths of Liver Regeneration--St. Mary's Hospital, Hong Kong, China
- 2012 Transplantation in the United States--Tohoku University Medical Center, Sendai, Japan
- 2012 Debate: Controversies in Transplantation: Are Molecular Diagnostics Ready for Prime Time? --at the American Transplant Congress--Boston, MA
- 2013 Physician Leadership in Transplantation at the Transplant Management Forum--San Diego, CA
- 2013 Clinical Implications of Basic Science Advances in Liver Research—AASLD Annual Meeting, Washington, D.C.
- 2014 Use of Marginal Organs for Transplantation--Medical University of South Carolina Grand Rounds—Charleston, SC
- 2014 Physician Leadership--United Network for Organ Sharing Symposium, Baltimore, MD
- 2016 The Myths of Liver Regeneration—Duke University, Surgery Grand Rounds, Durham, NC
- 2016 The Case Against Liver Redistricting—The Liver Meeting, AASLD, Boston, MA

- 2017 Key Habits of the Highly Successful Transplant Physician Director—Transplant Management Group 23rd Annual Practice of Transplant Administration Workshop, San Diego, CA
- 2018 Falling Feels Like Flying Till You Hit the Ground: Attempts to Translate Research Discoveries to the Bedside—Vanderbilt University Medical Center, Surgery Grand Rounds, Nashville, TN
- 2018 Debate on National Attitudes around Organ Donation—Controversies in Transplantation Meeting, Breckenridge, CO

Editorial Service

Deputy Editor—*American Journal of Transplantation*

Editorial Board—*Journal of Cellular and Molecular Gastroenterology and Hepatology*

E. Report of Clinical Activities

Clinical practice and complexity

Clinical practice involves all aspects of adult and pediatric liver transplantation and general surgery in patients with liver or kidney disease. The work would generally be considered of high complexity.

Clinical contributions

All aspects of transplantation surgery and general surgery in transplant patients.

Part III: Bibliography

Original Articles

1. Seal G, Brech K, **Karp SJ**, Cool BJ, Sirover MA. Immunological lesions in human uracil DNA glycosylase: association with Bloom syndrome. *Proc. Nat. Acad. Sci. USA*. 1988 Apr; 85(7):2339-43. PMID: 3353381 | PMID: PMC279987
2. Lurio J, Verson H, **Karp SJ**. Intestinal parasites in Cambodians: comparison of diagnostic methods used in screening refugees with implications for treatment of populations with high rates of infection. *J. Am. Board of Fam. Pract.* 1991 Mar-Apr; 4(2):71-78. PMID: 2028827
3. Sims JR, **Karp SJ**, Ingber DE. Altering the cellular mechanical force balance results in integrated changes in cell, cytoskeletal, and nuclear shape. *J. Cell. Science*. 1992 Dec; 103(Pt 4): 1215-22. PMID: 1487498
4. **Karp SJ**, Masu M, Eki T, Ozawa K, Nakanishi S. Molecular cloning and chromosomal localization of the key subunit of the human N-methyl-D-aspartate receptor. *J. Biol. Chem.* 1993 Feb 15; 268(5):3728-33. PMID: 7679115
5. Adili F, Stadius van Epps RG, **Karp SJ**, Watkins MT, LaMuraglia GM. Differential modulation of vascular endothelial and smooth muscle cell function by photodynamic therapy of extracellular matrix: novel insights into radical-mediated prevention of intimal hyperplasia. *J. Vasc. Surg.* 1996 Apr; 23(4):698-705. PMID: 8627908
6. LaMuraglia GM, Adili F, **Karp SJ**, Stadius van Eps RG, Watkins MT. Photodynamic therapy inactivates extracellular matrix-basic fibroblast growth factor: insights to its effect on the vascular wall. *J. Vasc. Surg.* 1997 Aug; 26(2):294-301. PMID: 9279318
7. **Karp SJ**, Schipani E, St-Jacques B, Hunzelman J, Kronenberg H, McMahon AP. Indian hedgehog coordinates endochondral bone growth and morphogenesis via parathyroid hormone related-protein-dependent and -independent pathways. *Development*. 2000 Feb; 127(3):543-8. PMID: 10631175
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10. **Karp SJ**, Hawxby A, Burdick JF. Axillorenal arteriovenous graft: a new approach for dialysis access. *J. Vasc. Surg.* 2004 Aug; 40(2):379-80. PMID: 15297838
11. Ugarte R, Kraus E, Montgomery RA, Burdick JF, Ratner L, Haas M, Hawxby AM, **Karp SJ**. Excellent outcomes after transplantation of deceased donor kidneys with high terminal creatinine and mild pathologic lesions. *Transplantation*. 2005 Sep 27; 80(6):794-800. PMID: 16210967
12. Wijgerde M, **Karp S**, McMahon J, McMahon AP. Noggin antagonism of BMP4 signaling controls development of the axial skeleton in the mouse. *Dev. Biol.* 2005 Oct 1; 286(1):149-57. PMID: 16122729
13. Johnson SR, Pavlakis M, Khwaja K, **Karp SJ**, Curry M, Curran CC, Monaco AP, Hanto DW. Intensive care unit extubation does not preclude extrarenal organ recovery from donors after cardiac death. *Transplantation*. 2005 Nov 15; 80(9):1244-1250. PMID: 16314792
14. Ohnishi S, Garfein ES, **Karp SJ**, Frangioni JV. Radiolabeled and near-infrared fluorescent fibrinogen derivatives create a system for the identification and repair of obscure gastrointestinal bleeding. *Surgery*. 2006 Nov; 140(5):785-92. PMID: 17084722 | PMCID: PMC2474709
15. Otu HH, Naxerova K, Ho K, Can H, Nesbitt N, Libermann TA, **Karp SJ**. Restoration of liver mass after injury requires proliferative and not embryonic transcriptional patterns. *J. Biol. Chem.* 2007 Apr 13; 282(15):11197-204. PMID: 17227769
16. Mandelbrot DA, Pavlakis M, Danovitch GM, Johnson SR, **Karp SJ**, Khwaja K, Hanto DW, Rodrigue JR. The medical evaluation of living kidney donors: a survey of US transplant centers. *Am. J. Transplant.* 2007 Oct; 7(10):2333-43. PMID: 17845567
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18. Ho KJ, Owens CD, Johnson SR, Khwaja K, Curry MP, Pavlakis M, Mandelbrot D, Pomposelli JJ, Shah SA, Saidi RF, Ko DS, Malek S, Belcher J, Hull D, Tullius SG, Freeman RB, Pomfret EA, Whiting JF, Hanto DW, **Karp SJ**. Donor post-extubation hypotension and age correlate with outcome after donation after cardiac death transplantation. *Transplantation*. 2008 Jun 15; 85(11):1588-94. PMID: 18551064
19. Ho KJ, Bass CE, Kroemer AH, Ma C, Terwilliger E, **Karp SJ**. Optimized adeno-associated virus 8 produces hepatocyte-specific Cre-mediated recombination without toxicity or affecting liver regeneration. *Am. J. Physiol. Gastrointest. Liver Physiol.* 2008 Aug; 295(2):G412-9. PMID: 18535290 | PMCID: PMC2519860
20. Mandelbrot DA, Pavlakis M, **Karp SJ**, Johnson SR, Hanto DW, Rodrigue JR. Practices and barriers in long-term living kidney donor follow-up: a survey of U.S. transplant centers. *Transplantation*. 2009 Oct 15; 88(7):855-60. PMID: 19935453
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24. Chudzinski RE, Khwaja K, Teune P, Miller J, Tang H, Pavlakis M, Rogers C, Johnson S, **Karp S**, Hanto D, Mandelbrot D. Successful DCD kidney transplantation using early corticosteroid withdrawal. *Am. J. Transplant.* 2010 Jan; 10(1):115-23. PMID: 19958332

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