CURRICULUM VITAE

Part I: General Information

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Place of Birth: Mineola, New York, USA

Education:

1988 A.B. Harvard College (Joint Degree Cum Laude in Physics and Astrophysics)

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

Postdoctoral Training:

Resident, Surgery, Brigham and Women's Hospital, Boston, MA
Postdoctoral Fellow, Harvard University, Cambridge, MA
Resident, Surgery, Brigham and Women's Hospital, Boston, MA
Chief Resident, Surgery, Brigham and Women's Hospital, Boston, MA
Fellow in Transplantation, Johns Hopkins Hospital, Baltimore, MD

Licensure and Certification:

Licensure

1994-2001 Massachusetts Medical License
 2001-present Maryland Medical License
 2004-present Massachusetts Medical License

Certification

2002 American Board of Surgery

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-present Assistant Professor of Surgery

Harvard Medical School, Boston, MA

Hospital or Affiliated Institution Appointments:

2001-2004 Attending Surgeon, Johns Hopkins Hospital, Baltimore, MD

2004-present Attending Surgeon, Beth Israel Deaconess Medical Center, Boston, MA

Professional Societies:

2002-present	Member, American Gastroenterological Society
2003-present	Member, Society for Developmental Biology
2003-present	Member, American Society of Transplant Surgeons
2003-2006	Member, Vanguard Committee, American Society of Transplant Surgeons
2004-present	Medical Advisory Committee, American Liver Foundation, New England
	Chapter
2006-present	Member, The Transplantation Society
2006-present	Member, Cell Transplant Committee, American Society of Transplant
-	Surgeons
2007-present	Member, American College of Surgeons

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

Part II: Research, Teaching, and Clinical Contributions

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

Basic research

Research in my laboratory concerns the biology of liver development and liver regeneration. Our goal is to understand the molecular basis of these processes and then apply this knowledge to strategies for liver renewal or replacement. Preparation for this research focus included work in molecular biology and limb development. Contributions included the cloning and characterization of a subunit of the human NMDA receptor and publications elucidating the signaling pathways critical for cartilage and bone development. Our recent work established that liver regeneration does not require embryonic signaling patterns or large scale changes in chromatin structure. This suggests that restoration of liver mass after injury is not true regeneration. This finding has implications for clinical strategies to enhance liver recovery after damage and in transplantation. We have also developed a novel adenovirus which allows us to specifically express genes in the liver without hepatotoxicty or affecting regeneration.

Clinical research

I developed 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, which has proven successful in animal models. We have also demonstrated that acute renal failure should not preclude use of kidneys for transplantation, providing guidelines to help clinicians make optimal use of donor organs. More recently, we provided evidence that severe hemodynamic instability during donation after cardiac death organ procurement produces poor outcomes after liver transplantation. This work may lead to improved use of these organs.

Teaching

Teaching contributions include mentoring students, residents, and fellows. I have received teaching awards from both medical students and residents.

B. Funding Information

Current

National Institutes of Health - K08; Principal Investigator.

"Activin Signaling in Liver Development and Regeneration"

ASTS Collaborative Scientist Award—Principal Investigator

"BMP Signaling in Liver Regeneration"

MIT CIMIT grant "Scaffold Design to Enhance Liver Regeneration"

Past	
1990	Johnson and Johnson; Co-Investigator.
	"Tensegrity as a Mechanism for Cellular Signal Transduction"
1991	M.I.T./Starr Foundation; Principal Investigator.
	"Cloning and Characterization of the Human NMDA Receptor"
1993	International Society for Cardiovascular Surgery; Co-Investigator.
	"Photodynamic Therapy Inhibits Intimal Hyperplasia via Extracellular Matrix"
1997-1999	American College of Surgeons; Principal Investigator.
	"Conditional Gene Inactivation in the Mouse Midbrain"
1997-1999	National Institutes of Health – F32; Co-Investigator.
	"Indian Hedgehog Modulates Cartilage Growth and Differentiation"
2002-2004	Johns Hopkins Hospital; Principal Investigator.
	"Transplantation Research"
2003-2004	American College of Surgeons; Principal Investigator.
	"Liver Development and Regeneration"
2005-2007	American Society of Transplant Surgeons; Principal
	Investigator. "Lineage Analysis of the Developing and Regenerating Liver"

C. Report of Current Research Activities

Basic research

We are investigating a variety of molecules that are inhibited as a requirement for restoration of liver mass after injury. We have evidence that absolute concentrations of specific inhibitory molecules control the rate of liver regeneration. This is a new paradigm in thinking about liver regeneration. Furthermore, we have evidence that novel molecular pathways are critical for liver regeneration and we are characterizing them. Importantly, we have developed multiple models in the lab allowing us to insert or delete a gene in the liver with tissue and temporal specificity. This capability will allow us to thoroughly investigate a wide variety of hypotheses concerning liver regeneration.

Other projects involve tissue engineering of biologically active scaffolds to encourage normal liver growth in fibrotic or cirrhotic liver.

Clinical research

Ongoing clinical research studies parameters that impact the decision to perform a combined liver-kidney transplant in cirrhotic patients with pre-transplant renal insufficiency.

D. Report of Teaching

Johns Hopkins Medical School

2001-2003 Fellow in Transplantation; responsible for teaching medical students and

residents.

Average of 10 students and 20 residents per year.

Contact time averaged 5 hours per week.

2003-2004 Attending Surgeon; responsible for teaching medical students, residents, and

fellows.

Average of 4 per week.

Contact time averaged 5 hours per week.

Harvard Medical School

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

Average of 1 student, 3 residents, and 1 fellow per week.

Contact time averages 5 hours per week.

Regional, National, or International Contributions:

Invited Presentations

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2004	Transplant Conference; "Current trends in gastroenterology, hepatology, and liver transplantation"; Maryland, 2004.
2006	Buenos Aires—Current Opinion Leaders in Transplantation—Molecular Mechanisms of liver development and regeneration
2007	Negotiating Your First Job—American Society of Transplant Surgeons Fellows Meeting

Leadership Positions

2008	rincipal surgeon, pancreas program, Beth Israel Deaconess Medical Center
2008	Co-chairman, cell transplant committee, American Society of Transplant Surgeons

E. Report of Clinical Activities

Clinical practice and complexity

My clinical practice involves all aspects of liver, kidney, and pancreas transplantation, as well as complex vascular access, and general surgery. My work is entirely out of Beth Israel Deaconess Medical Center. The complexity of cases is extremely high.

Clinical contributions

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

Part III. Bibliography

Original Articles:

1. Seal B, Brech K, **Karp SJ**, Cool BJ, Sirover MA. Immunological lesions in human uracil DNA gycosylase: association with Bloom's Syndrome. Proceedings of the National Academy of Sciences USA 1988;5:2339-2343.

- 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 Family Practice 1991;4(2):71-78.
- 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;103:1215-1222.
- 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 Chemistry 1993;268(5):3728-3733.
- 5. Adili F, Statius 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;23(4):698-705.
- 6. LaMuraglia GM, Adili F, **Karp SJ**, Statius 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.
- 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;127:543-548.
- 8. Long F, Zhang XM, **Karp S**, Yang Y, McMahon AP. Genetic manipulation of hedgehog signaling in the endochondral skeleton reveals a direct role in the regulation of chondrocyte proliferation. Development 2001;128:5099-5108.
- 9. Minina E, Wenzel HM, Kreschel C, **Karp S**, Gaffield W, McMahon AP, Vortkamp A. BMP and Ihh/PTHrP signaling interact to coordinate chondrocyte proliferation and differentiation. Development 2001;128:4523-4534.
- 10. **Karp SJ**, Hawxby A, Burdick J. Axillo-renal bypass graft: a novel approach for dialysis access. Journal of Vascular Surgery 2004;40:379-80.
- 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; 80(6): 794-800
- 12. Wijgerde M, **Karp S**, McMahon J, McMahon AP. Noggin Antagonism of BMP4 Signaling Controls Development of the Axial Skeleton in the Mouse. Developmental Biology 2005; 286(1):149-57.
- 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; 80(9):1244-1250.
- 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;140(5):785-92.
- 15. Otu HH, Naxerova K, Ho K, Can H, Nesbitt N, Libermann TA, **Karp SJ**. Global gene expression patterns reveal resotration of liver mass after injury as hepatocyte hyperplasia, not true regeneration. Journal of Biological Chemistry 2007; 282(15):11197-20.
- 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. American Journal of Transplantation. 2007;7(10):2333-43.
- 17. Rodrigue JR, Pavlakis M, Danovitch GM, Johnson SR, **Karp SJ**, Khwaja K, Hanto DW, Mandelbrot DA. Evaluating living kidney donors: relationship types, psychosocial criteria, and consent processes at US transplant programs. American Journal of Transplantation. 2007; 7(10):2326-32.
- 18. Ho KJ, Owens CD, Johnson SR, Khwaja K, Curry MP, Pavlakis M, Mandelbrot D, Pomposelli JJ, Shah SA, Saidi, RF, Ko SCD, 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 Liver and Kidney Transplantation. Transplantation, in press.
- 19. Ho KJ, Bass C, Kroemer AH, Ma C, Terwilliger EF, **Karp SJ**. Optimized adenoassociated virus 8 produces hepatocyte-specific Cre-mediated recombination without toxicity or affecting liver regeneration. Am J Physiol Gastrointest Liver Physiol. 2008.
- 20. Otu H, Ho KJ, Can H, Robson SC, **Karp SJ**. Signaling Pathways and Biological Processes Important for Liver Development are Highly Coordinated at the Transcriptional Level, submitted

Reviews, Chapters, and Editorials:

Book Chapters

- 1. **Karp SJ**, Soybel D. Anatomy and embryology of the small intestine. In: Zuidema G, Yeo C, and Pemberton R, editors. Surgery of the Alimentary Tract, 4th Edition. Philadelphia, PA: Elsevier; 2002.
- 2. Hanto DW, Johnson SR, **Karp SJ**, Khwaja K. Liver Transplantation. In: Norton et al. Surgery: Basic Science and Clinical Practice, in press.

Reviews

- 1. Ingber DE, Dike L, Hansen L, **Karp S**, Liley H, Maniotis A, McNamee H, Mooney D, Plopper G, Sims J, et al. Cellular tensegrity: exploring how mechanical changes in the Cytoskeleton regulate cell growth, migration, and tissue pattern during morphogenesis. Int Rev Cytol. 1994;150:173-224.
- 2. Nadig SN, Bratton CF, **Karp SJ.** Marginal Donors in Liver Transplantation: Expanding the Donor Pool. Current Surgery 2006; 64(1).
- 3. **Karp SJ**, Ku Y, Johnson S, Khwaja K, Curry M, Hanto, D. Surgical and Non-surgical Treatment for Hepatocellular Cancer. Current Opinion in Transplantation 2006; 11(3): 226-233.

Books, Monographs, and Text Books:

1. **Karp SJ**, Morris J, Soybel D. Blueprints in surgery. Malden, MA: Blackwell Science; 1998-2007, 4 editions.

Case Reports:

1. Brito D, Barton E, Spears KL, Cranmer HH, **Karp SJ**, Anglin D, Hutson HR. Acute right quadrant pain in a leukemic patient. Annals of Emergency Medicine 1998;32(1):98-101.

M.D. Thesis:

Karp SJ. Molecular cloning and chromosomal localization of the key subunit of the human NMDA receptor.

Patents:

Karp SJ. Cold Spring Diagnostics, Incorporated – assignee. Method for locating an internal bleeding site in a human body. US Patent number 6,314,314.

Karp SJ, Garfein E, Onishi S, Frangione J. Fluorescent method for locating an internal bleeding site in a human body. Patent pending.