

Curriculum Vitae

PART I: General Information

DATE PREPARED: July 1, 2006

Name: **Pedro J. del Nido, M.D.**

Office Address: Department of Cardiac Surgery
Children's Hospital Boston
300 Longwood Ave., Bader 273
Boston, MA 02115

Education:

1969-1973	B.A. (Honors)	University of Wisconsin, Madison, Wisconsin (Biochemistry)
1973-1977	M.D.	University of Wisconsin Medical School, Madison, Wisconsin

Academic Appointments

1986-1989	Assistant Professor of Surgery and Pediatrics, University of Illinois, Chicago, Illinois
1989-1992	Assistant Professor of Surgery, University of Pittsburgh, Pittsburgh, Pennsylvania
1992-1994	Associate Professor of Surgery, University of Pittsburgh, Pittsburgh, Pennsylvania
1994-2001	Associate Professor of Surgery, Harvard Medical School, Boston, Massachusetts
2001-present	Professor of Surgery, Harvard Medical School, Boston, Massachusetts
2004-present	William E. Ladd Professor of Child Surgery, Harvard Medical School

Hospital or Affiliated Institution Appointments:

1986-1989	Staff Surgeon, Division of Cardiothoracic Surgery, University of Illinois Hospital, Chicago, Illinois
1989-1994	Staff Surgeon, Division of Cardiothoracic Surgery, Children's Hospital, Pittsburgh, PA
1994-Present	Senior Associate in Cardiac Surgery, Children's Hospital Boston, Boston, Massachusetts
2002-Present	Chief, Department of Cardiac Surgery, Children's Hospital Boston, Boston, Massachusetts

Major Committee Assignments:

Harvard Medical School:

1999	Planning Committee, Harvard Adults with Congenital Heart Disease Service Chair, Inpatient Sub-Committee
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Children's Hospital Boston:

1987-2003.1	Institutional Animal Care and Use Committee – Member
2004-present	ARCH Steering Committee - Member

National Organizations:

1992-1996	Council on Cardiovascular and Thoracic Surgery: Executive Committee - American Heart Association
1993	Minority Institution and MBRS Special Emphasis Panel - Member, NIH-NIGMS
1996-1998	National Affiliate Research Committee: Study Section C - Co-Chairman, American Heart Association
1997	Mitochondrial Cardiomyopathy Special Emphasis Panel - Member, NIH-NHLBI
1997-2001	NIH-NHLBI, Surgery and Bioengineering Study Section - Member

1999-2002	Scientific Sessions Program Committee - Member, Council on Cardiovascular and Thoracic Surgery, American Heart Association
2000	Congenital Cardiac Surgery Seminar – Chair, American Association for Thoracic Surgery Annual Congress
2001-2005	Surgical Forum Committee – Cardiothoracic Surgery, American College of Surgeons
2001	NIH-Center for Scientific Review - Cardiovascular Sciences Scientific Boundaries Panel
2002-2006	Council on Cardiovascular and Thoracic Surgery: Executive Committee - American Heart Association
2002-2007	Scientific Advisory Committee – Pittsburgh NMR Center for Biologic Research, Carnegie Mellon University (NIH-NCRR)
2002-2004	Cardiac Surgery Biology Club (AATS) – Program Chair
2004-2006	Cardiac Surgery Biology Club (AATS) - President
2002-2004	NIH-NHLBI, Surgery and Bioengineering Study Section - Chair
2003-2007	Scientific and Government Affairs Comm. AATS – Chair
2005-2007	Workforce on Congenital Heart Surgery – Society of Thoracic Surgeons - Chair

Professional Societies:

(date of membership initiation)

1986	American Section, International Society for Heart Research - Member
1987	Association for Academic Surgery - Senior Member
1989	American College of Chest Physicians - Fellow
1989	American College of Surgeons - Fellow
1990	Pediatric Cardiac Surgeon's Society - "LUNAR SOCIETY" - Founding Member
1991	Society of Thoracic Surgeons - Member
1992	Congenital Heart Surgeon's Society - Member
1993	Society of University Surgeons - Senior Member
1995	American Association for the Advancement of Science
1996	Cardiac Surgery Biology Club - Member
1998	American Association for Thoracic Surgery - Member

Editorial Boards:

1992-2000	Member - Editorial Board, Pediatric Cardiology
1999-2003	Member - Editorial Board, Cardiothoracic Digest
2001-present	Member – Editorial Board, Annals of Thoracic Surgery
2001-2004	Member – Editorial Board, Pediatric Critical Care Medicine

Ad hoc reviewer: American Journal of Physiology: Heart and Circulatory Physiology
 Cardiovascular Research
 Circulation
 Circulation: Surgical Issue
 European Journal Of Thoracic and Cardiovascular Surgery
 Journal of the American College of Cardiology
 Journal of Thoracic and Cardiovascular Surgery
 Journal of Molecular and Cellular Cardiology
 Journal of Surgical Research
 Journal of Heart and Lung Transplantation

Awards and Honors:

1972	A. W. Peterson Award for Academic Achievement in the Area of Biochemistry
1973	Federal Research Fellowship Grant - Organic Photochemistry
1973-1975	Advanced Opportunity Fellowship
1982-1983	J. H. Cameron Scholarship, The Banting Institute, University of Toronto, Toronto, Canada

1985-1986	Canadian Heart Foundation - Senior Research Fellowship
1986	L. J. Tisdall Research Award – The Hospital for Sick Children - Toronto, Canada
1988	3M Non-tenured Faculty Research Award, 3M, Sarns, Inc.
1992	Michael E. Miller Young Investigator Award - Children's Hospital, Pittsburgh, PA

PART II: Research, Teaching and Clinical Contributions

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

My laboratory research work has focused on two areas related cardiac surgery:

The first area involves investigation of mechanisms of injury from myocardial ischemia and on developing techniques for heart preservation during cardiac surgery. Currently, my work includes: investigation of mechanisms responsible for decreased tolerance to ischemia in hypertrophied myocardium and the role angiogenesis plays in progression of hypertrophy to heart failure.

The second area of investigation aims to develop techniques for performing reconstructive surgery inside the beating heart using 3-D echocardiography. This project is a research partnership between ourselves, two engineering laboratories and industry and proposes to design and implement new technology and instrumentation to facilitate repair of intracardiac defects, thus obviating the need for open heart surgery.

My teaching activities include supervising pre- and post-doctoral research fellows working in my laboratory and instructing clinical residents and fellows in pediatric cardiac surgery. I actively participate in didactic conferences covering laboratory and clinical investigation, and in continuing medical education courses organized by the Departments of Pediatric Cardiology and Pediatric Cardiac Surgery.

My clinical activities include performing surgical procedures to repair all forms of congenital heart defects in children and adults. Other surgical procedures I perform include heart transplantation and mechanical circulatory support of children in end-stage heart failure. I have also developed techniques for performing minimally invasive cardiac surgery to correct simple and complex heart cardiac defects in infants and children

B. Report of Current Research Activities

- *"Analysis of Beating Heart Intracardiac Surgery"*. This project brings together a multidisciplinary team of engineers, echocardiographers and cardiac surgeons with the goal of developing specialized instrumentation and navigation techniques for performing beating heart intracardiac surgery using 3D-echocardiography guidance and telerobotic instruments. Role - Principal Investigator
- *"Image Guided Intracardiac Beating Heart Surgery"* This a Bioengineering Research Partnership to develop novel imaging techniques and instrument modification for performing reconstructive surgery inside the beating heart. The partnership includes two engineering laboratories (Dupont-Boston U.; Howe-Harvard DEAS), and industry (Philips Medical Systems) working on modification of ultrasound imaging hardware, image processing, instrument modification, and device development. Role – Principal Investigator
- *"Angiogenesis, Cardiac Hypertrophy and Surgical Ischemia"* This project aims to study the role of Hypoxia Inducible factor in capillary growth during the progression of pressure overload hypertrophy. Role – Principal Investigator.

C. Report of Clinical Activities

1. Description of clinical practice:

My current clinical practice involves the surgical management of children with congenital or acquired heart disease and adults with congenital heart defects. My practice has always been at

academic teaching institutions and initially included both acquired and congenital hearts defects in children and adults. Since 1989, when I joined the faculty at the University of Pittsburgh, I have concentrated my clinical activities exclusively in pediatric cardiac surgery and adults with congenital heart defects.

2. Patient load:

Currently, I perform approximately 300 congenital cardiac surgical procedures in children and adults per year. Around 70% are corrective procedures for complex congenital defects and include cardiac transplantation.

D. Report of Teaching

1. Local Contributions

Invited Teaching Seminars

1987-1989 University of Illinois: Chicago: Core curriculum lectures "Cardiac Surgery" for 3rd year medical students

Continuing Medical Education

1999 First Hispano-Latin American Conference in Pediatric Cardiac Surgery, San Juan, P.R., Co-Director and Lecturer

Advisory and Supervisory responsibility in Clinical Setting

1986-1989 University of Illinois Hospitals: Supervisory and teaching role for medical students, residents and fellows in pediatric cardiac surgery

1989-1994 University of Pittsburgh Medical School, Children's Hospital: Supervisory and teaching role for medical students, residents and fellows in pediatric cardiac surgery

1994-Present Children's Hospital Boston, Harvard Medical School: Supervisory and teaching responsibility to residents and clinical fellows in the area of pediatric cardiac surgery

Teaching Leadership Role in Department

1997-Present Cardiovascular Surgery Department "Research Work in Progress Seminars" - organize monthly seminars covering research topics relevant to current laboratory investigation.

Advisees or trainees in Laboratory Setting (*Duration of training, Name, and Current Position*)

1987-1989 Ernesto Jimenez, M.D., Cardiothoracic Surgeon, Tampa, Florida

1986-1988 Hiroomi Nakamura, M.D., Assistant Professor, Kobe University, Kobe, Japan

1989-1991 K. Eric Sommers, M.D., Associate Professor, Department of Surgery, University of Tampa, Florida

1990-1992 Akihiko Ohkado, M.D., Cardiothoracic Surgeon, Tohoku University, Sendai, Japan

1992-1994 Tzu-Chen Yeh, PhD, Assistant Professor, Department of Radiology, University of Taipei, Taiwan

1992-1995 Koh Takeuchi, M.D., Assistant Professor, Dept. of Cardiovascular Surgery, University of Tokyo, Japan

1993-1995	Percival Buenaventura, M.D., Associate Professor, Department of Surgery, University of Pittsburgh, PA
1999-2003	Ingeborg Friehs, M.D., Instructor, Dept. Of Surgery, Harvard Medical School. "Regulation of Angiogenesis in Hypertrophied Myocardium"
1998-2000	Mamoru Munakata, M.D., Cardiothoracic Surgeon, Hirosaki University, Japan. "Phospholipase C Activity in Post-ischemic Myocardium"
1998-2001	Christoff Stamm, M.D., Assistant Professor, University of Rostock Medical School, Germany. "Myocardial Protein Kinase C Modulation of Calcium/Force relationship in Ischemia/Reperfusion"
2001-2003	Meena Nathan, M.D.; Neena Braunwald Research Fellowship recipient, Harvard Medical School. "Mitochondrial function in Hypertrophied Myocardium". Resident in Cardiothoracic Surgery, Brigham and Women's Hospital, Boston
2001-2003	Jeremy Cannon, M.D., National Research Service Award recipient, "Telerobotic Minimally Invasive ASD Repair", Harvard Medical School – Massachusetts Institute of Technology. Resident in Surgery, Harvard Medical School
2003-2006	Nathalie Roy, M.D.; Thoracic Surgery Research Foundation Fellowship recipient "Dobutamine induced apoptosis in the post-ischemic heart"
2003-2005	Yoshihiro Suematsu, M.D.; Instructor of Surgery, University of Tokyo, " Image guided beating heart intracardiac surgery"

PART III: Bibliography

Original Articles:

1. Wilson G J, MacGregor D C, Klement P, Lee J M, del Nido PJ, Wong E, Leidner J. Anisotropic polyurethane non-woven conduits: A new approach to the design of a vascular prosthesis. Proceedings, Amer. Society for Artificial Internal Organs, 1983; 29:260-268.
2. Klement P, del Nido PJ, Wilson GJ. The use of cardiac pacemakers in veterinary practice. Compendium of Continuing Education for the Practicing Veterinarian, 1984; 6:893-902.
3. del Nido PJ, Wilson GJ, Mickle DAG, Klement P, Tait GA. The role of cardioplegic buffering in myocardial protection: A biochemical and histopathological assessment. J Thorac Cardiovasc Surg, 1985; 89:689-699.
4. Mickle DG, del Nido PJ, Wilson GJ, Harding RD, Romaschin AD. Exogenous substrate preference of the post-ischemic myocardium. Cardiovasc Res, 1986; 20:256-263.
5. del Nido PJ, Williams WG, Wilson GJ, Coles JG, Moes CAF, Hosokawa Y, McLaughlin PR, Fowler RS, Izukawa T, Rowe RD, Trusler GA. Synthetic patch angioplasty for repair of coarctation of the aorta: Experience with aneurysm formation. Circulation, 1986; 74:132-36.
6. Klement P, del Nido PJ, Mickleborough L, MacKay C, Klement G, Wilson GJ. Technique and postoperative management for successful cardiopulmonary bypass and open-heart surgery in dogs. JAVMA 1987; 190:869-874.
7. Klement P, Feindel CM, Scully HE, Mesher E, Klement G, del Nido PJ, Wilson GJ. Mitral valve replacement in dogs. Surgical technique and postoperative management. Veterinary Surgery 1987; 16:231-237.

8. del Nido PJ, Williams WG, Villamater J, Benson LN, Coles JG, Trusler GA. Changes in pericardial surface pressure during pulmonary hypertensive crisis after cardiac surgery. *Circulation* 1987; 76:III93-96.
9. del Nido PJ, Mickle DAG, Williams WG, Wilson GJ, Benson LN, Coles JG, Trusler GA. Evidence of myocardial free radical injury during elective repair of tetralogy of Fallot (TOF). *Circulation* 1987; 76:V174-179.
10. del Nido PJ, Benson LN, Mickle DAG, Kielmanowicz S, Coles JG, Wilson GJ. Impaired left ventricular post-ischemic function and metabolism in chronic right ventricular hypertrophy (RVH). *Circulation* 1987; 76:V168-173.
11. del Nido PJ, Mickle DAG, Wilson GJ, Benson LN, Weisel RD, Coles JG, Trusler GA, Williams WG. Inadequate myocardial protection with cold cardioplegic arrest during repair of tetralogy of Fallot. *J Thorac Cardiovasc Surg* 1988; 95:223-229.
12. del Nido PJ, Swan PR, Benson LN, Bohn D, Charlton MC, Coles JG, Trusler GA, Williams WG. Successful use of intra-aortic balloon pumping in a 2 Kg. infant. *Ann Thorac Surg* 1988; 46:574-576.
13. Nakamura H, del Nido PJ, Illes RW, Krukenkamp IB, Silverman NA, Levitsky SP. Preservation of postischemic cardiac function by deferoxamine is age dependent. *Surg Forum* 1988; 39:200-202.
14. del Nido PJ, Nakamura H, Mickle DAG, Illes RW, Romaschin A, Levitsky S. Maturation difference in functional/metabolic sequelae of free radical formation on reperfusion. *J Surg Res* 1989; 46:532-536
15. Illes RW, Silverman NA, Krukenkamp IB, del Nido PJ, Levitsky S. Amelioration of post-ischemic stunning by deferoxamine-blood cardioplegia. *Circulation*, 1989; 80:III30-35.
16. del Nido P, Goldman, BS. Temporary epicardial pacing after open heart surgery: complications and prevention. *J. Card Surg* 1989; 4:99-103.
17. Fischer DR, Ettetdgui JA, Park SC, Siewers RD, del Nido PJ. Carotid artery approach for balloon dilatation of aortic valve stenosis in the neonate. *J Amer Coll Cardiol* 1990; 15:1633-6.
18. Jimenez E, del Nido PJ, Sarin M, Nakamura H, Feinberg H, Levitsky, S. Effects of low extracellular calcium on cytosolic calcium and ischemic contracture. *J Surg Res*. 1990; 49:252-55.
19. Nakamura H, del Nido PJ, Jimenez E, Sarin M, Levitsky S, Feinberg H. Deferoxamine fails to improve post-ischemic cardiac function in hypertrophied hearts. *Circulation*, 1990; 82:IV328-331.
20. del Nido PJ, Nakamura H, Jimenez E, Sarin M, Feinberg H, Levitsky S. The effect of cardiac hypertrophy on changes in cytosolic free calcium concentration during ischemia. *Surgery* 1990 108:312-17.
21. Rebeyka JM, Axford-Gatley RA, Bush BG, del Nido PJ, Mickle DAG, Romaschin AD, Wilson GJ. Calcium paradox in an in vivo model of multidose cardioplegia and moderate hypothermia. Prevention with diltiazem or trace calcium. *J Thorac Cardiovasc Surg* 1990; 99:475-483.
22. Kumar S, Scagliotti H D, Fisher EA, del Nido PJ. Surgical correction of pulmonary atresia with ventricular septal defect and no central pulmonary arteries. *Am J Cardiol*, 1990; 65:261-63.
23. Anderson RH, Devine WA, del Nido PJ. Surgical anatomy of tetralogy of Fallot with pulmonary atresia rather than stenosis. *J Cardiac Surg*, 1991; 6:41-59.
24. Siewers RD, Ettetdgui J, Pahl E, Tallman T, del Nido PJ. Coarctation and hypoplasia of the aortic arch - will the arch grow? *Annals of Thorac Surg* 1991; 52:608-14.

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27. Armitage JM, Fricker FJ, del Nido PJ, Cipriani L, Starzl TE. The clinical trial of FK 506 as primary and rescue immunosuppression in pediatric cardiac transplantation. *Transpl Proc* 1991; 23:6.
28. Ghai V, del Nido PJ, Nakamura H, Fujii Y, Vidyasagar D, Wilson G. Improvement in oxygen tension and pulmonary blood flow with intermittent distal aortic compression during normoxia, hypoxia and hyperoxia in neonatal piglets. *Crit Care Med* 1991; 19:731-741.
29. Michaels MG, Wald ER, Fricker FJ, del Nido PJ, Armitage J. Toxoplasmosis in pediatric recipients of heart transplants. *Clinical Infectious Diseases* 1992; 14:847-51.
30. del Nido PJ, Dalton HJ, Thompson AE, Siewers RD. ECMO rescue in children during cardiac arrest following cardiac surgery. *Circulation* 1992; 86:11300-304.
31. Nakamura H, del Nido PJ, Jimenez E, Sarin M, Feinberg H, Levitsky S. Age related differences in cardiac susceptibility to ischemia/reperfusion injury: Response to deferoxamine. *J Thorac Cardiovasc Surg* 1992; 104:165-72.
32. Sommers KE, Ohkado A, Simplaceanu E, Koretsky AP, Ho C, del Nido PJ. The role of magnesium in post-ischemic cardiac dysfunction. *Surgery* 1992; 112:159-65.
33. Hoyer MH, Zuberbuhler JR, Anderson RH, del Nido PJ. Morphology of ventricular septal defects in complete transposition. *J. Thorac Cardiovasc Surg* 1992; 104:1203-11.
34. Grundl P, Miller S, del Nido PJ, Beerman L, Fuhrman B. Successful treatment of acute myocarditis using extracorporeal membrane oxygenation. *Crit Care Med* 1993; 21:302-304.
35. Armitage J, Fricker J, del Nido PJ, Starzl T, Hardesty R, Griffith B. A decade (1982 to 1992) of pediatric cardiac transplantation and the impact of FK 506 immunosuppression. *J Thorac Cardiovasc Surg* 1993; 105:465-473.
36. Ohkado A, Cao-Danh H, Sommer KE, del Nido PJ. Buffering capacity of histidine in cardioplegia analyzed by myocardial production of lactate and alanine. *Japanese J Thorac Surgery* 1993; 46:1021-1024.
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39. Jimenez E, del Nido PJ, Feinberg H, Levitsky S. Redistribution of myocardial calcium during ischemia: Relationship to onset of contracture. *J Thorac Cardiovasc Surg* 1993; 105:988-994.
40. Dalton HJ, Siewers RD, Fuhrman BP, del Nido PJ, Thompson AE, Shaver MG, Dowhy M. Extracorporeal membrane oxygenation for cardiac rescue in children with severe myocardial dysfunction. *Crit Care Med* 1993; 21:1020-8.

41. McGowan FX, Ikegami M, del Nido PJ, Motoyama EK, Kurland G, David PJ, Siewers RD: Cardiopulmonary bypass significantly reduced surfactant activity in children. *J Thorac Cardiovasc Surg*. 1993; 106:968-77.
42. McGowan FX, Takeuchi K, del Nido PJ, Davis P, Lancaster JR, Hattler BG: Myocardial Effects of Interleukin-2. *Transp. Proc.* 1994; 26:209-210.
43. Hoyer MH, Beerman LB, Etedgui JA, Park SC, del Nido PJ, Siewers, RD. Transatrial lead placement for endocardial pacing in children. *Annals Thorac Surg* 1994; 58:97-102.
44. Webber SA, Fricker FJ, Michaels MX, Pickering RM, del Nido PJ, Griffith BP, Armitage JM. Orthotopic transplantation in children with congenital heart disease. *Ann Thorac Surg* 1994; 58:1664-9.
45. del Nido PJ, Armitage JM, Fricker FJ, Shaver M, Cipriani L, Dayal G, Park S, Siewers RD. ECMO support as a bridge to pediatric heart transplantation. *Circulation* 1994; 90:1166-69.
46. Worsey J, Pham SM, Newman B, Park SC, del Nido PJ. Left main bronchus compression after arterial switch for transposition. *Ann of Thorac Surg* 1994; 57:1320-2.
47. Ohkado A, Cao-Danh C, Sommers KE, del Nido PJ. Evaluation of highly buffered, low calcium solution for long term preservation of the heart: comparison with University of Wisconsin solution. *J Thorac Cardiovasc Surg* 1994; 108:762-771.
48. McGowan F, Cao-Danh H, Takeuchi K, del Nido PJ. Prolonged neonatal myocardial preservation using a highly buffered low calcium solution. *J Thorac Cardiovasc Surg* 1994; 108:772-779.
49. McGowan FX, Davis PJ, del Nido PJ, Sobek M, Allen JW, Downing SE. Endothelium-dependent regulation of coronary tone in the neonatal pig. *Anesth & Analg* 1994; 79:1094-101.
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51. Grandis DJ, del Nido PJ, Koretsky AP. Functional and energetic effects of the inotrope EMD-57033 and BAPTA on the isolated rat heart. *Am J Physiol* 1995; 269:C472-479.
52. Takeuchi K, Takashima K, Kawai A, Konishi H, Ohkado A, Suzuki S, del Nido PJ. Prolonged preservation due to acceleration of anaerobic glycolysis with histidine buffered cardioplegia in canine heart. *Japanese J Thoracic Surgery* 1995; 43:1895-901.
53. Luss H, Simon C, Watkins PD, Freeswick PD, Imro AK, Nussler AK, Billiar TR, Simmons RL, del Nido PJ, McGowan FX. Characterization of inducible nitric oxide synthase expression in endotoxemic rat cardiac myocytes *in vivo* and following cytokine exposure *in vivo*. *J Mol Cell Cardiol* 1995; 27:2015-2029.
54. Takeuchi K, Buenaventura P, Cao-Danh H, Glynn P, Simplaceanu E, McGowan FX, del Nido PJ. Improved protection of the hypertrophied left ventricle by histidine containing cardioplegia. *Circulation* 1995; 92:11395-399.
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57. del Nido PJ. Extracorporeal membrane oxygenation for cardiac support in children. *Ann Thorac Surg* 1996; 61:336-9.

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60. Takeuchi K, Takashima K, Munakata M, Ono Y, Fukui K, Suzuki S, del Nido PJ. Inappropriate preservation of myocardium by topical cooling with iced slush. *J Japanese Association for Thoracic Surgery* 1996; 44:1691-1697.
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63. del Nido PJ. Myocardial protection and cardiopulmonary bypass in neonates and infants. *Annals of Thoracic Surgery* 1997; 64:878-9.
64. Friehs I, Cao-Danh H, Takahashi S, Buenaventura P, Glynn P, McGowan FX, del Nido PJ. Adenosine prevents protein kinase C activation during hypothermic ischemia. *Circulation* 1997; 96:11221-225.
65. Takeuchi K, Maida K, Yoshida S, Suzuki S, del Nido PJ, Tanaka S. A clinical application of histidine buffered cardioplegia. *J Japanese Assoc Thorac Surgery* 1997; 45:1715-1719.
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67. Takeuchi K, Cao-Danh H, Friehs I, Glynn P, D'Agostino D, Simplaceanu E, McGowan FX, del Nido PJ. Administration of fructose-1,6-diphosphate during early reperfusion significantly improves recovery of contractile function in the post-ischemic heart. *J Thorac Cardiovasc Surg*. 1998; 116:335-343.
68. Duncan B, Ibrahim A, Hraska V, del Nido PJ, Laussen P, Wessel D, Mayer J Jr., Bower L, Jonas R. Use of rapid-deployment extracorporeal membrane oxygenation for the resuscitation of pediatric patients with heart disease after cardiac arrest. *J Thorac Cardiovasc Surg*. 1998; 116:305-311.
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75. del Nido PJ, Duncan BW, Mayer JE, Wessel DL, LaPierre RA, Jonas RA. Left ventricular assist device improves survival in children with left ventricular dysfunction after repair of anomalous origin of the left coronary artery from the pulmonary artery. *Ann Thorac Surg.* 1999; 67:169-172.
76. Lardo AC, Weber SA, Friehs I, del Nido PJ, Cape EG. Fluid dynamic comparison of intra-atrial and extracardiac total cavopulmonary connections. *J Thorac Cardiovasc Surg.* 1999; 117:697-704.
77. Takeuchi K, Cao-Danh H, Kawai A, Ohkada A, Konishi H, Zhang S, Todo S, McGowan FX, del Nido PJ. Prolonged preservation of the blood-perfused canine heart with glycolysis-promoting solution. *Ann Thorac Surg.* 1999; 68:903-7.
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Patents:

del Nido PJ, Cao-Danh H, Sommers E, inventors; University of Pittsburgh assignee. "Process for Preserving An Organ and Organ Preservation Solution" U.S. Patent - #5,407,793 . Issued April 1995.

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