

Revised 5/06

CURRICULUM VITAE

NAME: Aviv Isaak Hassid

MARITAL STATUS: Married

CHILDREN: Jonathan and Benjamin

EDUCATION:

High School: Izmir Türk Koleji, Izmir, Turkey, 1956-1962

Undergraduate: Robert College, Istanbul, Turkey, 1962-1966; B.S. in Chemistry, 1966

Graduate: University of Minnesota, Dept. of Chemistry, Minneapolis, Minnesota, 1969-1973, Ph.D. in Chemistry, 1974

Honors : Research Career Development Award, U.S. Public Health Service grant 1 KO4 HL 01082 and 01492, 8/1/82-7/31/87

Bronstein Professorship of Cardiovascular Physiology, Univ. of Tennessee, Memphis, 1991

SOCIETY MEMBERSHIPS

American Association for the Advancement of Science
American Physiological Society
American Society of Pharmacology and Experimental Therapeutics
Society for Experimental Biology and Medicine

ACADEMIC APPOINTMENTS

1969-1972	Teaching Assistant, Department of Chemistry, University of Minnesota, Minneapolis, Minnesota
1972-1973	Research Assistant, Department of Chemistry, University of Minnesota, Minneapolis, Minnesota
1973-1975	Instructor, Department of Biochemistry, University of North Carolina, Chapel Hill, North Carolina
1975-1977	Post-doctoral Associate in the Laboratory of Dr. Lawrence Levine, Dept. of Biochemistry, Brandeis University, Waltham, MA
9/77- 6/84	Assistant Professor of Biochemistry in Medicine, Case Western Reserve University, Cleveland, Ohio
6/84-7/84	Associate Professor of Biochemistry in Medicine, Case Western Reserve University, Cleveland, Ohio
8/84-6/88	Associate Professor of Pharmacology, University of Tennessee, Memphis (awarded tenure in 1987)
7/88-9/88	Professor of Pharmacology, University of Tennessee, Memphis
10/88-6/91	Professor of Pharmacology, New York Medical College, Valhalla, NY (awarded tenure in 1989)
7/91-	Bronstein Professor of Cardiovascular Physiology, University of Tennessee, Memphis (awarded tenure in 1992)

NATIONAL AND INTERNATIONAL CONFERENCES AND SYMPOSIA ATTENDED AS INVITED PARTICIPANT

- 1) International Conference on Prostaglandins and the Kidney- 1982
- 2) Symposium on Renal Cells in Culture-1985
- 3) Angiotensin Gordon Conference-1987
- 4) FASEB Symposium on Mesangial Cell Contractility-1987
- 5) Satellite Symposium on the Vascular Smooth Muscle Cell, Switzerland-1988
- 6) Kallikrein and Kinin Gordon Conference-1989
- 7) FASEB Summer Conference on Mesangial cells-1989
- 8) FASEB Summer Conference on Vascular Smooth Muscle-1994
- 9) FASEB Conference on Nitric oxide-1997

INVITED SEMINAR SPEAKER

- 1) Cleveland Clinic, Division of Hypertension-1983
- 2) University of Missouri, Dept. of Physiology-1983
- 3) University of Tennessee, Dept. of Pharmacology- 1984
- 4) Middle Tennessee State University, Dept. of Chemistry-1986,1987
- 5) New York Medical College, Dept. of Pharmacology, 1988
- 6) Albert Einstein College of Medicine, Department of Medicine, 1989
- 7) SUNY, Stony Brook, Department of Medicine, 1989
- 8) St. Louis University, Dept. of Pharmacology, 1989
- 9) Medical College of Pennsylvania, Dept. of Pharmacology, 1990
- 10) New York Medical College, Dept. of Pathology, 1990
- 11) New Jersey Medical School, Dept. of Physiology, 1991
- 12) Berlex Laboratories, 1991
- 13) Georgetown Univ. Medical Center, Dept. of Surgery, 1991
- 14) University of Alabama at Birmingham, Hypertension Research Program retreat, 1992
- 15) University of Tennessee, Hypertension Research Day Speaker, 1993
- 16) Tulane University Medical Center, Depts. of Pharmacology and Physiology, 1996
- 17) University of Medicine and Dentistry of New Jersey, 1999
- 18) Baylor College of Medicine, 2000
- 19) University of Iowa, Dept of Anatomy, 2000
- 20) University of Alabama Birmingham Symposium, 2003

EDITORIAL BOARDS

Proceedings of the Society for Experimental Biology and Medicine-1990-1996
American Journal of Physiology-Heart and Circulatory Physiology-1995-present
General Pharmacology-1999-present

MEMBERSHIP ON GRANT REVIEW COMMITTEES

- 1) Ad Hoc Member, NIH Cardiovascular-Renal Study Section-1985
- 2) External Reviewer, NSF-1984, 1985,1991
- 3) External Reviewer, Veteran's Administration-1985
- 4) External Reviewer, Veteran's Administration-1987
- 5) Reviewer, site visit for program project Washington Univ. Dept. of Medicine, St. Louis, - 1987
- 6) Peer Review Committee, American Heart Association, Tennessee Affiliate-1988
- 7) Regular Member, NIH, DRG, Experimental Cardiovascular Sciences Study Section-1989-1993.
- 8) Program Project grant review, NHLBI-1993
- 9) AdHoc review committee, DRG-1994
- 10) Reviewer's Reserve, NIH, DRG, CVB Study Section-1995
- 11) External Reviewer, Veteran's Administration-1991, 1995, 1996
- 12) External Reviewer, Louisiana Board of Regents-1996
- 13) Regular member, NIH, DRG, Cardiovascular Renal Study Section, 1996-1998

POST-GRADUATE STUDENTS TRAINED

Case Western Reserve University:

- 1) Jean-Paul Oudinet: 1983-84. Current position. Staff member, INSERM, France
- 2) Martha Konieczkowski: 1984. Current position: unknown

New York Medical College:

- 1) Uttam C. Garg: 1988-1991 (funded by American Heart-New York Affiliate Fellowship). Current position: see below
- 2) Jyotsna Goyal: 1989-1991. Current position: unknown
- 3) Paul Cahill: 1990-1991. Current position: see below

University of Tennessee, Memphis:

- 1) Rebecca Morgan-Boyd: 1985-1988 (funded by American Heart-Tennessee Affiliate Fellowship). Current position: unknown
- 2) Nanni Pidikiti: 1984-1985. Current position unknown
- 3) Ferzan Lermioglu: 1987-1989. Current position: Ege University, Izmir, Turkey
- 4) Uttam C. Garg: 1988 (funded by American Heart-Tennessee Affiliate fellowship). Current position: Associate Professor, Department of Pathology and Lab Medicine Children's Mercy Hospital, Kansas City, MO
- 5) Yi-Ming Yu : 1988. Current position: unknown
- 6) Paul Cahill: 1991- 1992. Current position: Assistant Professor, Dublin University
- 7) Eileen Redmond: 1991- 1992. Current position: Assistant Professor, Dublin University
- 8) Gursev Dhaunsi: 1992-1995. Current position: Assistant Professor, Kuwait University
- 9) Juraj Okolicany: 1992-1994. Current position: unknown
- 10) Kuljeet Kaur: 1995-1996. Current position: Research Associate, University of Florida
- 11) Jian Yao: 1997-1998. Current position: Assistant Professor, Niigata University
- 12) Shile Huang: 1997-1998. Current position: unknown
- 13) Claire Brown: 1997-2000. Current position: pharmaceutical industry
- 14) Shyamali Roy: 1998. Current position: unknown
- 15) Isabelle Hugou: 1998-1999. Current position: unknown
- 16) Sreejayan: 1998-present. Funded by American Heart-Tennessee Affiliate. Current position: Assistant Professor, University of Wyoming
- 17) Hirosuke Kouchi-2001-2002. Private practice medicine
- 18) Madhulika Dixit-2001-2003
- 19) Daming Zhuang-2001-present
- 20) Alice Ceacareanu-2002-2004

GRADUATE STUDENTS TRAINED

Todd Bourcier-1990-1995. Current position: Assistant Professor, Harvard Medical School
 Yi Lin: 1998-2003. Current position: Postdoctoral Fellow, Oklahoma University Medical Center

TEACHING RESPONSIBILITIES

Case Western Reserve University:

Biochemistry to Medical and Graduate Students: Lipid and Prostaglandin Biochemistry-7 hrs/year

University of Tennessee, Memphis:

- 1) Medical Pharmacology: 7 hrs/year
- 2) Pharmacy Pharmacology: 7 hrs/year
- 3) Introduction to Pharmacology: 2 hrs/year

New York Medical College:

- 1) Medical Pharmacology: 3 hrs/year

2) Graduate Pharmacology: 2 hrs/year.

University of Tennessee, Memphis:

1) Medical Physiology: 15 hrs/year

ADMINISTRATIVE RESPONSIBILITIES

Director of Graduate Program, Dept. of Pharmacology, Univ. of Tennessee, Memphis: 1987-1988

Various faculty search committees in Departments of Pharmacology and Physiology, Univ. of Tennessee, Memphis: 1984-1988, 1991-1992, 1997-1999

Coordinator, Cardiovascular-Renal Journal Club: 1991-1993

Associate Director, Vascular Biology Program, University of Tennessee, Health Science Center: 2000-2004

KEY WORDS DESCRIBING AREA OF EXPERTISE

Vascular smooth muscle, cell growth and proliferation, atherosclerosis, vascular hypertrophy and hyperplasia, insulin, cyclic nucleotides, eicosanoids, nitric oxide, atrial natriuretic factor, reactive oxygen species, signal transduction, cell motility, cytoskeleton

PUBLICATIONS (from a total of 90)

11. Hassid, A., and Dunn, M.J. Microsomal Prostaglandin Synthesis of Human Kidney. *Journal of Biological Chemistry* 255:2422-2425, 1980.

12. Spagnuolo, P.J., Ellner, J.J., Hassid, A., and Dunn, M.J. Thromboxane A₂ Mediates Augmented Polymorphonuclear Leukocyte Adhesiveness. *Journal of Clinical Investigation* 66:406-414, 1980.

13. Beck, T.R., Hassid, A., and Dunn, M.J. The Effect of Arginine Vasopressin and Its Analogs on the Synthesis of Prostaglandin E₂ by Rat Renal Medullary Interstitial Cells in Culture. *Journal of Pharmacology and Experimental Therapeutics*. 215:15-19, 1980.

14. Malemud, C.J., Moskowitz, R.W., and Hassid, A. Prostaglandin Biosynthesis by Lapine Articular Chondrocytes in Culture. *Biochimica et Biophysica Acta* 633:480-490, 1981.

15. Hassid, A. Transport-active Renal Tubular Cells (MDCK and LLC-PK₁) in Culture. Prostaglandin Biosynthesis and Its Regulation by Peptide Hormones and Ionophore. *Prostaglandins* 21:985-1001, 1981.

16. Kinter, L.B., Dunn, M.J., Beck, T.R., Beeuwkes, R. III., and Hassid, A. The Interactions of Prostaglandins and Vasopressin in Kidney. *Annals of the New York Academy of Sciences*

(Scott, W.N., and Goodman, D.B.P., Eds.) Volume 372, pp. 163-178, 1981.

17. Beck, T.R., Hassid, A., and Dunn, M.J. Desamino-D-arginine vasopressin Induced Fatty Acid Cyclo-oxygenase Activity in the Renal Medulla of Diabetes Insipidus Rats. *Journal of Pharmacology and Experimental Therapeutics* 221:269-274, 1982.

18. Jim, K., Hassid, A., Sun, F., and Dunn, M.J. Lipoxygenase Activity in Rat Kidney Glomeruli, Glomerular Epithelial Cells and Cortical Tubules. *Journal of Biological Chemistry* 257:10294-10299, 1982.

19. Smith, M.C., Danviriyasup, K., Crow, J.W., Cato, A.E., Park, G.D., Hassid, A., and Dunn, M.J. Prostacyclin Substitution for Heparin in Long-term Hemodialysis. *American Journal of Medicine* 73:669-678, 1982.

20. Hassid, A. Regulation of Prostaglandin Biosynthesis in Cultured Cells. *Am. J. Physiol. Cell Physiology* 243:C205-211, 1982.

21. Hassid, A., and Dunn, M.J. Biosynthesis and Metabolism of Prostaglandins in Human Kidney, in vitro. In: *Prostaglandins and the Kidney: Biochemistry, Physiology, Pharmacology and Clinical Applications* (Dunn, M.J., Patrono, C., and Cinotti, G. eds). Plenum, 1982, pp. 3-15.

22. Dunn, M.J., Beck, T.R., Kinter, L.B., and Hassid, A. The Effects of Vasopressin and Vasopressin Analogues upon Renal Synthesis of Prostaglandins. In: *Prostaglandins and the Kidney: Biochemistry, Physiology, Pharmacology and Clinical Applications* (Dunn, M.J., Patrono, C., and Cinotti, G. eds). Plenum, 1982, pp. 151-166.

23. Dunn, M.J., Petrulis, A.S., Scharschmidt, L.A., Jim, K., and Hassid, A. The use of Glomerular Cell Culture to Evaluate Cyclo-oxygenase and Lipoxygenase Products of Arachidonic Acid Metabolism in the Kidney. In: *Biochemistry and Kidney Function. INSERM Symposium No. 21* (Morel, F., ed). Elsevier, 1982, pp. 3-12.

24. Rosner, I.A., Malemud, C.J., Hassid, A., Goldberg, V.M., Boja, B.A., and Moskowitz, R.W. Estradiol and Tamoxifen Stimulation of Lapine Articular Chondrocyte Prostaglandin Synthesis. *Prostaglandins* 26:123-138, 1983.

25. Hassid, A. Inhibition of Prostaglandin Biosynthesis in Renal (MDCK) Cells by Cyclic AMP. *American Journal of Physiology: Cell Physiology* 244:C369-C376, 1983.

26. Konieczkowski, M., Dunn, M.J., Stork, J.E., and Hassid, A. Glomerular Synthesis of Prostaglandins and Thromboxane in Spontaneously Hypertensive Rats. *Hypertension* 5:446-452, 1983.

27. Hassid, A. Modulation of Cyclic 3',5'-Adenosine Monophosphate in Cultured Renal (MDCK) Cells by Endogenous Prostaglandins. *Journal of Cellular Physiology* 116:297-302, 1983.

28. Hassid, A., and Williams, C. Vasoconstrictor-evoked Prostaglandin Synthesis by Cultured Vascular Smooth Muscle. *American Journal of Physiology: Cell Physiology* 245:C278-C282,

1983.

29. Lederman, M.M., Liebman, M.L., Hassid, A., and Berk, G.I. Preincubation of Human Monocytes Results in Loss of Effector Activity and Diminished Stimulation of the Autologous Mixed Lymphocyte Reaction. *Clinical and Experimental Immunology* 53:482-490, 1983.

30. Hassid, A., Sebrosky, A., and Dunn, M.J. Metabolism of Prostaglandins by Human Renal Enzymes: Presence of 9-Hydroxyprostaglandin Dehydrogenase Activity in Human Kidney. *Adv. Prostagland. Thromb. Leuk. Res.* 11:499-504, 1983.

31. Pugliese, F., Sato, M., Williams, S., Aikawa, M., Hassid, A., and Dunn, M.J. Rabbit and Rat Renal Papillary Collecting Tubule Cells in Culture: The Interactions of Arginine Vasopressin, Prostaglandins, and Cyclic AMP. *Adv. Prostagland. Thromb. Leuk. Res.* 11:517-523, 1983.

32. Hassid, A. Stimulation of Prostacyclin Synthesis by Thromboxane A₂-like Prostaglandin Endoperoxide Analogues in Cultured Vascular Smooth Muscle Cells. *Biochemical and Biophysical Research Communications* 123:21-26, 1984.

33. Pidikiti, N., Gamero, D., Gamero, J., and Hassid, A. Bradykinin-evoked Modulation of Cytosolic Ca²⁺ Concentrations in Cultured Renal Epithelial (MDCK) Cells. *Biochemical and Biophysical Research Communications* 130:807-813, 1985.

34. Town, C.D., Krill, D., and Hassid, A. Inhibition of Differentiation in *Dictyostelium Discoideum* by Anti-inflammatory Drugs. *Development Growth and Differentiation* 27:111-116, 1985.

35. Hassid, A. Atriopeptin II Decreases Cytosolic Free Ca in Cultured Vascular Smooth Muscle Cells. *American Journal of Physiology:Cell Physiology* 251:C681-C686, 1986

36. Erman, A., Hassid, A., Baer, P.G. , and Nasjletti, A. Treatment with dexamethasone increases glomerular prostaglandin synthesis in rats. *Journal of Pharmacology and Experimental Therapeutics* 239: 296-301, 1986

37. Hassid, A., and Oudinet, J.P. Relationship between cellular calcium and prostaglandin synthesis in cultured vascular smooth muscle cells. *Prostaglandins* 32: 457-478, 1986

38. Hassid, A., Pidikiti, N., and Gamero, D. Effects of vasoactive peptides on cytosolic calcium in cultured mesangial cells. *American Journal of Physiology. Renal Fluid and Electrolyte Physiology* 251:F1018-F1028, 1986

39. Hassid, A. Increase of cAMP Concentrations in Cultured Vascular Smooth Muscle Cells by Vasoactive Peptide Hormones. *Journal of Pharmacology and Experimental Therapeutics* 239:334-339, 1986.

40. Kreisberg, J.I., and Hassid, A. Functional Properties of Glomerular Cells in Culture. *Mineral and Electrolyte Metabolism* 12:25-31, 1986.

41. Crowley, W.R., Hassid, A., and Kalra, S.P. Neuropeptide Y enhances the release of

luteinizing hormone (LH) induced by LH-releasing hormone. *Endocrinology* 120:941-945, 1987

42. Morgan-Boyd, R., Stewart, J.M., Vavrek, R.J., and Hassid, A. Effects of bradykinin and angiotensin II on intracellular Ca dynamics in cultured adherent endothelial cells. *American Journal of Physiology:Cell Physiology*, 253:C588-C598, 1987.

43. Hassid, A. Atriopeptins decrease resting and hormone-elevated cytosolic Ca in cultured mesangial cells. *American Journal of Physiology:Renal Fluid and Electrolyte Physiology* 253:F1077-F1082, 1987.

44. Spagnuolo, P.J., Ellner, J.E., Hassid, A., and Dunn, M.J. Mediation of augmented monocyte adhesiveness by thromboxane. *Inflammation*, 12:1-9, 1988.

45. Johnson, A., Lermioglu, F., Garg, U.C., Morgan-Boyd, R., and Hassid, A. A Novel Biological Effect of Atrial Natriuretic Hormone: Inhibition of Mesangial Cell Mitogenesis. *Biochemical Biophysical Research Communications* 152:893-897, 1988.

46. Schlondorff, D., Singhal, P., Hassid, A., Satriano, J.A., and DeCandido, S. Relationship of GTP-binding proteins, phospholipase C and PGE₂ synthesis in rat glomerular mesangial cells. *American Journal of Physiology* 256 (Renal Fluid and Electrolyte Physiol.25), F171-F178, 1989

47. Hassid, A. and Yu, Yi-Ming. Mechanism of atriopeptin-induced decrease of cytosolic free Ca in rat vascular smooth muscle cells: Evidence for an intracellular locus of action. *Journal of Cardiovascular Pharmacology*, 14(suppl. 6):S34-S38, 1989.

48. Garg, U.C., and Hassid, A. Nitric oxide-generating vasodilators and 8-bromo-cyclic GMP inhibit mitogenesis and proliferation of cultured rat vascular smooth muscle cells. *Journal of Clinical Investigation*, 83:1774-1777, 1989.

49. Garg, U.C., and Hassid, A. Inhibition of mesangial cell mitogenesis by nitric oxide-generating vasodilators. *American Journal of Physiology (Renal Fluid and Electrolyte Physiology)*. 257:F60-F66, 1989.

50. Yu, Yi-Ming, Lermioglu, F., and Hassid, A. Modulation of Ca by agents affecting voltage-sensitive Ca channels in rat mesangial cells. *American Journal of Physiology. (Renal Fluid and Electrolyte Physiol.)*.257:F1094-F1099, 1989

51. Songu-Mize, E., S.E. Bealer, and Hassid, A. Centrally administered ANF promotes appearance of a circulating sodium pump inhibitor. *American Journal of Physiology* 258:H1655-H1659, 1990

52. Garg, U.C., and Hassid, A. Nitric oxide-generating vasodilators inhibit mitogenesis and proliferation of BALB/c 3T3 fibroblasts by a cyclic GMP-independent mechanism. *Biochemical and Biophysical Research Communications* 171:474-479, 1990

53. Garg, U.C., and Hassid, A. Nitric oxide decreases cytosolic free calcium in Balb/c 3T3

fibroblasts by a cyclic GMP-independent mechanism. *Journal of Biological Chemistry* 266:9-12, 1991

54. Lermioglu, F., Goyal, J., and Hassid, A. Cell density modulates the decrease of cytosolic free Ca induced by atrial natriuretic hormone, S-nitroso-N-acetylpenicillamine and 8-bromo-cGMP in cultured rat mesangial cells, *Biochemical Journal* 274:323-328, 1991

55. Cahill, P.A., and Hassid, A. Clearance receptor-binding atrial natriuretic peptides inhibit mitogenesis and proliferation of rat aortic smooth muscle cells. *Biochemical and Biophysical Research Communications* 179:1606-1613, 1991.

56. Cahill, P.A., and Hassid, A. Differential antimitogenic effectiveness of atrial natriuretic peptides in primary versus subcultured rat aortic smooth muscle cells: relationship to expression of ANF-C receptors. *Journal of Cellular Physiology*, 154:28-38, 1993.

57. Garg, U.C. and Hassid, A. Mechanisms of nitrosothiol-induced antimitogenesis in aortic smooth muscle cells. *European Journal of Pharmacology*, 237:243-249, 1993.

58. Cahill, P.A., and Hassid, A. ANF c-receptor-mediated inhibition of aortic smooth muscle cell proliferation and thymidine kinase activity. *American Journal of Physiology*, 266:R194-R203, 1994.

59. Hassid, A., Arabshahi, H., Bourcier, T., Dhaunsi, G.S. and Matthews. C. Nitric oxide selectively amplifies FGF-2-induced mitogenesis in primary rat aortic smooth muscle cells. *American Journal of Physiology*, 267:H1040-H1048, 1994

60. Bourcier, T., Dockter, M., and Hassid, A. Synergistic interaction of interleukin-1b and basic fibroblast growth factor in primary cultures of rat aortic smooth muscle cells. *Journal of Cellular Physiology* 164:644-657, 1995

61. Dhaunsi, G.S., and Hassid, A. Atrial and c-type natriuretic peptides amplify fibroblast growth factor-2 activity in primary rat aortic smooth muscle cells. *Cardiovascular Research* 31:37-47, 1996

62. Dhaunsi, G.S., Matthews, C., Kaur, K., and Hassid, A. Nitric oxide increases protein tyrosine phosphatase activity in aortic smooth muscle :relationship to antimitogenesis. *American Journal of Physiology: Heart and Circulatory Physiology* 272:H1342-H1349, 1997

63. Kaur, K., J. Yao, X. Pan, C. Matthews, and Hassid, A. NO decreases phosphorylation of focal adhesion proteins via reduction of Ca in rat aortic smooth muscle cells. *American Journal of Physiology: Heart and Circulatory Physiology* 274: H1613-1619, 1998

64. C. Brown, X. Pan and A. Hassid. Nitric Oxide and C-Type Atrial Natriuretic Peptide Stimulate Primary Aortic Smooth Muscle Cell Migration via a cGMP-Dependent Mechanism : Relationship to Microfilament Dissociation and Altered Cell Morphology. *Circ Res* 84:655-667, 1999

65. Hassid, A., S. Huang, and J. Yao. Role of PTP-1B in aortic smooth muscle cell motility and tyrosine phosphorylation of focal adhesion proteins. *Am J Physiol* **277**:H192-H198. 1999.
66. Hassid, A., J. Yao, and S. Huang. NO alters cell shape and motility in aortic smooth muscle cells via protein tyrosine phosphatase 1B activation. *Am J Physiol* **277**:H1014-1026, 1999.
67. Brown, C., Lin, Y., and Hassid, A. Requirement of protein tyrosine phosphatase SHP2 for NO-stimulated vascular smooth muscle cell motility. *Am J Physiol Heart Circ Physiol* **281**:H1598-605., 2001
68. Y. Chang, B. Ceacareanu, M. Dixit, N. Sreejayan and A. Hassid. Nitric oxide-induced motility in aortic smooth muscle cells: role of protein tyrosine phosphatase SHP-2 and GTP-binding protein Rho. *Circ Res* **91**:390-7., 2002
69. N. Sreejayan, Y. Lin and A. Hassid. NO attenuates insulin signaling and motility in aortic smooth muscle cells via protein tyrosine phosphatase 1B-mediated mechanism. *Arterioscler Thromb Vasc Biol* **22**:1086-92., 2002
70. Yellaturu, C. R., S. K. Ghosh, R. K. Rao, L. K. Jennings, A. Hassid, and G. N. Rao. A potential role for nuclear factor of activated T-cells in receptor tyrosine kinase and G-protein-coupled receptor agonist-induced cell proliferation. *Biochem J* **368**(Pt 1):183-190. (2002).
71. Bhanoori, M., C. R. Yellaturu, S. K. Ghosh, A. Hassid, L. K. Jennings, and G. N. Rao. Thiol alkylation inhibits the mitogenic effects of platelet-derived growth factor and renders it proapoptotic via activation of STATs and p53 and induction of expression of caspase1 and p21(waf1 / cip1). *Oncogene* **22**(1):117-130. (2003).
72. Yigzaw, Y., H. M. Poppleton, N. Sreejayan, A. Hassid, and T. B. Patel. Protein-tyrosine Phosphatase-1B (PTP1B) Mediates the Anti-migratory Actions of Sprouty. *J Biol Chem* **278**(1):284-288. (2003).
73. Lin, Y., Ceacareanu, A. C., and Hassid, A. Nitric oxide-induced inhibition of aortic smooth muscle cell motility: role of PTP-PEST and adaptor proteins p130cas and Crk. *Am J Physiol Heart Circ Physiol* **285**(2), H710-721 (2003)
74. Dixit, M., D. Zhuang, B. Ceacareanu, and A. Hassid. Treatment with insulin uncovers the motogenic capacity of nitric oxide in aortic smooth muscle cells: dependence on Gab1 and Gab1-SHP2 association. *Circ Res* **93**(10):e113-123 (2003).
75. Zhuang, D., Ceacareanu, A-C., Lin Yi, Ceacareanu, B., Dixit, M., Chapman, K.E., Waters, C.M., Rao, G.N., and Hassid, A. Nitric oxide attenuates insulin- or IGF1-stimulated aortic smooth muscle cell motility by decreasing hydrogen peroxide levels. Essential role of Cyclic GMP. *Am J Physiol Heart Circ Physiol* **286**:H2103-211276 (2004).
76. Chang Y, Zhuang D, Zhang C, Hassid A. Increase of PTP levels in vascular injury and in cultured aortic smooth muscle cells treated with specific growth factors. *Am J Physiol Heart Circ Physiol*. 2004;287:H2201-2208.

77. Tomar A, Wang Y, Kumar N, George S, Ceacareanu B, Hassid A, Chapman KE, Aryal AM, Waters CM, Khurana S. Regulation of cell motility by tyrosine phosphorylated villin. *Mol Biol Cell*. 2004;15:4807-4817.
78. Desai LP, Aryal AM, Ceacareanu B, Hassid A, Waters CM. RhoA and Rac1 are both required for efficient wound closure of airway epithelial cells. *Am J Physiol Lung Cell Mol Physiol*. 2004;287:L1134-1144.
79. Zhuang D, Ceacareanu AC, Ceacareanu B, Hassid A. Essential role of protein kinase G and decreased cytoplasmic Ca²⁺ levels in NO-induced inhibition of rat aortic smooth muscle cell motility. *Am J Physiol Heart Circ Physiol*. 2005;288:H1859-1866. Epub 2004 Dec 1852.
80. Chang Y, Ceacareanu B, Zhuang D, Zhang C, Pu Q, Ceacareanu AC, Hassid A. Counter-regulatory function of protein tyrosine phosphatase 1B in platelet-derived growth factor- or fibroblast growth factor-induced motility and proliferation of cultured smooth muscle cells and in neointima formation. *Arterioscler Thromb Vasc Biol*. 2006;26:501-507.
81. Ceacareanu AC, Ceacareanu B, Zhuang D, Chang Y, Ray RM, Desai L, Chapman KE, Waters CM, Hassid A. Nitric oxide attenuates IGF-I-induced aortic smooth muscle cell motility by decreasing Rac1 activity: essential role of PTP-PEST and p130cas. *Am J Physiol Cell Physiol*. 2006;290:C1263-1270. Epub 2005 Dec 1214.
82. Dixit M, Loot AE, Mohamed A, Fisslthaler B, Boulanger CM, Ceacareanu B, Hassid A, Busse R, Fleming I. Gab1, SHP2, and protein kinase A are crucial for the activation of the endothelial NO synthase by fluid shear stress. *Circ Res*. 2005;97:1236-1244. Epub 2005 Nov 1210.
83. Chapman KE, Sinclair SE, Zhuang D, Hassid A, Desai LP, Waters CM. Cyclic mechanical strain increases reactive oxygen species production in pulmonary epithelial cells. *Am J Physiol Lung Cell Mol Physiol*. 2005;289:L834-841. Epub 2005 Jun 2017.
84. Liu X, Sun SQ, Hassid AI, Ostrom RS. cAMP inhibits TGFbeta-stimulated collagen synthesis via inhibition of erk1/2 and smad signaling in rat cardiac fibroblasts. *Mol Pharmacol*. 2006;70:1992-2003. Epub 2006 Sep 7.
85. Rafiq K, Kolpakov MA, Abdelfettah M, Streblow DN, Hassid A, Dell'Italia LJ, Sabri A. Role of protein-tyrosine phosphatase SHP2 in focal adhesion kinase down-regulation during neutrophil cathepsin G-induced cardiomyocytes anoikis. *J Biol Chem*. 2006;281:19781-19792. Epub 2006 May 19711.
86. Desai LP, Sinclair SE, Chapman KE, Hassid A, and Waters CM. High tidal volume mechanical ventilation with hyperoxia alters alveolar type II cell adhesion. *Am J Physiol Lung Cell Mol Physiol* 293: L769-778. Epub 2007 Jun 2029., 2007.
87. Xi Q, Adebiyi A, Zhao G, Chapman KE, Waters CM, Hassid A, and Jaggar JH. IP3 constricts cerebral arteries via IP3 receptor-mediated TRPC3 channel activation and independently of sarcoplasmic reticulum Ca²⁺ release. *Circ Res* 102: 1118-1126. Epub 2008 Apr 1113., 2008.

88. Zhuang D, Pu Q, Ceacareanu B, Chang Y, Dixit M, and Hassid A. Chronic insulin treatment amplifies PDGF-induced motility in differentiated aortic smooth muscle cells by suppressing the expression and function of PTP1B. *Am J Physiol Heart Circ Physiol* 295: H163-173. Epub 2008 May 2002., 2008.
89. Lu L, Chen SS, Hassid A, and Sun Y. Cardiac fibrogenesis following infarction in mice with deletion of inducible nitric oxide synthase. *Am J Med Sci* 335: 431-438., 2008.
90. Pu Q., Chang Y., Zhang C., Cai Y., and Hassid A. Chronic insulin treatment suppresses PTP1B function, induces increased PDGF signaling, and amplifies neointima formation in the balloon-injured rat artery. *Am J Physiol Heart Circ Physiol* 296:H132-139. Epub 2008 Nov 14, 2009