

CURRICULUM VITAE

NAME: Rick A. Friedman M.D., PhD

Research Interests:

1. State of the Art management of acoustic neuroma and meningioma
2. Surgery of acoustic neuroma after failed radiation
3. Identification of potential treatable target for Meniere's using a genetic approach
4. Genetics of otosclerosis and presbycusis

ADDRESS:

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Professional Experience:

Fellow, House Ear Clinic (1-95 thru 12-95)
Assistant Professor, Otolaryngology University of Cincinnati School of Medicine (1-96 thru 3-98)
Associate House Ear Clinic, Inc., (4-98 thru Present)
House Ear Institute Chief of Section on Genetic disorder of the ear,(4-98 thru present)
USC, Associate Professor Keck School of Medicine, Graduate School of Hearing Communications/Neuroscience (4-98 thru present)
Cedar's Sinai Medical Center, Medical Director of Cranial Base Surgical Center, (1/05-1/10)

EDUCATION:

BA, University of California, Los Angeles (1984)
MD, University of California, San Diego (1988)
PhD, Dept. of Molecular Pathology. University of California, San Diego, CA, Thesis Advisor – M. Jeffrey Rosenfeld, M.D.,PhD (1994)
Intern, Dept. of Surgery, UCSD Medical Center (1988-1989)
Resident, Division of Otolaryngology, UCSD Medical Center (1989-1994)
Clinical Fellow, House Ear Clinic, Inc. (1995)

BOARD CERTIFICATION: American Board of Otolaryngology
American Board of Neurotology

PATENTS: Treatment and/or prevention of Presbycusis by Modulation of Metabotropic Glutamate Receptor 7 (Issued, 5-20-2003 U.S. Patent Number 5,566,580 B1)

MEMBERSHIPS:

American Otological Society
American Academy of Otolaryngology, Head and Neck Surgery
Association for Research in Otolaryngology
Acoustic Neuroma Association
American Neurotology Society
Deafness Research Foundation-Scientific Review Committee
Committee on Facial Nerve Disorders, American Academy of

Otolaryngology, Head and Neck Surgery
Committee on Hearing Balance Disorders, American Academy of
Otolaryngology, Head and Neck Surgery
American Board of Otolaryngology Examiner
National Organization for Hearing Research-Scientific Review Committee

MEMBERSHIPS (cont):

Triological Society
NIH/NIDCD Ad Hoc Reviewer AUD Study Section
Board of North American Skull Base Society
Society of Otolaryngology, President, 2007
Collegium Oto-Rhino-Laryngologicum

HONORS:

AAO-HNS Foundation's Norwich-Eaton Pharmaceuticals
Resident Research Award, 1991
ARO Travel Award, 1991
AAO-HNS Cherry Blossom Travel Award, 1991
ARO Travel Award, 1992
Chairman's Award, Chief Resident, UCSD, 1994
Edmund Prince Fowler Award, Triological Society
Guide to Top Doctors, Top-Rated Physicians in America
Best Doctors in America, 2003-2004, 2005-2006, 2007-2008, 2008-2009 (peer-
selected database of top physicians)
Top Doctors Physicians, 2006, 2007, 2008
Super Doctors, 2010

HOSPITAL AFFILIATIONS:

Active, (1993-Present) St. Vincent's Medical Center
Active, (1998-Present) Cedars-Sinai Medical Center
Active, (2006-Present) Good Samaritan Hospital

EDITORIAL BOARDS:

Audiology and Neurotology (Editor-in-chief) Karger, Basel, Switzerland

MANUSCRIPT REVIEWER:

Otology & Neurotology
Otolaryngology-Head & Neck Surgery
International Journal of Pediatric Otolaryngology
The Laryngoscope

CONTRACTS AND GRANTS:

1. The Schwartz Foundation, Genetics of Age-Related hearing Impairment, Effective July 1, 2010
2. NIH NIDCD 1R01 DC010215-01, Genetic Analysis of Age Related Hearing Impairment, Effective September 2009, Co-Investigator
3. Seaver Foundation Grant. Genetics of Age Related Hearing Loss: A whole genome association study. Effective January 2006 through December 2007
4. NIH, NIDCD R01 DC04796-01, Study of a conserved genetic network in ear development. Awarded September 2001. Effective 10-2001 through 8-2006
5. NIH, NIDCD R01 DC05827, The Genetics of Age Related Hearing Loss. Awarded January 2003-December 2007, Co-Investigator.
6. NIH, NIDCD R03 Co-investigator
7. K08 DC00119-01A1 Awarded October, 1996 Effective 1-1997 through 12-2001.
8. American Otological Society, The genetics of otosclerosis.
9. Deafness Research Foundation, 1992 to 1994
10. Trustee Grant, Children's Hospital Research Foundation, Effective 7-1-1997 through 6/30/1999.
11. AAO-HNS/Norwich-Eaton Pharmaceuticals, 1991

BIBLIOGRAPHY

Abstracts/Posters:

1. **Friedman RA**, Waldman L, Covell J. Alterations in the magnitude and direction of principal strains with increases in the left ventricular volume in the dog. Federation Proceedings, 45:777, 1986.
2. **Friedman RA**, Crenshaw E, Rosenfeld M, Ryan A.: Cloning the insertion site of a transgenic inner ear mutant. ARO Proceedings, Midwinter meeting, St. Petersburg, FL, February, 1991.
3. **Friedman RA**, Crenshaw E, Rosenfeld M, Ryan A.: Molecular studies of the *Wocko* insertional inner ear mutation. ARO Proceedings, Midwinter meeting, St. Petersburg, FL, February, 1992.
4. **Friedman RA**, Djabali M, Crenshaw E, Rosenfeld M, Ryan A.: Molecular characterization of the *Wocko* insertional inner ear mutation. The Molecular Biology of Hearing and Deafness, UCSD, La Jolla, CA, May, 1992.
5. **Friedman RA**, Djabali M, Crenshaw E, Rosenfeld M, Ryan A.: Molecular studies of a transgenic insertional inner ear mutant. AAO-HNS Research Forum, Washington, DC, September, 1992.
6. **Friedman RA**, Djabali M, Crenshaw E, Rosenfeld M, Ryan A.: Molecular characterization of the *Wocko* insertional inner ear mutation. 29th Inner Ear Biology Workshop, Engelberg, Switzerland, 1992.
7. **Friedman RA**, Wood E, Seid A, Pransky S, and Kearns D.: Nager acrofacial dysostosis: A difficult airway. American Society of Pediatric Otolaryngology Proceedings, April, 1993, Los Angeles, CA.
8. **Friedman RA**, Adir V, Crenshaw E, Rosenfeld M, and Ryan A.: A complex rearrangement at the

transgene integration site of the *Wocko* insertional inner ear mutation. AAO-HNS Research Forum, San Diego, CA, September, 1994.

9. Ryan A, **Friedman RA**, Hepler K, Adir V, and Luo L.: Molecular mechanisms of transmembrane ion movement in the cochlea. Inner Ear Neuropharmacology Symposium, Montpellier, France, September, 1994.
10. **Friedman RA**, Adir V, Crenshaw EB, Avraham K, Copeland N, Jenkins N, Rosenfeld MG, Ryan AF.: A transgenic insertional inner ear mutation on mouse chromosome 1. Molecular Biology of Hearing and Deafness Conference, Bethesda, MD, October, 1995.
11. **Friedman RA**, Brackmann D, Mills D. Promontory stimulation in patients with hearing loss after middle cranial fossa acoustic tumor removal. American Otologic Society, May, 1996 **Friedman RA**, Hitselberger WE, Brackman DE, Van Loveren H. Management of the contracted mastoid in translabyrinthine acoustic tumor removal. 2nd International Skull Base Congress. July, 1996.
12. **Friedman RA**, Brackmann D, Mills, D. Promontory stimulation in patients with hearing loss after middle cranial fossa acoustic tumor removal. 2nd International Skull Base Congress. July, 1996.
13. **Friedman RA**, Pensak ML, Tauber M, Tew JM JR., van Loveren HR. Anterior Petrosectomy Approach to Infracallosal Basilar Artery Aneurysms. Western Section Meeting, Triological Society, Tucson, AZ, January, 1997.
14. **Friedman RA**. Transforming Growth Factor Beta Genes and Inner Ear Development, Association for Research in Otolaryngology, Mid-Winter Meeting, St. Petersburg Beach, FL, February, 1997
15. Pensak ML, **Friedman RA**. An Overview of the Surgical Treatment of Vertigo, XVI World Congress of Otorhinolaryngology Head and Neck Surgery, Sydney, Australia, March 2-7, 1997.
16. **Friedman RA**, House JW. Use of the House-Brackmann facial nerve grading scale with acute and subacute facial palsy. VIII International Symposium on the Facial Nerve, Matsuyama, Ehime, Japan, May 13-18, 1997.
17. **Friedman RA**, Paradies NE, Wert S, Doetschman T, Cardell EL. The effect of TGF β -2 on inner ear development: Light and electron microscopy observations. Electron Microscopy Society Annual Meeting, Cleveland OH, August 1997.
18. Pelton PD, Sherman LS, **Friedman, RA**, Marchionni MA, Ratner N. Abnormal Proliferation, Spreading and Cytoskeletal Organization of Schwannoma-Derived Schwann Cells. American Society of Cell Biology. September 1997.
19. Steward D, Paradies NE, Cardell EL, Doetschman T, **Friedman RA**. The role of TGF β 1 in inner ear development. Poster. American Academy of Otolaryngology-Head and Neck Surgery, 101st Annual Meeting San Francisco, CA, September 1997.
20. Paradies NE, Wert S, Doetschman T, **Friedman RA**. The TGF β genes and tissue interactions during inner ear morphogenesis. Association for Research in Otolaryngology. February 1998.
21. **Friedman RA**. Cochlear Implant Case Study. Central Auditory Neuropathy Conference, Lake Arrowhead, CA, March 1998.
22. Johnson K, Cook S, Erway L, Matthews A, Sanford L, Paradies N, **Friedman RA**, A Mouse model of Branchio-Oto-Renal syndrome. Poster. Cell and Molecular Biology of the Ear Symposium, House Ear Institute, Los Angeles, CA, April 1998.
23. **Friedman RA**, House JW, Luxford WM, Gherini S, Mills D. Profound hearing loss associated with hydrocodone/acetaminophen abuse. COSM, Palm Desert, 1999.
24. **Friedman RA**, Wackym PE. Will my child inherit my acoustic neuroma? Acoustic Neuroma Society, Milwaukee WI, June 1999.
25. K. Johnson, S. Cook, L. Erway, A. Matthews, L., C. Li, **R. Friedman**. ¹Jackson Laboratories, Inner Ear and Kidney Anomalies Caused by IAP Insertion in an Intron of the *Eyal* Gene in a Mouse

Model of BOR Syndrome. Association for Research in Otolaryngology. February 2000.

26. **Friedman RA**, Adir V, Crenshaw EB, Ryan AF, Rosenfeld MG. A transgenic insertional inner ear mutation on mouse chromosome 1. Combined Otolaryngology Spring Meetings, Orlando FLA, 2000. Edmund Prince Fowler Award.
27. **Friedman RA**, Hitselberger WE, Brackmann DE, Day JD. Management of Acoustic Neuromas in Hearing Patients. North American Skull Base Society, Phoenix AZ, March 2000.
28. Kesser BW, **Friedman RA**, Brackmann DE, Hitselberger WE. Preserving Hearing after Sudden Loss in Acoustic Neuroma. *Otol Head Neck Surg.* :1999.
29. Kesser BW, **Friedman RA**, Slattery WH Brackmann DE. Long-term hearing results in acoustic neuroma surgery. *Otol Head Neck Surg.* 123;71:2000.
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31. X.Cindy Li, Dawna Mills, Patricia Johnson, Derald Brackmann, **Rick A. Friedman** (2001) Genetic and clinical studies of Otosclerosis. The 10th International Congress of Human Genetics.
32. Biesiada E, Lusic AJ, **Friedman RA**. A modification of the Eya1 mutant phenotype. *Molecular Biology of Hearing and Deafness*, Bethesda MD, October 2001.
33. Li XC, Brackmann DE, **Friedman RA**. A novel locus for otosclerosis OTSC3. *Molecular Biology of Hearing and Deafness*, Bethesda MD, October 2001.
34. **Friedman RA**, Brackmann DE, Day JD, Hitselberger WE. Hearing preservation in vestibular schwannoma. 5th European Skull Base Society Congress, Copenhagen, Denmark. June 2001. *Skull Base* 11 (suppl 2).
35. Biesiada E., Lusic AJ, **Friedman RA**. QTL mapping of an Eya1bor suppressor gene. Association for Research in Otolaryngology. February 2002.
36. Fisher O, **Friedman RA**, Luxford WM, Mills D. Profound hearing loss associated with hydrocodone/acetaminophen abuse. *Triological Society, Western Section*, Pasadena CA 2002.
37. **Friedman RA**, van Laer, L, Huentelman, MJ, Sheth, SS, van Eyken, E, Corneveaux, JJ, Tembe, WD, Halperin, RF, Thorburn, AQ, Thys, S, Bonneux, S, Fransen, E, Huyghe, J, Pyykkö, I, Cremers, CWRJ, Kremer, H, Dhooze, I, Stephens, D, Orzan, E, Pfister, M, Bille, M, Parving, A, Sorri, M, van de Heyning, PH, Makmura, L, Ohmen, JD, Linthicum, FH, Fayad, JN, Pearson, JV, Craig, DW, Stephan, DA, van Camp, G. GRM7 Variants confer susceptibility to age-related hearing impairment. *ARO and AOS* 2008.
38. White, C.H., Ohmen, J.D., Sheth, S., Zebboudj, A., McHugh, R.K., Hoffman, L.F., Lusic, A.J., Davis, R.C., **Friedman, R.A.**, Genome-wide Screening for Genetic Loci Associated with Noise-Induced Hearing Loss, *ARO, Midwinter Meeting*, Anaheim, CA, February 9, 2010

Articles:

1. **Friedman RA**, Harris JP, Sitzer M, Schaff H, Marshall L, and Shackford S.: Injuries related to all-terrain vehicular accidents: A closer look at head and neck trauma. *Laryngoscope.* 1989;98 (11): 1251-1254.
2. **Friedman RA**, Wood E, Seid A, Pransky S, Kearns D.: Nager acrofacial dysostosis: A difficult airway. *International Journal of Pediatric Otolaryngology.* 1996;35:69-72.
3. **Friedman RA**, Nelson RA, Harris JP.: Posterior fossa meningiomas intimately involved with endolymphatic sac. *American Journal of Otology.* 1996;17 (4):612-616.
4. **Friedman RA**. Transgenic insertional mutagenesis: A tool for the study of inner ear development. *Archives of Otolaryngology - Head and Neck Surgery.* March, 1996;122:252-257.

5. **Friedman RA**, Talbot JM, Wilson D, Fischel-Ghodsian N.: Molecular genetic analysis of patients with X-linked mixed deafness and perilymph gusher. *Annals of Otolaryngology, Rhinology, and Laryngology*. 1997;106:320-325.
6. DeKok Y, Vossenaar C, Cremers WRJ, Dahl N, Laporte J, Hu LJ, **Friedman RA**, et al.: Identification of a hot spot for microdeletions in patients with X-linked deafness type 3 (DFN3) 900 kb proximal to the DFN3 gene POU3F4 *Human Molecular Genetics*. 1996;5 (9):1229-1235.
7. **Friedman RA**, Brackmann DE, van Loveren HR, Hitselberger WE.: Management of the contracted mastoid intralabyrinthine acoustic tumor removal. *Arch Otolaryngol Head Neck Surg*. 1997;123:342-344.
8. **Friedman RA**, Pensak ML, Tauber M, Tew JM, Jr., van Loveren HR. Anterior petrosectomy approach to infraclinoidal basilar artery aneurysms. *Laryngoscope*. 1997;107:977-983.
9. Pensak ML, **Friedman RA**. The fallopian bridge technique in chronic ear surgery. *Laryngoscope*. 1997;107:1451-1456.
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18. **Friedman RA**, Brackmann DE, Mills D. Auditory-nerve Integrity After Middle-Fossa Acoustic-tumor Removal. *Otolaryngology- Head and Neck Surgery*, 1998;119 Number 6:588-592.
19. Paradies NE, Sanford LP, Doetschman T, **Friedman RA**. Developmental expression of the TGF- β 2 in the mouse cochlea. *Mechanisms Of Development* (79)1-2 (1998) pp. 165-168.
20. Johnson K, Cook S, Erway L, Matthews A, Sanford L, Paradies N, **Friedman RA**. Inner ear and kidney anomalies caused by IAP insertion in an intron of the *Eya1* gene in a mouse model of BOR syndrome. *Hum Mol Genet*. 1999 Apr;8(4):645-653.
21. **Friedman RA**, Bykhovskaya Y, Sue CM, DiMauro S, Bradley R, Fallis R, Paradies N, Pensak ML, Smith RJ, Groden J, Li XC, Fischel-Ghodsian N. Maternally Inherited Non-syndromic Hearing Loss. *Am J Med Genet* 1999 Jun 4;84(4):369-72.

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24. Sue CM, Tanji K, Hadjigeorgiou G, Andreu AL, Nishino I, Krishna S, Bruno C, Hirano M, Shanske S, Bonilla E, Fischel-Ghodsian N, DiMauro S, **Friedman R**. Maternally inherited hearing loss in a large kindred with a novel T7511C mutation in the mitochondrial DNA tRNA(Ser(UCN)) gene. *Neurology* 1999 Jun 10;52(9):1905-8
25. **Friedman RA**. The surgical management of Bell's palsy: A review. *Am J Otol* 2000;21:139-144.
26. **Friedman RA**, House JW, Luxford WM, Gherini S, Mills D. Profound hearing loss associated with hydrocodone/acetaminophen abuse. *Am J Otol* 2000;21:188-191.
27. Brackmann DE, Owens R, **Friedman RA**, Slattery WH, Hitselberger WE, House JW, Luxford WM, DelaCruz A, Nelson RA, Fayad J. Prognostic factors for hearing preservation in middle fossa acoustic tumor surgery. *Am J Otol* 2000;21:417-424.
28. **Friedman RA**, Adir V, Crenshaw EB, Ryan AF, Rosenfeld MG. A transgenic insertional inner ear mutation on mouse chromosome 1. *Laryngoscope* 2000;110:489-496.
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30. **Friedman RA**, Brackmann DE. The middle cranial fossa approach to vestibular schwannomas. *Operative Techniques in Neurosurgery* 2001;4:30-35.
31. **Friedman RA**, Kesser B, Brackmann DE, Hitselberger WE. Hearing preservation in patients with sudden hearing loss and vestibular schwannoma. *Otol Head Neck Surg* 2001;125:544-551.
32. **Friedman RA**, Kesser B, Brackmann DE, Fisher LM, Slattery WH, Hitselberger WE Long-term hearing preservation after middle fossa removal of vestibular schwannoma. *Otolaryngology Head Neck Surg*. 2003 Dec;129(6):660-5.
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36. Weber PC, Roland PS, Hannley M, **Friedman R**, Manolidis S, Matz G, Owens F, Rybak L, Stewart MG. The development of antibiotic resistant organisms with the use of ototopical medications. *Otolaryngol Head Neck Surg*. 2004 Mar;130(3 Suppl):S89-94.
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40. Li XC, **Friedman RA**. Hereditary Hearing Loss. In: *The Otolaryngologic Clinics of North America.* 2002 Apr;35(2):275-85. Review.
41. Friedman **RA**, Makmura L, Biesiada E, Wang X, Keithley EM. Eya1 acts upstream of Tbx1, Neurogenin 1, NeuroD and the neurotrophins BDNF and NT-3 during inner ear development. *Mech Dev.* 2005 May;122(5):625-34. Epub 2005 Jan 8.
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43. Doherty JK, **Friedman RA**. Controversies in building a management algorithm for vestibular schwannomas. *Curr Opin Otolaryngol Head Neck Surg.* 2006 Oct;14(5):305-13.
44. Mc Hugh RK, **Friedman RA**. Genetics of hearing loss: Allelism and modifier genes produce a phenotypic continuum. *Anat Rec A Discov Mol Cell Evol Biol.* 2006 Apr;288(4):370-81.
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48. **Friedman RA**, Cullen RD, Ulis J, Brackmann DE. Management of cerebrospinal fluid leaks after acoustic tumor removal. *Neurosurgery.* 2007
49. Kutz JW Jr, Verma S, Tan HT, Lo WW, Slattery WH 3rd, **Friedman RA**. Surgical management of skull base chondroblastoma. *Laryngoscope.* 2007 May;117(5):848-53
50. Starkweather A, **Friedman RA**. Effect of ciprofloxacin on graft healing in tympanoplasty. *Adv Ther.* 2007 Mar-Apr;24(2):427-35
51. Kutz JW Jr, **Friedman RA**. Congenital middle ear cholesteatoma. In: *Ear Nose Throat J.* 2007 Nov;86(11):654.
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57. Bassim, M., Berliner, K., Fisher, L., Brackmann, D., **Friedman, RA** Radiation Therapy for the treatment of Vestibular Schwannoma: A Critical Evaluation of The State of Literature. *Otology Neurotology* 2010 June.

Chapters:

1. **Friedman RA**, Harris JP.: Paranasal Sinusitis. *Annual Review of Medicine*. 1992;42: 471-489.
2. **Friedman RA**, Ryan AF.: Transgenic mice: Current applications to the study of the auditory and vestibular systems. *The Otolaryngologic Clinics of North American*. 1992;25 (5):1017-1026.
3. **Friedman RA**, Luxford, W. L.: Injuries of the auricle, middle ear, and temporal bone. In *Pediatric Otology/Neurotology*. Edited by Lalwani AK and Grundfast KM. J.B. Lippincott Company, Philadelphia, PA. November, 1996.
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5. Pensak ML, **Friedman, R.**: Malignant tumors of the temporal bone. In: *Clinical Otology*, 2nd edition. Edited by Pensak ML, and Hughes G. Thieme Publishers, New York, NY. 1997;23:335-343.
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8. **Friedman RA**. Pathogenesis of Menieres's Disease with particular attention to molecular mechanisms. In: *Menieres Disease*. Edited by Harris JP. Kugler Publications, the Netherlands.
9. **Friedman RA**. Congenital and acquired facial paralysis. In: *Practical Pediatric Otolaryngology*, Edited by Cotton RT, and Myer CM III, Lippincott-Raven Publishers, Philadelphia, PA. Publication expected September, 1997.
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