

CURRICULUM VITAE

Name: Daniel Choo, M.D., F.A.C.S.
Professor and Director
Division of Pediatric Otolaryngology Head and Neck Surgery

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Education and Training:

1985 University of Pennsylvania
B.A. Biology with Honors
Philadelphia, PA

1989 State University of New York
M.D. with Honors
Health Science Center
Syracuse, New York

1989- 1990 Internship
Department of General Surgery
State University of New York, Health Science Center
Syracuse, New York

1990- 1994 Residency
Department of Otolaryngology
State University of New York, Health Science Center
Syracuse, New York

1994- 1995 Fellowship
Clinical and Surgical Neuro-Otology Training
Ear Research Foundation
Sarasota, Florida

Professional Appointments Continued:

1999-2012	Faculty Department of Otolaryngology Head and Neck Surgery Director, Division of Otolaryngology/Neurotology University of Cincinnati College of Medicine Cincinnati Children's Hospital Medical Center
2001 -Present	Faculty Division of Molecular and Developmental Biology
October, 2012-Present	Director, Division of Pediatric Otolaryngology Head & Neck Surgery Cincinnati Children's Hospital Medical Center

Privileges

1999 - Present	Cincinnati Children's Hospital Medical Center Cincinnati, OH
1999 - Present	University Hospital Cincinnati, OH
1999 - Present	The Christ Hospital Cincinnati, OH
1999 - Present	Good Samaritan Hospital Cincinnati, OH
2013 -Present	Shriners Hospital

Honors and Awards

1988	AOA Medical Student Research Award	
1989	AAO-HNS Medical Student Research Award	
1995	Ear Research Foundation	Fellow's Award for Excellence
1998	National Institute of Health-Clinical Center	Director's Award
2001	"Best doctors of the year award"	
2007	Certificate of Honor AAO-HNS Foundation	
2008	George Adams Young Faculty Award	

Professional Societies

1995- 1996	Florida Medical Society
1995- 1997	Pan American Otorhinolaryngologic Society
1996 - Present	Fellow AAO-HNS
1996 - Present	American Medical Association AME Board of
1996 - Present	Medical Specialists Association for Research
1999 - Present	in Otolaryngology American Academy of
2001 -Present	Sciences
2002 - Present	American College of Surgeons
2002 - Present	American Auditory Society, Inc.
2002 - Present	American College of Surgeons
2004- Present	The American Society of Pediatric Otolaryngology
2005 - Present	Society for ENT Advances in Children
2008 - Present	American Otologic Society
2008 - Present	Triological Society
2008 - Present	The Politzer Society

Professional Leadership and Committee Experience

1996- 1997	Fellows Committee NIDCD Clinical Representative
1995 - Present	Medical Advisory Committee Ear Research Foundation Sarasota, Florida
1997- 1998	Surgical Administrative Committee NIH-Clinical Center
1997- 1998	NIDCD Mentorship Committee
1997- 1998	National Institute on Dental Research Institutional Review Board
1999 - Present	Ohio Department of Health, Infant Hearing Screening & Assessment Program
2000- Present	AAO-HNS/F Subcommittee on Research Education

2000 - Present Center for Hearing and Deafness Research

2002 - Present Co-Chair for the Universal Newborn Hearing Screening
Assessment Program for the Ohio Department of Health

Professional Leadership and Committee Experience Continued:

2002- Present Director, Pediatric Otology Clinic at Children's Medical Center in
Dayton, Ohio

2003- Present American Academy of Pediatrics (Pedi link Committee)

2003 Special Emphasis Study Section, NIDCD

2004 National Student Research Forum

2004- Present American Board of Otolaryngology New Materials Task Force

2004- Present American Board of Otolaryngology Examiner

2005 - Present Ad hoc Research Committee, American Society for Pediatric
Otolaryngology

2005- Present Fellowship Committee, American Society for Pediatric Otolaryngology

2006 Special Emphasis Study Section, NHLBI

2007 Special Emphasis Study Section, NIDCD

2013 Member of FDA Data Safety Monitoring Board-Harvard ABI Clinical
Trial

Editorial Service/Journal Editorial Work

2009- Present Editorial Board, International Journal of Pediatric Otolaryngology

2009-Present Laryngoscope Best Practice Committee

Clinical Research Protocols

- Co-Investigator-Endolymphatic sac tumors in a population of patients with von Hippel Lindau Disease. Natural history, pathology, and a prospective, non-randomized trial of hearing preservation surgery in patients with early stage tumors (97-N-0102). National Institutes of Health Clinical Center.
- Principle Investigator – Auditory Skills Checklist for Congenital Hearing Loss Cincinnati Children's Hospital Medical Center
- Co-investigator- Functional magnetic resonance imaging of auditory cortical activation in infants and toddlers prior to cochlear implantation Cincinnati Children's Hospital Medical Center

- Co-investigator- Impact of distance hearing and incidental learning in children with sensorineural hearing loss Cincinnati Children's Hospital Medical Center
- Co-investigator-Additional Disabilities in the pediatric sensorineural hearing loss population Cincinnati Children's Hospital Medical Center

Clinical Research Protocols Continued:

- Co-investigator-Perceived benefits in adolescent patients undergoing cochlear implantation Cincinnati Children's Hospital Medical Center
- Co-investigator-Outcomes in bilateral pediatric cochlear implantation Cincinnati Children's Hospital Medical Center
- Co-investigator-C-HEAR: a multicenter NIH contract focusing on Congenital CMV and hearing loss

Current Extramural Funding

1) ROI DC008651-01 Daniel Choo, M.D.(PI)

Title: A preclinical trial of intratympanic antivirals for CMV –related hearing loss

1/1107- 12/31/12

Goal: To determine the safety and efficacy of delivering antiviral drugs to the inner ear via intratympanic drug delivery. Using a guinea pig model of CMV – related inner ear damage and also study the efficacy of delivering antiviral drugs directly to the inner ear rather than systemic delivery.

2) Suresh Boppana, M.D.(PI) / Daniel Choo, M.D.Co-investigator

NIH Contract
NIDCDINIH

Title: Congenital CMV and Hearing Loss 7/1/05- 6/30/12

Goal: A 7 center study designed to enroll 100,000 infants that will be screened for congenital CMV. Those infants screening positive for CMV will then be followed for 4 years clinically and audiometrically in order to determine the true incidence of asymptomatic congenital CMV infection and hearing loss as well as to determine the natural history of hearing loss in this population of infants with confirmed congenital CMV infection.

Current Extramural Funding Continued:

- 3) John Greinwald, M.D. (PI) / Daniel Choo, M.D. Co-investigator

BRTTIWIC 2/03-8/08
Biomedical research technical transfer commission of the state of Ohio

Title: Development of a microarray tool for the genetic diagnosis of newborn/infant hearing loss
Current Extramural Funding Continued:

Goal: A microarray-based mutation screening tool of known deafness genes is feasible using new state of the art technology and that rapid and cost effective screening of genetic technology will allow for more accurate predications of hearing impairment (HI) severity and prognosis and allow for successful rehabilitation to be made within a time critical period of speech and language development.

- 4) P.I. Min-Xin Guan, PhD 7/1/02- Present
Daniel Choo, M.D. Role: Collaborator

Title: Molecular Mechanism of Aminoglycoside Ototoxicity

Goal: This study seeks to determine the role of Mitochondrial DNA mutation in aminoglycoside induced sensorineural hearing loss by studying populations of patients diagnosed with aminoglycoside induced deafness.

- 5) Scott Holland, Ph.D. (PI) / Daniel Choo M.D. (Co-investigator)
NIDCD R01DC007186 8/04 - 7/09

A prospective study using functional MRI techniques to study auditory cortical activation in infants and toddlers prior to cochlear implantation and correlating these data auditory and language outcomes 1 and 2 years after cochlear implantation.

- 6) Daniel Choo (Co-Mentor) / Vincent Schmidthorst (PI)

Title: K25 Cortical Reorganization in Children with Unilateral Sensorineural Hearing Loss

Goal: To define the altered patterns of cortical activation, especially with respect to speech and language, in children with unilateral profound sensorineural hearing loss.

7) Daniel Choo /Jareen Meinzen-Derr

Title: R40 MC 21513-01 MCHR HRSA Impact of Cognition on Language in Pediatric Hearing Loss and Cognitive Disabilities.

Goal: The goal of this project is to determine the effect of nonverbal cognition and hearing loss on language and thoroughly characterize the language-based intervention strategies.

8) Daniel Choo / Kevin Li

Title: 1R21DC011062-01 Improved Method of Drug Delivery to the Inner Ear.

Goal: The objectives are to develop a temperature responsive system for sustained drug delivery to the inner ear via the round window membrane and control/enhance drug delivery using iontophoresis.

Prior Extramural Funding History

- 1) P.I. Daniel Choo, M.D. 4/1101 - 3/31/06
NIDCD K08 DC00193 Role: Principal Investigator

Title: Molecular Development of the Endolymphatic Duct and Sac

Goal: Identification of genes involved in the development of the endolymphatic duct and sac of the mouse inner ear. Determination of the functions of identified genes in this developmental pathway.

- 2) The Neuroscience Institute Daniel Choo, M.D. (PI)
1/1/06-12/31/06
Role: PI

Title: Micro imaging of the developing inner ear

Goal: To explore the structural development and cellular patterning of the inner ear by applying resolution imaging techniques to longitudinal studies of the embryonic inner ear.

- 3) Daniel Choo, M.D. (Mentor/Co-investigator)
Scott Schraff, M.D. (PI) 7/1/05 - 6/30/06

American Society for Pediatric Otolaryngology Resident Research Award

Title: The role of immunomodulatory genes in CMV-induced hearing loss

Goal: Utilizing targeted deletion of specific pro-inflammatory genes normally encoded in the CMV genome, we will demonstrate the role of proinflammatory genes (such as MIP1-alpha) in inducing CMV-related hearing loss in guinea pig model of CMV labyrinthitis.

- 4) Daniel Choo (Collaborator) / Mark Schleiss (PI)
NIDCD/NIH

Title: Pathogenesis and prevention of CMV -induced deafness

Goal: The goal of this proposal is to determine the efficacy of a recombinant vaccine to induce transplacental protection against congenital CMV infection and hearing loss in a guinea pig model of congenital CMV infection and to determine whether viral proinflammatory genes, encoded by the CMV genome, play a role in CMV -labyrinthitis and deafness.

- S) HHSN26020050000BC Daniel Choo (Collaborator) / David Bernstein (PI)

Title: The Natural History of CMV -Related Hearing Loss and the Feasibility of CMV Screening as adjunct to hearing in the newborn.

Goal: Address the relationship between the presence of congenital CMV and long term audiologic/otologic outcome, and address the clinical validity and utility of CMV screening in the detection of permanent hearing impairment in the newborn, as well as the prediction of hearing impairment.

Publications

Zinberg, E. M., D.I. Choo, et al. "Effect of heparinized irrigating solutions on patency of experimental microvascular anastomoses." *Microsurgery* 1989;10(2):103-7; discussion 108-109.

Choo, D., L.T. Malmgren, et al. "Age-related changes in Schwann cells of the internal branch of the rat superior laryngeal nerve." *Otolaryngology Head Neck Surgery* 1990;103(4): 628-636.

Silverstein, H., J. Kuhn, et al. "Laser-assisted tympanostomy." *Laryngoscope* 1996;106(9 Pt 1): 1067-1074.

Silverstein, H., D. Choo, et al. "Intratympanic steroid treatment of inner ear disease and tinnitus (preliminary report)." *Ear Nose Throat Journal* 1996;75(8): 468-471,474,476 passim.

Vortmeyer, A.O., D. Choo, et al. "von Hippel-Lindau disease gene alterations associated with endolymphatic sac tumor." *Journal of the National Cancer Institute* 1997;89(13): 970-972.

Choo, D., J. L. Sanne, et al. "The differential sensitivities of inner ear structures to retinoic acid during development." *Developmental Biology* 1998;204(1): 136-150.

Wu, D.K., F. D. Nunes, et al. "Axial specification for sensory organs versus non-sensory structures of the chicken inner ear." *Development* 1998;125(1): 11-20.

Morsli, H., D. Choo, et al. "Development of the mouse inner ear and origin of its sensory organs." *Journal of Neuroscience* 1998;18(9): 3327-3335.

Morsli, H., F. Tuorto, et al. "Otx1 and Otx2 activities are required for the normal development of the mouse inner ear." *Development* 1999;126(11): 2335-2343.

Acampora, D., V. Avantaggiato, et al. "Differential transcriptional control as the major molecular event in generating Otx1^{-/-} and Otx2^{-/-} divergent phenotypes." *Development* 1999;126(7): 1417-1426.

Chen, D., A.K. Laiwani, et al. "Aspergillus mastoiditis in acquired immunodeficiency syndrome." *American Journal of Otolaryngology* 1999;20(5): 561-567.

Vortmeyer, A.O., D. Choo, et al. "VHL gene inactivation in an endolymphatic sac tumor associated with von Hippel-Lindau disease." *Neurology* 2000;55(3): 460.

Stewart, D.L., D.I. Choo, et al. "Selective indications for the management of extensive anterior epitympanic cholesteatoma via combined transmastoid/middle fossa approach." *Laryngoscope* 2000;110(10 Pt 1): 1660-1666.

Liu, J.H., M.J. Rutter, et al. "Congenital cholesteatoma of the middle ear." *Clinical Pediatrics (Phila)* 2000;39(9): 549-551.

Merves, M., B. Bobbitt, et al. "Developmental expression of aquaporin 2 in the mouse inner ear." *Laryngoscope* 2000;110(11): 1925-1930.

Choo, D. "The impact of molecular genetics on the clinical management of pediatric sensorineural hearing loss." *The Journal of Pediatrics* 2002 Feb;140(2): 148-149.

Madden, C., L. Hilbert, et al. "Pediatric cochlear implantation in auditory neuropathy." *Otology & Neurotology* 2002 Mar;23(2):163-168.

Megerian, C. A., D.S. Haynes, et al. "Hearing preservation surgery for small endolymphatic sac tumors in patients with von Rippel-Lindau syndrome." *Otology & Neurotology* 2002 May;23(3):378-387.

Choo, D.I., D.L. Steward, et al. "Meningioma involving Meckel's cave: transpetrosal surgical anatomy and clinical considerations." *The Annals of Otolaryngology, Rhinology and Laryngology* 2002 Sep;111(9):850-854.

Madden C, Rutter M, Hilbert L, Greinwald JH Jr, Choo DI. "Clinical and audiological features in auditory neuropathy." *Archives Otolaryngology - Head & Neck Surg*. 2002 Sep;128(9):1026-1030

Dou, H., K. Finberg, et al. "Mice lacking the B1 subunit of H⁺-ATPase have normal hearing." *Hearing Research* 2003 Jun;180(1-2):76-84.

Merves, M., C.M. Krane, et al. "Expression of aquaporin 1 and 5 in the developing mouse inner ear and audiovestibular assessment of an Aqp5 null mutant." *Journal of the Association for Research in Otolaryngology* 2003 Jun;4(2):264-275.

Madden, C., M. Halsted, et al. "Enlarged vestibular aqueduct syndrome in the pediatric population." *Otology & Neurotology* 2003 Jul;24(4):625-632.

Lim, L.H., J.K. Bradshaw, et al. "Genotypic and phenotypic correlations of DFNB1-related hearing impairment in the Midwestern United States." *Archives Otolaryngology-Head & Neck Surgery* 2003 Aug;129(8):836-840.

Madden, C., M.J. Halsted, et al. "Temporal bone abnormalities associated with hearing loss in Waardenburg syndrome." *Laryngoscope* 2003 Nov;113(11): 2035-2041.

Shortland LI, Mastroianni MA, Choo DI, Szymko-Bennett YM, Dally LG, Pikus AT, Sledjeski K, Marques A. "Audiologic manifestations of patients with post-treatment Lyme disease syndrome." *Ear & Hearing*. 2003 Dec;24(6):508-517.

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Looser, R. R., H.J. Kim, et al. "Tumors of the endolymphatic sac in von Hippel-Lindau disease." *The New England Journal of Medicine* 2004 Jun;350(24):2481-2486.

Pilipenko, V. V., A. Reece, et al. "Genomic organization and expression analysis of the murine Fam3c gene." *Gene* 2004 Jun;335:159-168.

Guo Y, Pilipenko V, Lim LH, Dou H, Johnson L, Srisailapathy CR, Ramesh A, Choo DI, Smith RJ, Greinwald JH. "Refining the DFNB17 interval in consanguineous Indian families." *Molecular Biology Rep*. 2004 Jun;31(2):97-105.

Li, R., J.H. Greinwald, Jr., et al. "Molecular analysis of the mitochondrial 12S rRNA and tRNA^{Ser}(UCN) genes in paediatric subjects with non-syndromic hearing loss." *Journal of Medical Genetics* 2004 Aug;41(8): 615-620.

Dou, H., J. Xu, et al. "Co-expression of pendrin, vacuolar H⁺-ATPase alpha4-subunit and carbonic anhydrase II in epithelial cells of the murine endolymphatic sac." *Journal of Histochemistry and Cytochemistry* 2004 Oct;52(10): 1377-1384.

Zur, K.B., S.K. Holland, et al. "Functional magnetic resonance imaging: contemporary and future use." *Current Opinion in Otolaryngology & Head and Neck Surgery* 2004 Oct;12(5): 374-377.

Preciado, D, A., L.H. Lim, et al. "A diagnostic paradigm for childhood idiopathic sensorineural hearing loss." *Otolaryngology Head Neck Surgery* 2004 Dec;131(6): 804-809.

Proceedings of the 5th International Symposium on Meniere's Disease and Inner Ear Homeostasis Disorders, 2005; David J. Lim, editor; House Ear Institute, Los Angeles, CA, publishers. ISBN 0-9776204-0-9.

Preciado, D., E. Caicedo, et al. "Pseudomonas aeruginosa lipopolysaccharide induction of keratinocyte proliferation, NF-kappa B, and cyclin D1 is inhibited by indomethacin." *The Journal of Immunology* 2005 Mar;174(5): 2964-2973.

Wiley, S., M. Jahnke, et al. "Perceived qualitative benefits of cochlear implants in children with multi-handicaps." *International Journal of Pediatric Otorhinolaryngology* 2005 Jun;69(6): 791-798.

LiZ, Li R, Chen J, Liao Z, Zhu Y, Qian Y, Xiong S, Herman-Ackah S, Wu J, Choo DI, Guan MX. "Mutational analysis of the mitochondrial 12S rRNA gene in Chinese pediatric subjects with aminoglycoside-induced and non-syndromic hearing loss." *Human Genetics*. 2005 Jun; 117(1):9-15.

Preciado, D.A., L. Lawson, et al. "Improved diagnostic effectiveness with a sequential diagnostic paradigm in idiopathic pediatric sensorineural hearing loss." *Otology and Neurotology*. 2005 Jul;26(4): 610-615.

Madden, C., S. Wiley, et al. "Audiometric, clinical and educational outcomes in a pediatric symptomatic congenital cytomegalovirus (CMV) population with sensorineural hearing loss." *International Journal of Pediatric Otorhinolaryngology*. 2005 Sep;69(9): 1191-1198.

Choo D, Ward J, Reece A, Dou H, Lin Z, Greinwald J. "Molecular mechanisms underlying inner ear patterning defects in Kreisler mutants." *Developmental Biology* 2006 Jan 15; 289(2):308-317 Epub 2005 Dec 1.

Wiley, S., D. Choo, et al. "GJB2 mutations and additional disabilities in a pediatric cochlear implant population." *International Journal of Pediatric Otorhinolaryngology*. 2006 Mar 15; 70(3):493-500.

Zhu Y, Qian Y, Tang X, Wang J, Yang L, Liao Z, Li R, Ji J, LiZ, Chen J, Choo DI, Lu J, Guan MX. "Aminoglycoside-induced and non-syndromic hearing loss is associated with the G7444A mutation in the mitochondrial COI/tRNASer(UCN) genes in two Chinese families." *Biochemical and Biophysical Research Communications*. 2006 Apr 14; 342(3):843-850.

White DR, Choo DI, Stroup G, Schleiss MR. "The effect of cidofovir on cytomegalovirus-induced hearing loss in a guinea pig model." *Archives Otolaryngology- Head & Neck Surgery* 2006 Jun;(132) 608-615.

Mark R. Schleiss, Daniel I. Choo. "Mechanisms of congenital Cytomegalovirus-induced hearing deafness." *Drug Discovery Today* 2006 Autumn;3(1):105-113.

Madden C, Halsted M, Meinzen-Derr J, Bardo D, Boston M, Arjmand E, Nishimuru C, Yang T, Benton C, Das V, Smith R, Choo, Greinwald J. "The influence of mutations in the SLC26A4 gene on the temporal bone in a population with enlarged vestibular aqueduct." *Archives Otolaryngology- Head & Neck Surgery* 2007 Feb;133(2):162-168.

Boston M, Halsted M, Meinzen-Derr J, Bean J, Vijayasekaran S, Arjmand E, Choo D, Benton C, Greinwald J. "The Large vestibular aqueduct: a new definition based on audiologic and computed tomography correlation." *Otolaryngology Head and Neck Surgery*. 2007 Jun; 136(6):972-977.

Patel AM, Cahill LD, Ret J, Schmitthorst V, Choo D, Holland. "Functional magnetic resonance imaging of hearing-impaired children under sedation before cochlear implantation." *Archives Otolaryngology- Head & Neck Surgery* 2007 Jul; 133(7):677-683.

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Schraff SA, Schleiss MR, Brown DK, et al. "Macrophage Inflammatory Proteins in CMV-Related Inner Ear Injury." *Otolaryngology Head and Neck Surgery* 2007 Oct;(137):612-618.

Schraff SA, Brown DK, Schleiss MR, et al. "The role of CMV inflammatory genes in hearing loss." *Otology & Neurotology.* 2007 Oct;28(7):964-9.

De Alarcon A, Choo DI. "Controversies in aural atresia repair." *Current Opinion in Otolaryngology & Head and Neck Surgery* 2007 Oct; 15(5):310-314.

Schraff SA, Schleiss MR, Brown DK, Meinzen-Derr J, Choi KY, Greinwald JH, Choo DI. "Macrophage inflammatory proteins in cytomegalovirus-related inner ear injury." *Otolaryngology & Head and Neck Surgery.* 2007 Oct; 137(4):612-8.

Mehta D, Statham M, Choo D. "Actinomycosis of the Temporal Bone with Labyrinthine and Facial Nerve Involvement." *Laryngoscope.* 2007 Nov; 117(11):1999-2001

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Weinel S, Lucky AW, Uitto J, Pfendner EG, Choo D. "Dystrophic epidermolysis bullosa with one dominant and one recessive mutation of the COL7A1 gene in a child with deafness." *Pediatr Dermatol.* 2008 Mar-Apr;25(2):210-4.

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Wiley S, Meinzen-Derr J, Choo D. "Auditory skills developmental among children with developmental delays and cochlear implants." *Annals of Otolaryngology, Rhinology and Laryngology* 2008 Oct; 117(10):711-718.

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Hall JE, Richter GT, Choo DI. "Surgical Management of Otologic Disease in Pediatric Patients with Turner Syndrome." *International Journal of Pediatric Otorhinolaryngology* 2009 Jan; 73(1):57-65.

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Sun GH, Leung R, Samy RN, McAfee JS, Hearst MJ, Savage CR, Choo DI, Pensak ML. "Analysis of hearing preservation after endolymphatic mastoid sac surgery for Meniere's disease." *Laryngoscope* 2010 Mar; 120(3):591-7.

Hamajima Y, Komori M, Preciado DA, Choo DI, Moribe K, Murakami S, Ondrey FG, Lin J. "The role of inhibitor of DNA-binding (Id1) in hyperproliferation of keratinocytes: the pathological basis for middle ear cholesteatoma from chronic otitis media." *Cell Prolif*. 2010 Oct; 43(5):457-63.

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Ida JB, Mansfield S, Meinzen-Derr JK, Choo DI. "Complications in pediatric osseointegrated implantation." *Otolaryngol Head Neck Surg*. 2011 Apr; 144(4):586-91.

Waryah AM, Ahmed ZM, Binder MA, Choo DI, Sisk RA, Shahzad M, Khan SN, Friedman TB, Riazuddin S, Riazuddin S. "Molecular and clinical studies of X-linked deafness among Pakistani families." *J Hum Genet*. 2011 Jul; 56(7):534-40.

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