

## BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME <b>GAHL, William A</b>	POSITION TITLE <b>Clinical Director, NHGRI</b> <b>Chief, Section of Human Biochemical Genetics, Medical Genetics Branch, NHGRI</b>		
eRA COMMONS USER NAME (credential, e.g., agency login)			
<b>EDUCATION/TRAINING</b> ( <i>Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.</i> )			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Massachusetts Institute of Technology, Cambridge, Massachusetts	B.S.	1972	Biochemistry
University of Wisconsin Medical School	M.D.	1976	Pediatrics
University of Wisconsin Graduate School	Ph.D.	1981	Oncology

**NOTE: The Biographical Sketch may not exceed four pages. Follow the formats and instructions below.**

### A. Personal Statement

Dr. Gahl is the head of the Undiagnosed Diseases Program at the NIH. He will be involved in the recruitment and care of patients, securing skin biopsies, and the culture of fibroblasts..

### B. Positions and Honors

#### Positions and Employment

1979-80	Chief Resident, Department of Pediatrics, University of Wisconsin Hospitals, Madison, WI
1980-81	Postdoctoral Fellow, McArdle Labs for Cancer Research, Madison, Wisconsin
1980-81	Instructor, Department of Pediatrics, University of Wisconsin Hospitals, Madison, Wisconsin
1981-84	Medical Staff Fellow, Interinstitute Genetics Program, National Inst. Health, Bethesda, MD
1984-86	Senior Staff Fellow, Section Hum. Biochem. Genet., Hum. Genet. Branch, NICHD, Bethesda, MD
1986-95	Medical Officer, Head, Section on Human Biochemical Genetics, Human Genetics Branch, NICH
1988	Acting Chief, Human Genetics Branch, NICHD
1989-94	Chief, Human Genetics Branch, NICHD
1995-2002	Chief, Section on Human Biochemical Genetics, Heritable Disorders, Branch, NICHD
2002-	Clinical Director, NHGRI; Head, Section on Human Biochemical Genetics, Medical Genetics Branch, NHGRI
2002-	Head, Intramural Program of the Office of Rare Diseases
2008-	Director, NIH Undiagnosed Diseases Program

#### Other Experience and Professional Memberships (selected)

1983-	Principal Investigator, Nine (9) NICHD/NHGRI Protocols
1983-	Society for Inherited Metabolic Disorders (President, 1994-5)
1984-	American Society of Human Genetics
1985-	Cystinosis Foundation National Medical Advisory Board
1986-	Society for Pediatric Research; Society for the Study of Inborn Errors of Metabolism
1987-94; 98-01	Member, Institutional Review Board, NICHD
1988-	American Society for Clinical Investigation
1989-	American Federation for Clinical Research
1989-94	Director, Interinstitute Genetics Program, NIH Clinical Center
1990-92	Associate Editor, <u>American Journal of Human Genetics</u>

1991-	Editorial Board, <u>Biochemical and Molecular Medicine/Molecular Genetics and Metabolism</u>
1993-94;07-	Founding Fellow, American College of Medical Genetics
1993-2008	Society for Experimental Biology and Medicine
2002-2007	Board of Directors, American Board of Medical Genetics
2004	American Society for Cell Biology
2006	Program Chair, 2006 American Society of Human Genetics Annual Meeting
2007-	Editorial Board, North American Metabolic Academy

### **Awards and Honors (selected)**

1988	Public Health Service Superior Service Award
1994-	<i>The Best Doctors in America</i>
1997	Owen James Gardner Memorial Lecture, Penn State University
1998	Alliance of Genetic Support Groups "Kaplan Art of Listening Award"
1999	Procter & Gamble Lectureship, University of Cincinnati College of Medicine
2001	Commendation, Distinguished Clinical Teacher Award, NIH Fellows
2002	Distinguished Lecturer, Harvard School of Public Health
2004	Association of American Physicians
2007	NIH Director's Award for Mentoring
2007	Commendation, Distinguished Clinical Teacher Award
2009	NIH Director's Award for Establishing and Leading the Undiagnosed Diseases Program

### **C. Selected Peer-reviewed Publications (selected)**

- Renlund M, Tietze F, Gahl WA. Defective sialic acid egress from isolated fibroblast lysosomes of patients with Salla disease. **Science** 232:759-62, 1986.
- Bernar J, Tietze F, Kohn LD, Bernardini I, Harper GS, Grollman EF, Gahl WA. Characteristics of a lysosomal membrane transport system for tyrosine and other neutral amino acids in rat thyroid-derived cells. **J Biol Chem** 261:17107-12, 1986.
- Gahl WA, Reed GF, Thoene JG, Schulman JD, Rizzo WB, Jonas AJ, Denman DW, Schlesselman JJ, Corden BJ, Schneider JA. Cysteamine therapy for children with nephropathic cystinosis. **N Engl J Med** 316:971-7, 1987.
- Harper GS, Hascall VC, Yanagishita M, Gahl WA. Proteoglycan synthesis in normal and Lowe syndrome fibroblasts. **J Biol Chem** 262:5637-43, 1987.
- Kaiser-Kupfer MI, Fujikawa L, Kuwabara T, Gahl WA. Removal of corneal crystals by topical cysteamine in nephropathic cystinosis. **N Engl J Med** 316:775-9, 1987.
- Gahl WA, Bernardini I, Dalakas M, Rizzo WB, Harper GS, Hoeg JM, Hurko O, Bernar J. Oral carnitine therapy in children with cystinosis and renal Fanconi syndrome. **J Clin Invest** 81:549-60, 1988.
- Gahl WA, Bernardini I, Finkelstein JD, Tangerman A, Martin JJ, Blom HJ, Mullen K, Mudd SH. Transsulfuration in an adult with hepatic methionine adenosyltransferase deficiency. **J Clin Invest** 81:390-7, 1988.
- Reiss RE, Kuwabara T, Smith ML, Gahl WA. Successful pregnancy despite placental cystine crystals in a woman with nephropathic cystinosis. **N Engl J Med** 319:223-6, 1988.
- Gahl WA, Dalakas M, Charnas L, Chen KTK, Pezeshkpour GH, Kuwabara T, Davis SL, Chesney RW, Fink J, Hutchison HT. Myopathy and cystine storage in muscles in a patient with nephropathic cystinosis. **New Engl J Med** 319:1461-4, 1988.
- Tietze F, Kohn LD, Kohn AD, Bernardini I, Andersson HC, Adamson MD, Harper GS, Gahl WA. Carrier-mediated transport of monoiodotyrosine out of thyroid cell lysosomes. **J Biol Chem** 264:4762-5, 1989.
- Tietze F, Seppala R, Renlund M, Hopwood J, Harper GS, Thomas G, Gahl WA. Defective lysosomal egress of free sialic acid in fibroblasts of patients with infantile free sialic acid storage disease. **J Biol Chem** 264:15316-22, 1989.
- Sonies B, Ekman EF, Andersson H, Adamson M, Kaler S, Markello T, Gahl WA. Swallowing dysfunction in nephropathic cystinosis. **N Engl J Med** 323:565-70, 1990.
- Charnas LR, Bernardini I, Rader D, Hoeg JM, Gahl WA. Clinical and laboratory findings in the Oculocerebrorenal Syndrome of Lowe, with special reference to growth and renal function. **N Engl J Med** 324:1318-25, 1991.
- Seppala R, Tietze F, Krasnewich D, Weiss P, Ashwell G, Barsh G, Thomas GH, Packman S, Gahl WA. Sialic acid metabolism in sialuria fibroblasts. **J Biol Chem** 266:7456-61, 1991.
- Markello TC, Bernardini IM, Gahl WA. Improved renal function in children with cystinosis treated with cysteamine. **N Engl J Med** 328:1157-62, 1993.
- Theodoropoulos DS, Krasnewich D, Kaiser-Kupfer MI, Gahl WA. Classical nephropathic cystinosis as an adult disease. **JAMA** 270:2200-4, 1993.
- Kaler SG, Gallo LK, Proud VK, Percy AK, Mark Y, Segal NA, Goldstein DS, Holmes CS, Gahl WA. Occipital horn

- syndrome and a mild Menkes phenotype associated with splice site mutations at the MNK locus. **Nature Genet** 8:195-202, 1994.
- Gahl WA, Brantly M, Kaiser-Kupfer MI, Iwata F, Hazelwood S, Shotelersuk V, Duffy LF, Kuehl EM, Bernardini I. Genetic defects and clinical characteristics of patients with a form of oculocutaneous albinism (Hermansky-Pudlak syndrome). **N Engl J Med** 338:1258-64, 1998.
- Anikster Y, Huizing M, White J, Bale S, Gahl WA, Toro J. Mutation of a new gene causes a unique form of Hermansky-Pudlak syndrome in a genetic isolate of central Puerto Rico. **Nature Genet** 28:376-380, 2001.
- Phornphutkul C, Introne WJ, Perry MB, Bernardini I, Murphey MD, Fitzpatrick DL, Anderson PD, Huizing M, Anikster Y, Gerber LH, Gahl WA. Natural history of alkaptonuria, **N Engl J Med** 347:2111-2121, 2002.
- Kleta R, Romeo E, Ristic Z, Ohura T, Stuart C, Arcos-Burgos M, Dave MH, Wagner CA, Camargo SRM, Inoue S, Matsuura N, Helip-Wooley A, Bockenhauer D, Warth R, Bernardini I, Visser G, Eggermann T, Lee P, Chairoungdua A, Jutabha P, Babu E, Nilwarangkoon S, Anzai N, Kanai Y, Verrey F, Gahl WA, Koizumi A. Mutations in *SLC6A19*, encoding BoAT1, cause Hartnup disorder. **Nature Genet** 36:999-1002, 2004.
- Gwynn B, Martina JA, Bonifacino JS, Sviderskaya EV, Lamoreux ML, Bennett DC, Moriyama K, Huizing M, Helip-Wooley A, Gahl WA, Webb LS, Lambert AJ, Peters LL. Reduced pigmentation (*rp*), a mouse model of Hermansky-Pudlak syndrome, encodes a novel component of the BLOC-1 complex. **Blood** 104:3181-3189, 2004.
- Sonies BC, Almajid P, Kleta R, Bernardini I, Gahl WA. Swallowing dysfunction in 101 patients with nephropathic cystinosis: Benefit of long-term cysteamine therapy. **Medicine** 84:137-146, 2005.
- Suwannarat P, O'Brien K, Perry MB, Sebring N, Bernardini I, Kaiser-Kupfer MI, Rubin BI, Tsilou E, Gerber LH, Gahl WA. Use of nitisinone in patients with alkaptonuria. **Metabolism Clin Exptl** 54:719-728, 2005.
- Chintala S, Li W, Lamoreux ML, Ito S, Wakamatsu K, Sviderskaya EV, Bennett DC, Park Y-M, Gahl WA, Huizing M, Spritz RA, Ben S, Novak EK, Tan J, Swank RT. *Slc7a11* controls production of pheomelanin pigment and proliferation of cultured cells. **PNAS**, 102:10964-10969, 2005.
- Ueda M, O'Brien K, Rosing DR, Ling A, Kleta R, MacAreavey D, Bernardini I, Gahl WA. Coronary artery and other vascular calcifications in cystinosis patients after kidney transplantation. **Clin J Am Soc Nephrol** 1:555-562, 2006.
- Galeano B, Klootwijk R, Manoli I, Sun M-S, Ciccone C, Darvish D, Starost MF, Zerfas PM, Hoffmann VJ, Hoogstraten-Miller S, Krasnewich DM, Gahl WA, Huizing M. Mutation in the key enzyme of sialic acid biosynthesis causes severe glomerular proteinuria and is rescued by N-acetylmannosamine. **J Clin Invest** 117:1585-94, 2007.
- Merideth MA, Gordon LB, Clauss S, Sachdev V, Smith ACM, Perry MB, Brewer C, Zalewski C, Kim J, Solomon B, Brooks BP, Gerber LH, Turner M, Domingo DL, Hart TC, Graf J, Reynolds JC, Gropman A, Yanovski JA, Gerhard-Herman M, Collins FS, Nabel EG, Cannon RO III, Gahl WA, Introne WJ. Phenotype and course of Hutchinson-Gilford Progeria Syndrome. **N Engl J Med** 358:592-604, 2008.
- Westbroek W, Tuchman M, Tinloy B, De Wever O, Vilboux T, Hertz JM, Hasle H, Heilmann C, Helip-Wooley A, Kleta R, Gahl WA. A novel missense mutation (G43S) in the switch I region of Rab27A causing Griscelli Syndrome. **Mol Genet Metab** 94:248-54, 2008. PMC2430933.
- Klootwijk RD, Savelkoul PJM, Ciccone C, Manoli I, Caplen NJ, Krasnewich DM, Gahl WA, Huizing M. Allele-specific silencing of the dominant disease allele in sialuria by RNA interference. **FASEB J** 22:3846-52, 2008 Jul 24 [Epub ahead of print]. [PMID: 18653764]
- Domingo DL, Trujillo MI, Council SE, Merideth MA, Gordon LB, Wu T, Introne WJ, Gahl WA, Hart TC. Hutchinson-Gilford progeria syndrome: Oral and craniofacial phenotypes. **Oral Diseases** 15:187-95, 2009.
- TurkBey B, Ocak I, Daryanani K, Font-Montgomery E, Lukose L, Bryant J, Tuchman M, Mohan P, Heller T, Gahl WA, Choyke PL, Gunay-Aygun M. Autosomal recessive polycystic kidney disease and congenital hepatic fibrosis (ARPKD/CHF). **Pediatr Radiol** 39:100-111, 2009.
- Stanescu H, Wolfsberg TG, Moreland RT, Ayub M, Erickson E, Westbroek W, Huizing M, Gahl WA, Helip-Wooley A. Identifying putative promoter regions of Hermansky-Pudlak syndrome genes by means of phylogenetic footprinting. **Ann Hum Genet** 73:422-8, 2009.
- Merideth MA, Vincent LM, Sparks SE, Hess RA, Manoli I, O'Brien KJ, Tsilou E, White JG, Huizing M, Gahl WA. Hermansky-Pudlak syndrome in two African-American brothers. **Am J Med Genet Part A** 149A:987-92, 2009.
- Bockenhauer D, Feather S, Stanescu HC, Bandulik S, Zdebik AA, Reichold M, Tobin J, Lieberer E, Sterner C, Landoure G, Arora R, Sirimanna T, Thompson D, Cross JH, van't Hoff W, Al Masri O, Tullus K, Yeung S, Anikster Y, Klootwijk E, Hubank M, Dillon MJ, Heitzmann D, Arcos-Burgos M, Knepper MA, Dobbie A, Gahl WA, Warth R, Sheridan E, Kleta R. A new syndrome presenting with epilepsy, ataxia, sensorineural deafness, and tubulopathy (EAST syndrome) due to mutations in *KCNJ10*. **N Engl J Med** 360:1960-70, 2009.
- Rouhani FN, Brantly ML, Markello TC, Helip-Wooley A, O'Brien K, Hess R, Huizing M, Gahl WA, Gochuico BR. Alveolar macrophage dysregulation in Hermansky-Pudlak Syndrome type -1. **Am J Resp Crit Care Med** 180:1114-21, 2009.
- Gunay-Aygun M, Parisi MA, Doherty D, Tuchman M, Tsilou E, Kleiner DE, Huizing M, Turkbey B, Choyke P, Guay-Woodford L, Heller T, Szymanska K, Johnson CA, Glass I, Gahl WA. MKS3-related ciliopathy with features of

- Autosomal Recessive Polycystic Kidney Disease, nephronophthisis and Joubert syndrome. **J Pediatr** 155:386-92, 2009.
- Vincent LM, Adams D, Hess RA, Ziegler SG, Tsilou E, Golas G, O'Brien KJ, White JG, Huizing M, Gahl WA. Hermansky-Pudlak Syndrome type 1 in patients of Indian descent. **Mol Genet Metab** 97:227-33, 2009.
- Muller F, Mutch NJ, Schenk WA, Smith SA, Esterl L, Spronk HM, Schmidbauer S, Gahl WA, Morrissey JH, Renne T. Platelet polyphosphates are proinflammatory and procoagulant mediators in vivo. **Cell** 139:1143-56, 2009.
- Madhavarao CN, Arun P, Anikster Y, Mog SR, Staretz-Chacham O, Moffett JR, Grunberg NE, Gahl WA, Namboodiri AM (2009) Glyceryl triacetate for Canavan disease: A low-dose trial in infants and evaluation of a higher dose for toxicity in the tremor rat model. **J Inherit Metab Dis** 32:640-50, 2009. doi 10.1007/s10545-009-1155-3.
- Huizing M, Pederson B, Hess RA, Griffin A, Helip-Wooley A, Westbroek W, Dorward H, O'Brien KJ, Golas G, Tsilou E, White JG, Gahl WA. Clinical and cellular characterization of Hermansky-Pudlak syndrome type-6. **J Med Genet** 46:803-10, 2009. doi:10.1136/jmg.2008.065961.
- Demir H, Dorschner M, van Essen AJ, Gahl WA, Gentile M, Gorden NT, Hikida A, Knutzen D, Ozyurek H, Phelps I, Rosenthal P, Verloes A, Weigand H, Chance PF, Dobyns WB, Glass IA (2009) Mutations in 3 genes (MKS3, CC2D2A and RPGRIP1L) cause COACH syndrome (Joubert syndrome with congenital hepatic fibrosis). **J Med Genet** 47:8-21, 2010.
- Gunay-Aygun M, Tuchman M, Edwards H, Garcia A, Ausawarat S, Ziegler SG, Piwnica-Worms K, Bryant J, Bernardini I, Fischer R, Huizing M, Guay-Woodford L, Gahl WA. **PKHD1** Sequence Variations in 78 Children and Adults with Autosomal Recessive Polycystic Kidney Disease and Congenital Hepatic Fibrosis. **Mol Genet Metab** 99:160-73, 2010.
- Vilboux T, Kayser M, Introne W, Suwannarat P, Bernardini I, Fischer R, O'Brien K, Kleta R, Huizing M, Gahl WA. Mutation spectrum of homogentisic acid oxidase (**HGD**) in alkaptonuria. **Human Mutation** 30:1611-9, 2009.
- Hendrix A, Maynard D, Pauwels P, Braems G, Denys H, Van den Broecke R, Lambert J, Van Belle S, Cocquyt V, Gespach C, Bracke M, Seabra MC, Gahl WA, De Wever O, Westbroek W. The effect of the secretory small GTPase Rab287B on breast cancer growth, invasion, and metastasis. **J Nat Cancer Inst** 102:866-80, 2010. doi: 10.1093/jnci/djq153.
- Sansanwal P, Yen B, Ying L, Gahl WA, Sarwal M. Mitochondrial autophagy in cystinosis may determine the phenotype of renal injury. **J Am Soc Nephrol** 21:272-83, 2010.
- Bassim CW, Gautam P, Domingo DL, Balog JZ, Guadagnini JP, Gahl WA, Hart TC. Craniofacial and dental findings in cystinosis. **Oral Dis** 16:488-95, 2010.
- Manoli I, Golas G, Westbroek W, Vilboux T, Markello T, Introne W, Maynard D, Tsilou E, Hart S, White JG, Gahl WA, Huizing M. Chediak-Higashi syndrome with early developmental delay resulting from paternal heterodisomy of chromosome 1. **Am J Med Genet Part A** 152A:1474-83, 2010.
- Morrone K, Wang Y, Huizing M, Sutton E, White JGW, Gahl WA, Moody KM. Two novel mutations identified in an African-American child with Chediak-Higashi Syndrome. **Case Report Med.** doi:10.1155/2010/967535.
- Gunay-Aygun M, Font-Montgomery E, Lukose L, Tuchman M, Graf J, Bryant JC, Kleta R, Garcia A, Edwards H, Piwnica-Worms K, Adams D, Bernardini I, Fischer RE, Krasnewich D, Oden N, Ling A, Quezado Z, Zak C, Daryanani KT, Turkbey B, Choyke P, Guay-Woodford LM, Gahl WA. **Clin J Am Soc Nephrol** 5:972-84, 2010.
- Huizing M, Dorward H, Ly L, Klootwijk R, Kleta R, Skovby F, Pei W, Feldman B, Gahl WA, Anikster Y. OPA3, mutated in 3-methylglutaconic aciduria type III, encodes two transcripts targeted primarily to mitochondria. **Mol Genet Metab** 100:149-54, 2010.
- Arun P, Madhavarao CN, Moffet JR, Hamilton K, Grunberg NE, Ariyannur PS, Gahl WA, Anikster Y, Mog S, Hallows WC, Denu JM, Namboodiri AMA. Metabolic acetate therapy improves phenotype in the tremor rat model of Canavan Disease. **J Inher Metab Dis** 33:195-210, 2010. DOI 10.1007/s10545-010-9100-z.
- Thielen N, Huizing M, Krabbe JG, White JG, Jansen TJ, Merle PA, Gahl WA, Zweegman S. Hermansky-Pudlak syndrome: the importance of molecular subtyping. **J Thromb Haemostasis** 8:1643-5, 2010.
- Nemunaitis G, Maples PB, Jay C, Gahl WA, Huizing M, Poling J, Tong AW, Phadke AP, Pappen BO, Bedell C, Templeton NS, Kuhn J, Senzer N, Nemunaitis J. Hereditary Inclusion Body Myopathy (HIBM): Single Patient Response to GNE Gene Lipoplex Therapy. **J Gene Med** 12:403-12, 2010.

## D. Research Support

Intramural NIH budget, 1983-2010.