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CURRICULUM VITAE

Gherman Y. Wiederschain MD, PhD, Doc.Sci.
Scholar

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Personal Date and place of birth: April 17, 1939; Simferopol, Ukraine
Marital Status: Married to Luidmila N. Wiederschain; two adult children: Vera Alexander and Dmitri Wiederschain.
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Education

1962 M.D. Crimean Medical Institute, Simferopol, Ukraine

1967 Ph.D. (Biology/Biochemistry) Institute of Biomedical Chemistry of the Russian Academy of Medical Sciences, Moscow, Russia
1977 Doctor of Science (Biology/Biochemistry), Institute of Biomedical Chemistry of the Russian Academy of Medical Sciences, Moscow, Russia

Academic and Hospital Appointments

1962 - 1964 Postgraduate Fellow, Laboratory of Carbohydrate Biochemistry and Pathochemistry, Institute of Biomedical Chemistry, Russian Academy of Medical Science, Moscow, Russia

1964 - 1972 Research Scientist, Laboratory of Carbohydrate Biochemistry and Pathochemistry, Institute of Biomedical Chemistry, Russian Academy of Medical Science, Moscow, Russia

1972 - 1980 Senior Scientist, Laboratory of Carbohydrate Biochemistry and Pathochemistry, Institute of Biomedical Chemistry, Russian Academy of Medical Science, Moscow, Russia

1980 – 1992 Professor and Chief Laboratory of Biochemistry of Inherited Diseases, Institute of Biomedical Chemistry, Russian Academy of

	Medical Science, Moscow, Russia
1993 -1997	Research Associate/ Senior Research Associate/ Scientist E. K. Shriver Center for Mental Retardation, Waltham, MA, USA
1994 – 1998	Research Associate in Neurology, Harvard Medical School, Boston, Scientist, Massachusetts General Hospital, Boston, MA, USA

Awards and Honors

1989 - 1990	Fogarty Foundation Visiting Scientist, Shriver Center, Waltham, MA, USA

Professional Societies

1994 - Present	Society for Glycobiology Boston Glycobiology Discussion Group

Teaching Experience

1975-1990 former USSR	Training of biochemistry professors from all medical schools in the
1980-1990	Course Director and Lecturer at Biochemistry Department of Moscow State University. Course title: Biochemistry and biological role of glycoconjugates at the normal state and at lysosomal storage diseases (LSD)
1993-1997	At the Shriver Center for Mental Retardation, training of postdoctoral scientist in glycobiology
1997	Lecturer at the Northeastern University, Boston, USA. Biochemistry course at the Biology Department, fall semester

Management Experience

1980-1992 At the Institute of Biomedical Chemistry of the Russian Academy of Medical Sciences supervised work of 10-13 investigators. Developed strategy for the laboratory, collaborated with numerous research institutions in the former USSR

1993-1997 At the E.K. Shriver Center of Mental Retardation, Waltham, USA. Supervised of technicians and postdoctoral scientists in glycobiology research

1998 - 2000 At ZymeQuest, Inc., Beverly, MA, Developed scientific and business strategies. Performed general laboratory management.

2000 – 2011 At Shire HGT supervised and trained various group of researchers in numerous types of assays, HPLC, Dionex chromatography system, spectrocolorimetric, fluorometric and others analytical methods

Editorial Service

Reviewer for New Foreign Books, a Russian journal containing reviews of foreign books in biochemistry and biology. Reviewer of new books for international journal "Biochemistry (Moscow)"

International Advising Board Member for Biomedical Chemistry Journal (Moscow, Russian Federation)

Editor of Russian editions of the following books:

Emery, A.E.H., Ed. (1973). Antenatal Diagnosis of Genetic Disease. Churchill Livingstone, Edinburgh and London

Callahan, J., and J. Lowden, Eds. (1981) Lysosomes and Lysosomal Storage Diseases: Raven Press, New York

Cohn, R., and K. Roth, Eds. (1983) Metabolic Disease: A Guide to Early Recognition. Saunders, New York

Gherman Wiederschain (Ed.) Glycobiology, Special Issue, Biochemistry (Moscow), vol. 78, # 7, July 2013.

G. Wiederschain (Ed.), 2016, Glycobiology and Human Diseases, CRC press, USA, pp. 324

Experimental Skills

- Purification and characterization of proteins, glycoconjugates and oligosaccharides by gel filtration, affinity and ion exchange chromatography, electrophoresis and isoelectrofocusing
- Analysis of sugars and glycoconjugates by various colorimetric and enzymatic methods
- Chromatography experience: TLC, HPTLC, HPLC, reversed-phase chromatography on C18 column, and gas chromatography. Various types of chromatography and separations of biomolecules by Dionex system.
- Fluorophore Assisted Carbohydrate Electrophoresis (FACE) technology
- Enzyme assays of glycosidases and glycosyltransferases with natural and synthetic substrates and acceptors using colorimetric, fluorometric and radiometric methods

- Various types of 96-well plate assays, including developing methods for analysis of OTC-, aryl-sulfatases, GALC-, LAL-activities and analytical assays for several enzymes of urea circle.
- Quantitative data analysis utilizing Fluoro-S-Imager
- Supervision and training of laboratory personal.
- Broad laboratory management expertise.

Major Research Accomplishments

1962 - 1992
Institute of Biomedical Chemistry, Academy of Medical Sciences, Moscow, Russia

- Discovered multiple forms of α-L-fucosidase, β-D-fucoside (galactoside) hydrolase, and α-D-fucoside (galactoside) hydrolase in humans and other mammals, as recognized by "Enzyme Nomenclature Recommendations (1984) of the International Union of Biochemistry". Academic Press, 1984, N.Y., London.
  Identified region of pyranose ring that determines substrate specificity of these enzymes.

- Pioneered investigation of the specificity of certain human lysosomal glycolipid hydrolases using a new series of 4-MUF-glycosides with fatty acid chains of various lengths. Showed that influence of fatty acid chain length on substrate molecules determines the action of certain types of β-galactosidase (galactocerebrosidase and G_{M1}- ganglioside-β-galactosidase).

- Developed an efficient method for the diagnosis of Krabbe disease with new specific fluorogenic substrate (6-hexadecanoyl-amino-4-methylumbelliferyl-β-D-galactopyranoside) for galactocerebrosidase.

- Identified changes in intralysosomal pH and organization of intermediate filaments resulting from lysosomal storage diseases.

- Found α-L-fucosidase activity in human milk and showed that fucosidase and fucosyltransferase activities are inversely related in human milk over the course of lactation. Identified free fucose, N-acetylneuraminic acid and N-acetylhexosamines in human milk.

- Showed expression of α1, 3 fucosyltransferase, α-L-fucosidase, β-D-galactosidase and α-D-galactosidase in developing rat brain. Determined substrate specificity of α1, 3 fucosyltransferase in COS-1 cells transfected with the cloned rat α1, 3 fucosyltransferase gene.

1989 – 1990 National Institutes of Health, Fogarty Foundation

E. K. Shriver Center for Mental Retardation, Waltham, MA

Visiting Scientist/Professor

- Developed a new biochemical method for the diagnosis of Krabbe's disease (deficiency of lysosomal β-galactocerebrosidase) in humans and in naturally occurring animal models ('twitcher mice').

1993 – 1997 E. K. Shriver Center for Mental Retardation, Waltham, MA
Research Associate / Senior Research Associate / Scientist

- Studied fucosylation step in the biosynthesis of stage specific embryonic antigen SSEA–1 (Le^X), an epitope that plays a key role in cell-cell interactions during brain development.
- Demonstrated expression of α1,3- fucosyltransferase, α-L-fucosidase, β-D-galactosidase and α-D-galactosidase in developing rat brain. Determined substrate specificity of α1,3 fucosyltransferase in COS-1 cells transfected with rat □1,3-fucosyltransferase gene.
- Found that α-L-fucosidase and other glycosidases are present in human milk and determined activities of these enzymes over the course of lactation. Showed that these glycohydrolases might be important for the overall concentration of fucooligosaccharides as protective factors against pathogens in human milk.
- Improved fluorometric method for diagnosis of Morquio disease type A (MPS IVA), a deficiency of lysosomal N-acetylgalactosamine-6-sulphate sulphatase.
Supervised undergraduate students and postdoctoral fellows.

1998 - 2000 ZymeQuest, Inc., Beverly, MA
Scientific Consultant/ Senior Scientist

- Developed methods to convert A, B and AB specific erythrocyte antigens into the universal O-type, using various enzymatic modification approaches.
- Studied properties and substrate specificity of glycosidases using wide spectrum of fluorogenic and chromogenic oligosaccharides and glycosides as substrates.
- Developed scientific and business strategies; performed general laboratory management.

2000 –2011 Transkaryotic Therapies, Inc., / Shire Pharmaceutical, HGT, Cambridge, later Lexington, MA, **Scientist**

- Developed and validated analytical methods for quantification and identification glycolipids in human biological fluids (urine, plasma) of healthy persons and Fabry disease' patients using solid-phase extraction and HPLC separation and integration.
- Utilized these novel methodologies to monitor Fabry disease patients enrolled in multiple clinical trials to evaluate the efficacy of enzyme replacement therapy.
- Developed analytical method for glycosaminoglycans (GAG) quantification in normal urine and in MPS II (Hunter disease) patients' urine.
- Developed method for identification GAG's subclasses (dermatan sulfate, heparan sulfate etc.) by using combination of specific depolymerization enzymes, chemical degradation with nitrous acid and specific ELISA assays.
- Developed 96-well plate colorimetric assay for quantification of orotic acid in urine of normal mice and mice with ornithine transcarbamylase (OTC) deficiency.
- Improved method for activity assay of arylsulfatases using lead acetate, which allow increase activity of this type of enzymes in many times.
- In the first time showed that sulfated polysaccharides, fucoidan, high and low molecular weight dextran sulfates in nmoles amount significantly decrease Sulf 1&2 activities in separate experiments when either 4-MUS or heparin were used as substrates.
- Developed assay for Sulf1&Sulf2 activities using Dionex system. Obtained data about substrate specificities of these enzymes using 40 natural and seminatural substrates with various molecular weight and structure.
- Developed rapid GALC-assay in 96-well plate for analysis of galactocerebrosidase activity (deficiency in Krabbe' disease) using fluorogenic substrate, HMGal. The sensitivity of this

assay compare with sensitivity of time-consuming assays with radioactive substrate. **Filed application form for patent related to GALC project (GALC assay in 96 plate format).**

- Developed simple and sensitive assays for four enzymes of urea circle (Urea Cycle Diseases, UCD-project): OTC, ASL, ASD and ARG. **Filed 4 innovation protocols and application forms for patents.**
- For the first time characterized chromatographic parameters (Rt) and pmol/nmol quantitation level for all components of GALK/GALT metabolic reactions (Gal, Gal-OH, Gal-1-P, Glc-1-P, UDP-Glc, UDP-Gal, ATP, and ADP) using various types of Dionex CarboPac columns and 16 different elution systems.
- Improved 96-well plate assay for lysosomal acidic lipase (LAL project) to analyze activity of this enzyme at various steps of purification.
- Working 6 months of year 2009 as a major research scientist in the New Technology Group. Generated data related to formulation and preparation of lipid vesicles (liposomes), analyzed their size, stability, targeting, mRNA determination and protein expression. All these experiments were related to Company's drug delivery program for treatment patients with various diseases.
- Developed spectrophotometric assays in 96-well plate for cystathionine-β-synthetase (CBS-project)
- Developing separation and quantitation of monosaccharide's components of glycoconjugates, including enzymes of glycoproteins nature, as potential drug for enzyme replacement therapy (ERT) using high-pH anion exchange chromatography with pulsed amperometric detection (HPAEC/PAD) without preliminary derivatization of sugars (the project currently in progress).
- Participated Project teams (mRNA delivery, ASD), Visiting Lecturer Program Events (VLPE). Organized several inter departments methodical seminars and lectures related to HPLC, Mass Spectrometry, Dionex Systems Chromatography, Spectra- and Fluorometry Microplate Readers.

Boston college, Biology Department 2011-2018

In July 2011 Dr. Wiederschain retired from Shire HGT and was invited participate grants dependent Glycobiology Program at Biology Department of Boston College (MA, USA) as Research Associate Professor in Dr. D. S. Newburg' laboratory. During Dr. Wiederschain tenure in Biology Department of Boston College he was involved in writing and editing scientific papers including reviews, supervision of undergraduate and graduated BC students and postdocs, he did various presentations on the conferences, symposiums, and internal laboratory meetings. Gherman was member of Board of Directors of Boston Glycobiology Discussion Group (BGDG) at Boston College.

After ending grants support for Glycobiology Program in 2014, Gherman was appointed for one year as a Scholar at Biology Department of Boston College and finished his appointment in the end of 2015. In May 2017 Dr. Wiederschain was again appointed for one year as a Scholar at Biology Department of Boston College and currently he is staying in Professor Thomas Seyfried Lab, where Gherman involved in participation of Lab meeting, discussions of Lab projects, and tutoring process in glycobiology.

Dr. Wiederschain is the author, co-author and editor of books "Biochemical Bases of Glycosidoses" (in Russian, Moscow, Meditsina, 1980, 288 pp.) and "Glycobiology and Human Diseases" (CRC Press, Taylor & Francis Group, 2016, 324 pp.) Gherman was inviting author and co-author of chapters of following books: 1. Encyclopedia of Physical Organic Chemistry, 6 Volumes Set, by Zerong Wang (Editor), Uta Wille and Eusebio Juaristi (Associate Editors), ISBN: 978-1-118-

47045-9, 4464 pages, John Wiley & Sons, 2017. G. Wiederschain, Vol. 6, Chapter 72, Glycobiology, p. 3949-3992. 2. Dietary Sugars: Chemistry, Analysis, Function and Effects**,** Victor R Preedy (Editor), Chapter 32: Analysis of Human Milk Lactose, David S Newburg, Ceng Chen and Gherman Wiederschain, 2012.

Dr. Wiederschain is author and co-author more than 150 publications in peer review scientific journals. Dr. Wiederschain is an International Advising Board Member for Biomedical Chemistry Journal (Moscow, Russian Federation), he is member of Editorial Board of Journal of Pediatric Diseases (from 2017). Gherman is also served as a new book reviewer for International journal "Biochemistry (Moscow)" published monthly simultaneously in Russian and English. For more than three decades this journal has published more than 100 reviews for new books from various Publisher Houses such as Springer, CRC Press, Marcel & Dekker, Humana Press and others.

In 2013 Dr. Wiederschain was key person and Guest Editor for special Glycobiology issue of "Biochemistry (Moscow)" journal, # 7, July, 2013. This issue, including Dr. Wiederschain review "Glycobiology: Progress, Problems, and Perspectives" with other papers of the international contributors available on the Springer web site link: http://link.springer.com.proxy.bc.edu/journal/volumesAndIssues/10541 or in the "Biochemistry" website: http://protein.bio.msu.ru/biokhimiya/

Professional Expertise

Solid background and extensive experience in glycobiology, carbohydrate biochemistry and enzymology in both academic and industrial settings. Expertise in investigating biological role of glycoconjugates and their metabolism by glycosyltransferases and glycosidases under normal and pathological conditions. Broad and extensive knowledge in lysosomal storage diseases. Development of analytical methods for biochemical diagnosis of metabolic diseases such as Fabry disease (deficiency of α-galactosidase), Krabbe disease (deficiency of ß-galactosidase), Hunter disease (deficiency of iduronate-2-sulfatase). About 50 years of experience (13 years in industry) in isolation, identification and characterization of biological compounds and metabolites using various techniques. Responsible, mature and results-driven professional with excellent analytical and communication skills.

Experimental Skills

Isolation and characterization of biopolimers by gel filtration, affinity chromatography and isoelectrofocusing. Analysis of sugars and glycoconjugates by different colorimetric methods, HPTLC, reversed-phase chromatography on C-18 columns, GC and FACE (Fluorophore Assisted Carbohydrate Electrophoresis) technology. Determination of activity of different types of glycosidases and glycosyltransferases using calorimetric, fluorometric and radiometric methods. Protein determination in microtiter plate with BCA protein assay reagent using Microkinetics Reader Spectrophotometer. Various types of immunoassays, ultrafiltration and ultracentrifugation. Autoradiography. Quantitative data analysis utilizing Fluoro-S-Imager.

Selected Publications

1**. Wiederschain, G.Ya.,** and E.L. Rosenfeld (1969). Specificity of pig kidney fucosidase and its action on different fragments of blood group (A+H) substance. Bull. Soc. Chim. Biol. 51:1075-1084.

2**. Wiederschain, G.Ya.**, E.L. Rosenfeld, A.I. Brusilovsky, and L.G. Kolibaba (1971). α-L-Fucosidase and other glycosidases in human placenta, foetal liver and amniotic fluid at various stages of gestation. Clin. Chim. Acta 35:99-107.

3. **Wiederschain, G.Ya**., and E.L. Rosenfeld (1971). Two forms of α-L-fucosidase from pig kidney and their action on natural oligosaccharides. Biochem. Biophys. Res. Comm. 44:1008-1014.

4**. Wiederschain, G.Ya**., E.L. Rosenfeld, and L.G. Kolibaba (1973). Human α-L-fucosidases. Clin. Chim. Acta 46:305-310.

5**. Wiederschain, G.Ya**., and A.S. Prokopenkov (1973). β-D-Galactosidase and β-D-fucosidase of pig kidney. Arch. Biochem. Biophys. 158:539-543.

6**. Wiederschain, G.Ya.** (1976)**.** Carbohydrate-containing compounds: Their biosynthesis and role in animal cells. (Review). Mol. Biol. (Russ.) 10:957-980.

7. **Wiederschain, G.Ya.** (1979). Carbohydrate-containing biopolymers in the recognition processes of molecules and cells. (Review). Adv. Biol. Chem. (Russ.) 20:46-70.

8. **Wiederschain, G.Ya.** (1980). Determination of β-D-fucosidase and α-L-arabinosidase deficiency: A useful diagnostic test for detecting patients with generalized G_{M1}-gangliosidosis. Lancet I, N8173:881.

9. **Wiederschain, G.Ya.** (1980).The Biochemical Bases of Glycosidoses. Moscow: Meditzina, 288 pp.

10. **Wiederschain, G.Ya.,** E.M. Beyer, B.A. Klyashchitsky, and A.S. Shashkov (1981). Specificity patterns of different types of human fucosidase. Recognition by enzymes of a certain region of the pyranose ring in sugars. Biochim. Biophys. Acta 659:434-444.

11. **Wiederschain, G.Ya**. (1982). Multiple forms of human glycosidases and their role in glycoconjugate degradation. Adv. Clin. Enzymol. 2:150-157.

12. Beyer, E.M., and **G.Ya. Wiederschain** (1982). Further evidence of human α-L-fucosidase polymorphism. Clin. Chim. Acta 123:251-259.

13. Beyer, E.M., and **G.Ya. Wiederschain** (1982). Human and animal fucosidases. (Review). Adv. Biol. Chem. (Russ.) 23:103-122.

14. **Wiederschain, G.Ya.,** E.M. Beyer, and M. Wehnert (1983). Genetische Komplementation bei G_{M2}-gangliosidosen. Dt. Gesundh.-Wesen 38:1619-1622.

15. Beyer, E.M., and **G.Ya. Wiederschain** (1984). Activity and multiple forms of α-L-fucosidase and hexosaminidase in chorion biopsy specimens and some fetal organs. Prenatal

Diagnosis 4:43-49.

16. **Wiederschain, G.Ya.** (1986). Aspects of glycolipid metabolism in normal state and glycolipidoses. (Review). Adv. Biol. Chem. (Russ.) 27:117-135.

17. Beyer, E.M., N.I. Schono, I.K. Kozlova, and **G.Ya. Wiederschain** (1990). Relationship of the multiple forms of human α-D-galactosidase and α-D-fucosidase in the normal and in Fabry disease. Biochim. Biophys. Acta 1038:386-389.

18. Beyer, E., E. Djatlovitskaya, A. Berestova, M. Mendelson, E. Brook, and **G.Ya. Wiederschain** (1990). Identification of Fabry disease in two brothers. J. Inher. Metab. Dis. 13:230-231.

19. Shapiro, E., L. Lockman, W. Kennedy, D. Zimmerman, E. Kolodny, S. Raghavan, **G.Ya. Wiederschain,** D. Wenger, J.H. Sung, C. Summers, and W. Krivit (1991). Bone marrow transplantation as treatment for globoid cell leukodystrophy. In: Desnick, R.J. (ed.) Treatment of Genetic Diseases. New York: Churchill Livingstone, pp. 223-238.

20. Pshezhetsky, A.V., O.A. Buneeva, and **G.Ya. Wiederschain** (1991). Solubilization of rat kidney lysosomes in reversed micelles of aerosol OT in octane. FEBS Letters 287:219-222.

21. Ivleva, T.S., T.A. Ogloblina, L.L. Litinskaya, and **G.Ya. Wiederschain** (1991). Estimation and comparison of lysosomal and cytoplasmic pH of human fibroblasts from healthy donors and patients with lysosomal storage diseases. Biomed. Sci. 2:398-402.

22. Grimm, U., M. Zschiesche, **G.Ya. Wiederschain**, G. Seidlitz, and G. Machill (1991). Use of a fluorogenic substrate, 6-hexadecanoylamino-4-methylumbelliferyl-β-D-galactopyranoside, in the diagnosis of Krabbe disease. J. Inher. Metab. Dis. 14:940-941.

23. **Wiederschain, G.Ya**., I.K. Kozlova, G.S. Ilyina, M.A. Mikhaylova, and E.M. Beyer (1992). The use of glycosides of 6- and 8-acylamino-4 methylumbelliferone in studies of the specificity and properties of human lysosomal glycolipid hydrolases. Carbohydrate Res. 224:255-272.

24. **Wiederschain, G.Ya**., S. Raghavan, and E. Kolodny (1992). Characterization of 6-hexadecanoylamino-4-methylumbelliferyl-ß-D-galactopyranoside as fluorogenic substrate of galactocerebrosidase for the diagnosis of Krabbe disease. Clin. Chim. Acta 205:87-96.

25. Ivleva, T.S., I.S. Tint, A.D. Bershadsky, and **G.Ya. Wiederschain** (1992). Changes in the organization of intermediate filaments of human fibroblasts in lysosomal storage diseases and in their modelling. Bull. Exper. Biol. Med. (Russ.) N31:263-268.

26. Pshezhetsky A.V., Levashov A.V., and **G.Ya. Wiederschain** (1992). Regulation of the GM1-galactosidase supramolecular structure and catalytic activity in vitro. Biochim. Biophys. Acta 1122:154-160.

27. Beyer E.M., Ivleva T.S., Artykova G.T.,and **G.Ya. Wiederschain** (1993). Comparative studies of intracellular activity, secretion and multiple forms spectra of human skin fibroblast α-L-fucosidase in the normal and after sucrose load. Biochem. Molecul. Biol. Internat. 30:N2, 367-375.

28. Pshezhetsky A.V., Beyer E.M., Vinogradova M.V., and **G.Ya. Wiederschain** (1993). Effects of glycolipids on olgomeric structure and catalytic activity of human α-L-fucosidase. Biochimiya (Russ.) 58:879-889.

29. Pshezhetsky A.V., Beyer E.M., Buneeva O.A., Vinogradova M.V., Levashov A.V. and **G.Ya. Wiederschain** (1993) Human glycosidases reversed micellar system:properties and kinetics. Bioorganic Chemistry (Russ.) 19:161-173.

30. Ivleva T. S. and **Wiederschain G.Ya.** (1994). Reversible rearrangement of vimentin-type intermediate filaments in cultured human skin fibroblasts from patients with lysosomal storage diseases. Cell Biology International 18: No.6, 647-653.

31. Beyer E.M., Ivleva T.S., Artykova G.T., and **G.Ya. Wiederschain** (1995). Change of isoforms' spectra of α-L-fucosidase from human skin fibroblasts in intracellular storage of nonhydrolyzable substances. Biochim. Biophys. Acta 1270: 7-11.

32. **Wiederschain G.Ya.** and Newburg D.S. (1995). Human milk fucosyltransferase and α-L-fucosidase activities change during the course of lactation. J. Nutr. Biochem. 6:582-587, 1995.

33. **Wiederschain, G.Y.** and Newburg, D.S. (1996). Compartmentalization of fucosyltransferase and α-L-fucosidase in human milk. Biochem. Molec. Med. 58:211-220.

34. Mikhaylova M., **Wiederschain G.,** Mikhaylov V., and Aerts J. M. (1996). The enzymatic hydrolysis of 6-acylamino-4-methylumbelliferyl-β-D-glucosides: identification of a novel human acid β-glucosidase. Biochim. Biophys. Acta 1317: 71-79.

35. Sajdel-Sulkowska, E.M., Smith, F.I., **Wiederschain**, G. and McCluer, R.H. (1997). Cloning of a rat α-(1,3)-fucosyltransferase (rFucT gene): A member of the fucosyltransferase IV family. Glycoconjugate J., 14: 249-258.

36. **Wiederschain, G**., Chaturvedi,P. and Newburg,D.S.(1997). 3-Fucosyllactose is the major product of fucosyltransferase in human milk." Glycobiology, 6, 762.

37. **Wiederschain, G.Ya**., Koul, O., Aucoin, J., Smith, F. and McCluer, R.H. (1998). α1,3 Fucosyltransferase, α-L-fucosidase, α-D-galactosidase, β-D-galactosidase, and Le^x glycoconjugates in developing rat brain. Glycoconjugate J., 15: 379-388.

38. **Wiederschain, G.Ya**., Koul, O., Bovin N. V., Nifant'ev N. E. and McCluer, R.H. (2000). The study of the substrate specificity of rat-brain fucosyltransferase using synthetic acceptors. Russian Journal of Bioorganic Chemistry, 26: 403-406.

39. **Wiederschain, G.Ya.,** Newburg, D.S. (2001). Glycoconjugate stability in human milk: glycosidase activities and sugar release. J. Nutr. Biochem., vol. 12, 559-564.

40. **Wiederschain, G.Ya**., Newburg, D.S. (2002). α-Fucosidases. In: Creighton, T.E. (ed.) Wiley Encyclopedia of Molecular Medicine, p. 133-136, J. Wiley & Sons Press, New York.

41. **Wiederschain, G.Ya**., Newburg, D.S. (2002). Fucosyltransferases. In: Wiley Encyclopedia of Molecular Medicine, Creighton, T.E. (Ed.), p. 1335-1338, J. Wiley & Sons Press, NY.

42. **Wiederschain G**., Hartman L., Sellos-Moura M., Ruiz J. (2005). Simultaneous specific quantification of Dermatan sulfate and Heparan Sulfate in urine. 10th Annual Conference of the Society for Glycobiology, November 9-12, 2003, San-Diego, Abstracts, p. 1244, in Glycobiology 15, # 11, 1244.

43. **Wiederschain G.,** Baldry M. (2006). Review on book "Directory of Therapeutic Enzymes", Eds. McGrath B. M. and Walsh G., CRC Press, London-New York, 2006, pp.303. Biochemistry (Moscow), Vol. 71, No. 11, pp. 1289-1290.

44. **Wiederschain, G**. and Newburg, D. (2001) Glycosidase activities and sugar release in human milk. In: Bioactive components of human milk. Advances in Experimental medicine and Biology. Vol. 501, D. Newburg (Ed.). pp. 573-578. Kluver Academic/ plenum Publishers, New York, Boston, London, Moscow.

45. Newburg, D., Chen, C., and **Wiederschain, G.** (2012). In: Dietary Sugars: Chemistry, Analysis, Function and Effects**,** Victor R Preedy (Editor), Chapter 32: Analysis of Human Milk Lactose.

46. **Wiederschain, G**. (2013). Glycobiology: Progress, problems, and perspectives. Biochemistry (Moscow) 78(7): pp. 679-696.

47. Alroy, J., Garganta, C., and **Wiederschain, G.** (2014). Secondary biochemical and morphological consequences in lysosomal storage diseases. Biochemistry (Moscow) 79(7): pp. 619-636.

48. **Wiederschain, G. (Ed.),** (2016) Glycobiology and Human Diseases. CRC Press, Taylor and Francis Group, Boca Raton, London, New York, 2016, 324 pp.

49. **Wiederschain, G.** (2017), In: Encyclopedia of Physical Organic Chemistry, 6 Volume Set, by Zerong Wang (Editor), Uta Wille, and Eusebio Juaristi (Associate Editors), ISBN: 978-1-118-47045-9, 4464 pages, John Wiley & Sons, 2017., Vol. 6, Chapter 72, Glycobiology, p. 3949-3992.

50. **Wiederschain, G.** Patent: Assays and kits to determine galactocerebrosidase activity on solid support, US 20130337482 A1.

Selected Abstracts

Newburg D. and Wiederschain, G. The fucosyltransferases and fucosidases of human milk. Experimental Biology 94, Anaheim, California, April 24-28, 1994. The FASEB Journal 8: N4, #908, A157, 1994.

Newburg D., Wiederschain G., Ruiz-Palacios G., Morrow A., Pickering L. Fucosyltransferase and α-L-fucosidase activities of human milk over the course of lactation. The American Pediatric Society and The Society for Pediatric Research. San Diego, CA, May 7-11, 1995. Pediatric Research 37: N4, #1762, 296A, 1995.

Newburg DS, Wiederschain G., Chaturvedi P, Pickering LK. Characterization of human milk α-L-fucosidase and fucosyltransferase. FASEB J. 1995; 9: A278.

Wiederschain, G., O. Koul, and R. McCluer. Expression of α1, 3 fucosyltransferase in developing rat brain. XIIIth International Symposium on Glycoconjugates (August 20-26, 1995, Seattle, USA). Glycoconjugate J. 12: N4, #S9, p. 442, 1995.

Newburg D. and Wiederschain, G. Enzymology of human milk: fucosyltransferases and fucosidases. XIIIth International Symposium on Glycoconjugates (August 20-26, 1995, Seattle, USA). Glycoconjugate J. 12: N4, #S30, p. 560, 1995.

Newburg D., Peterson J., Ruiz-Palacios G., Matson D., Morrow A., Wiederschain G., Chaturvedy P., Newburg S., Scallan C., Taylor M., Kiwan R., Ceriani R., and Pickering L.. Human milk lactadherin: nature of its carbohydrate linkage and protection against symptomatic rotavirus infection. The American Pediatric Society and The Society for Pediatric Research. Washington, DC, May 6-10, 1996. Pediatric Research 39: N4, #1779, 299A, 1996.

Wiederschain, G. and D. Newburg. Identification of free fucose and N-acetylneuraminic acid in human milk. 24th Meeting of the Society for Glycobiology (November 23-26, 1996, Boston, Massachusetts). Glycobiology 6: N7, #10.08, p. 758, 1996.

Wiederschain, G., O. Koul, N. Bovin, N. Nifant'ev and R. McCluer. Expression of α1, 3 fucosyltransferase, α-L-fucosidase and β-D-galactosidases in developing rat brain. 24th Meeting of the Society for Glycobiology (November 23-26, 1996, Boston, Massachusetts). Glycobiology 6: N7, #11.11, p. 761, 1996.

Wiederschain, G., E. Sajdel-Sulkowska, F. Smith, and R. McCluer. Substrate specificity of α1, 3 fucosyltransferase expressed in COS-1 cells transfected with a rat α1,3 fucosyltransferase (rFT) gene. 24th Meeting of the Society for Glycobiology (November 23-26, 1996, Boston, Massachusetts). Glycobiology 6: N7, #11.12, p. 761, 1996.

Wiederschain, G., P. Chaturvedi and D. Newburg. 3-Fucosyllactose is the major product of fucosyltransferase in human milk. 24th Meeting of the Society for Glycobiology (November 23-26, 1996, Boston, Massachusetts). Glycobiology 6: N7, #11.16, p. 762, 1996.

Warren C., P. Chaturvedi, G. Wiederschain, L. Pickering, G. Ruiz-Palacios, and D. Newburg. Changes in human milk oligosaccharides during lactation.
24th Meeting of the Society for Glycobiology (November 23-26, 1996, Boston, Massachusetts). Glycobiology 6: N7, #J-5, p. 730, 1996.

Newburg D. and Wiederschain, G. Human milk glycosidases and the modification of oligosaccharides in human milk. The American Pediatric Society and The Society for Pediatric Research. Washington, DC, May 2-6, 1997. Pediatric Research 41: N4, #503, 86A, 1997.

Newburg D. S., Warren C. D., Chaturvedi P., Wiederschain G., Ruiz-Palacios G., Pickering L. K. and Jeanloz R. W. Individual variation of human milk oligosaccharides. XIVth International Symposium on Glycoconjugates (September 7 - 12, 1997, Zurich, Switzerland). Glycoconjugate J. 14: Suppl. 1, PO39 #255, S100, 1997.

Wiederschain, G. and D. Newburg. Human milk enzymes may modify endogenous complex carbohydrates. 25th Meeting of the Society for Glycobiology (November 1-4, 1997, Long Beach, California). Glycobiology 7: N7, #101, p. 1040, 1997.

Daniel, P., Wiederschain G., Ruiz, J. (2002). Development of an HPLC procedure for the quantification of neutral glycosphingolipids in samples from Fabry patients. 2nd International Symposium on Lysosomal Storage Diseases, Cannes, France, April 26-27, 2002, Abstracts, p. 59.

Wiederschain G., Sellos-Moura M., Ruiz J. (2003). Development and validation of DMB assay in 96-vell microplate for quantification of glycosaminoglycans from normal urine and urine from patients with different types of mucopolysaccharidoses. 8th Annual Conference of the Society for Glycobiology, December 3-6, 2003, San-Diego, Abstracts, p. 845-846, in Glycobiology 13, # 11, 2003.

Wiederschain G., Hartman L., Sellos-Moura M., Ruiz J. (2005). Simultaneous specific quantification of Dermatan sulfate and Heparan Sulfate in urine. 10th Annual Conference of the Society for Glycobiology, November 9-12, 2003, San-Diego, Abstracts, p. 1244, in Glycobiology 15, # 11, 1244.

Wiederschain G., Cook L., Iskenderian A., Zhang B., Norton A., Concino M. (2009). Microplate assay for galactocerebrosidase activity. Annual Conference of the Society for Glycobiology, November 12-15, 2009, San-Diego, Abstracts, p. 1316, in Glycobiology 19, # 11, 2009.

Wiederschain G. (2012) Secondary changes in lysosomal storage diseases: Cytoskeleton, pH and glycosidase forms. Annual JOINT MEETING OF THE SOCIETY FOR GLYCOBIOLOGY & AMERICAN SOCIETY FOR MATRIX BIOLOGY, November 11–14, 2012, San Diego, Abstract # 154, p. 1571.

References available upon request