
BIOGRAPHICAL SKETCH

NAME Gary W. Conrad	POSITION TITLE University Distinguished Professor		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Union College, Schenectady, NY Yale University, New Haven, CT University of Chicago, Chicago, IL	B.S. M.S., Ph.D. Postdoc	1963 1965, 1968 1968-1970	Biology Developmental Biology Polysaccharide Biochemistry

A. Positions and Honors: Positions and Employment

1971 - Assistant Professor – Division of Biology, Kansas State University
1975 - Associate Professor - Division of Biology, Kansas State University
1980 - Professor - - - - - Division of Biology, Kansas State University
1998 - University Distinguished Professor - Division of Biology, Kansas State University
2008-2013 – Lillian J. Brychta Endowed Professor of Biology, Kansas State University

Other Experience and Honors

Sabbatical: '77-'78, Max-Planck Institut für Biochemie, Munich, West Germany; Biochemistry and immunocytochemistry of collagens; lab of Klaus von der Mark.

Sabbatical: '84-'85, Physiological Laboratory, Cambridge University, England; measurement of $[Ca^{2+}]_i$ in mammalian cells with quin2; lab of Timothy J. Rink. [NIH Fogarty Senior International Fellowship #1]

Sabbatical: '91-'92, Institut d'Embryologie Cellulaire et Moleculaire, Nogent-sur-Marne (Paris), France; quail-chick transplantations, corneal nerve embryonic origins from trigeminal ganglia; lab of Nicole LeDouarin [NIH Fogarty Senior International Fellowship #2]

Recipient: 1996 Alcon Research Institute-Research Achievement Award, Ophthalmology, Award:\$100,000

Recipient: 2006 Dolph Simons-Higuchi Award for Biomedical Research (Univ. of Kansas): \$10,000

Recipient: 2007 Professorial Performance Award from the Division of Biology: \$2,500

Recipient 2008 Iman Award for Research (1st awarded) from Kansas State University: \$5,000

Recipient 2008 Undergraduate Mentoring in Research Award, from Kansas State University: \$2,500

B. Selected peer reviewed-publications:

79. Tasheva, E.S., M.L. Funderburgh, J. McReynolds, J.L. Funderburgh, and G.W. Conrad. 1999. The bovine mimecan gene: Molecular cloning and characterization of two major RNA transcripts generated by alternative use of two splice acceptor sites in the third exon. *J. Biol. Chem.* 274:18693-18701. PMID: 10373482

80. Barrett, J.E., D.C. Wells, and G.W. Conrad. 1999. Pretreatment methods to improve nerve immunostaining in corneas from long-term fixed embryonic quail eyes. *J. Neuroscience Methods* 92:161-168. PMID: 10595714

81. Barrett, J.E., D.C. Wells, A.Q. Paulsen, and G.W. Conrad. 2000. Embryonic quail eye development in microgravity. *J. Applied Physiol.* 88:1614-1622. PMID: 10797121

82. Tasheva, E.S., M. Pettenati, C., Von Kap-Her, and G.W. Conrad. 2000. Assignment of mimecan- (OGN) gene to human chromosome 9 band q22 by *in situ* hybridization. *Cytogen. & Cell Gen.* 88:326-327. PMID: 10828622

83. Tasheva, E.S., M. Pettenati, C. Von Kap-Her, and G.W. Conrad. 2000. Assignment of keratocan (KERA) gene to human chromosome 12 band q22 by *in situ* hybridization. *Cytogen. & Cell Gen.* 88: 244-245. PMID: 10828599

84. Long, C.J., M.R. Roth, E.S. Tasheva, M. Funderburgh, R. Smit, G.W. Conrad, and J.L. Funderburgh. 2000. Fibroblast growth factor-2 promotes keratan sulfate proteoglycan expression by keratocytes *in vitro*. *J. Biol. Chem.* 275:13918-13923. PMID: 10788517
85. Tasheva, E.S., A.H. Conrad, and G.W. Conrad. 2000. Identification and characterization of conserved *cis*-regulatory elements in the human keratocan gene promoter. *Biochim. Biophys. Acta [Gene Structure and Expression]* 1492:452-459. PMID: 10899581
86. Swiergiel, J.J., J.L. Funderburgh, M.J. Justice, and G.W. Conrad. 2000. Developmental eye and neural tube defects in the *eye blebs* mouse. *Developmental Dynamics* 219:21-27. PMID: 10974668
87. Corpuz, L.M., J.R. Dunlevy, J.R. Hassell, A.H. Conrad, and G.W. Conrad. 2000. Molecular cloning and relative tissue expression of keratocan and mimecan in embryonic quail cornea. *Matrix Biology* 19:693-698. PMID: 11102758
88. Corpuz, L.M., J.R. Dunlevy, J.R. Hassell, A.H. Conrad, and G.W. Conrad. 2000. Molecular cloning and relative tissue expression of decorin and lumican in embryonic quail cornea. *Matrix Biology* 19:699-704. PMID: 11102759
89. Conrad, G.W. 2000. Biological roles of keratan sulfate proteoglycans. In: *Carbohydrates in Chemistry and Biology, Part II. Biology of Saccharides*, vol. 4, Lectins and Saccharides Biology (eds., B. Ernst, G.W. Hart, and P. Sinaÿ). Wiley-VCH, Weinheim, pp. 7171-727. (Invited, non-refereed review)
90. Tasheva, E.S., C.G. Maki, A.H. Conrad, and G.W. Conrad. 2001. Transcriptional activation of bovine mimecan by p53 through an intronic DNA-binding site. *Biochim. Biophys. Acta [Gene Structure and Expression]* 1517:333-338. PMID: 11342211
91. Riley, N.C., P.Y. Lwigale, and G.W. Conrad. 2001. Specificity of corneal nerve positions during embryogenesis. *Molecular Vision* 7:297-304. PMID: 11754335
93. Tasheva, E.S., A. Koester, A.Q. Paulsen, A.S. Garrett, D.L. Boyle, H.J. Davidson, M. Song, N. Fox, and G.W. Conrad. 2002. Mimecan/osteoglycin-deficient mice have collagen fibril abnormalities. *Molecular Vision* 8:407-415. PMID: 12432342
94. Tasheva, E.S. and G.W. Conrad. 2003. The UV responsive elements in the human mimecan promoter: A functional characterization. *Molecular Vision* 9:1-9. PMID: 12533723
95. Tasheva, E.S. and G.W. Conrad. 2003. Interferon-gamma regulation of the human mimecan promoter. *Molecular Vision* 9:277-287. PMID: 12835654
96. Conrad, A.H. and G.W. Conrad. 2003. The keratocan gene is expressed in both ocular and non-ocular tissues during early chick development. *Matrix Biology* 22:323-337. PMID: 12935817
97. Lwigale, P.Y., G.W. Conrad and M. Bronner-Fraser. 2004. Graded potential of neural crest to form cornea, sensory neurons and cartilage along the rostrocaudal axis. *Development* 131:1979-1991. PMID: 15056619
98. Tasheva, E.S., K. An, Y. Deng, C. Jun, L.J. Takemoto, A. Koester, and G.W. Conrad. 2004. Differentially expressed genes in the lens of mimecan-null mice. *Molecular Vision* 10:403-416. PMID: 15215744
99. Tasheva, E.S., K. An, and G.W. Conrad. 2004. Analysis of the expression of chondroadherin in mouse ocular and non-ocular tissues. *Molecular Vision* 10:544-554. PMID: 15332017
100. Tasheva, E.S., B. Klocke, and G.W. Conrad. 2004. Analysis of transcriptional regulation of the small leucine-rich proteoglycans. *Molecular Vision* 10:758-772. PMID: 15496828
101. Zhang, Y., Y. Kariya, A.H. Conrad, E.S. Tasheva, and G.W. Conrad. 2005. Analysis of keratan sulfate oligosaccharides by electrospray ionization tandem mass spectrometry. *Analytical Chemistry* 77(3):902-910. PMID: 15679360
102. Zhang, Y., A.H. Conrad, E.S. Tasheva, K. An, L.M. Corpuz, Y. Kariya, K. Suzuki, and G.W. Conrad. 2005. Detection and quantification of sulfated disaccharides from keratan sulfate and chondroitin/dermatan sulfate during chick corneal development by ESI-MS/MS. *Invest. Ophthalmol. Vis. Sci.* 46(5):1604-14. PMID: 15851558
103. Zhang, Y., A.H. Conrad, and G.W. Conrad. 2005. Detection and Quantification of 3,5,3'-triiodothyronine and 3,3',5'-triiodothyronine by Electrospray Ionization Tandem Mass Spectrometry. *J. Am. Soc. Mass Spectrom.* 16(11): 1781-1786. PMID: 16182556
104. Tasheva, E.S., K. An, D.L. Boyle, and G.W. Conrad. 2005. Expression and localization of leucine-rich B7 protein in human ocular tissues. *Molec. Vision* 11:452-460. PMID: 16030496
105. Beecher, N., C. Carlson, B.R. Allen, R. Kipchumba, G.W. Conrad, K.M. Meek, and A.J. Quantock. 2005. An X-ray diffraction study of corneal structure in mimecan-deficient mice. *Invest. Ophthalmol. Vis. Sci.* 46:4046-4049. PMID: 16249479
106. Kao, W.W., Funderburgh, J.L., Xia Y., Liu C.Y., and Conrad, G.W. 2006. Focus on molecules: Lumican.

- Exp. Eye Res. 82:3-4. (Invited, non-refereed review) PMID: 16213485
107. Zhang, Y., A.H. Conrad, R. Thoma, and G.W. Conrad. 2006. Differentiation of diiodothyronines using electrospray ionization tandem mass spectrometry. *J. Mass Spectrom.* 41(2):162-168. PMID: 16353128
108. Zhang, Y., A.H. Conrad, R. Thoma, and G.W. Conrad. 2006. Differentiation of monoiodothyronines using electrospray ionization tandem mass spectrometry. *Rapid Commun. Mass Spectrom.* 20(3):481-486. PMID: 16395738
109. Conrad, A.H., Y. Zhang, A.R. Walker, L.A. Olberding, A. Hanzlik, A.J. Zimmer, R. Morffi, and G.W. Conrad. 2006. Thyroxine affects expression of KSPG-related and carbonic anhydrase II genes and KS sulfation in the embryonic chicken cornea. *Invest. Ophthalmol. Vis. Sci.* 47(1):120-132. PMID: 16384953
110. Zhang, Y., I. Schmack, D.G. Dawson, H.E. Grossniklaus, A.H. Conrad, Y. Kariya, K. Suzuki, H.F. Edelhauser, and G.W. Conrad. 2006. Analysis of keratan sulfate and chondroitin/dermatan sulfate disaccharides in post-mortem human LASIK cornea using laser capture microscopy and electrospray ionization tandem mass spectrometry. *Invest. Ophthalmol. Vis. Sci.* 47(6):2390-2396. PMID: 16723448
111. Conrad, A.H., J.M. Strafass, M.D. Wittman, S. Conway, and G.W. Conrad. 2008. Thyroxine increases the rate, but does not alter the pattern of innervation during embryonic chick corneal development. *Invest. Ophthalmol. Vis. Sci.* 49(1):139-153. PMID: 18172086
112. Zhang Y, Iwamoto T, Radke G, Kariya Y, Suzuki K, Conrad AH, Tomich JM, Conrad GW. 2008. On-target derivatization of keratan sulfate oligosaccharides with pyrenebutyric acid hydrazide for MALDI-TOF/TOF-MS. *J Mass Spectrom.* 43: 765-772. PMID: 18205237
113. Williamson, R.E, K.N. Darrow, A.B. Giersch, B.L. Resendes, M. Huang, G.W. Conrad, Z.Y. Chen, M.C. Liberman, C.C. Morton, E.S. Tasheva. 2008. Expression studies of osteoglycin/mimecan (OGN) in the cochlea and auditory phenotype of Ogn-deficient mice. *Hearing Res.* 237: 57-65. PMID: 18243607
114. Petretto E, R. Sarwar, I. Grieve, H. Lu, M.K. Kumaran, P.J. Muckett, J. Mangion, B. Schroen, M. Benson, P.P. Punjabi, S.K. Prasad, D.J. Pennell, C. Kiesewetter, E.S. Tasheva, L.M. Corpuz, M.D. Webb, G.W. Conrad, T.W. Kurtz, V. Kren, J. Fischer, N. Hubner, Y.M. Pinto, M. Pravenec, T.J. Aitman, S.A. Cook. 2008. Integrated genomic approaches implicate osteoglycin (Ogn) in the regulation of left ventricular mass. *Nat. Genet.* 40:546-552. PMID: 18443592

Graduate Student Publications (Note: I allow my graduate students to publish their thesis work under their own name. Rationale was presented: Conrad, G.W. 1982. *TIBS* 7:167-168.)

13. Lwigale, P.Y. 1999. Nuclear morphologies of bovine corneal cells as visualized by confocal microscopy. *Cells, Tissues and Organs* (formerly, *Acta Anatomica*) 165:104-112. PMID: 10516423
14. Lwigale, P.Y. 2001. Embryonic origin of avian corneal sensory nerves. *Devel. Biol.* 239:323-337. PMID: 11784038

Publications of Senior Lab Colleagues, relevant to this project:

92. Tasheva, E.S. 2002. Analysis of the promoter region of human mimecan gene. *Biochim. Biophys. Acta [Gene Structure and Expression]* 1575:123-129. PMID: 12020827

C. Research Support.

Research Projects Ongoing or Completed During the Last Three Years:

ACTIVE:

Fibroblast Differentiation During Eye Development. NIH EY000952-35, funded through –36;

P.I.: Gary W. Conrad

Specific Aims:

1. Characterize these products of fibroblast differentiation in developing eyes, particularly the carbohydrate structures and bound factors in key locations and determine their roles in the eye development.
2. Determine the mechanisms by which each step in corneal sensory innervation occurs by growth cones of neural crest (NC)-derived trigeminal (TGN) ganglion neurons.
3. Determine the normal lineage source of the non-myelinating Schwann cells of the corneal stroma, including identifying marker proteins expressed by the non-myelinating Schwann cells.

Overall goals: Characterize the steps by which specific fibroblast populations arise within different regions of the eye, particularly the cornea, and particularly using synthesis of specific proteoglycans and other glycosylated proteins as markers of differentiated states.

ACTIVE:

Microarray Supplement to NIH EY000952-35S1

PI: Gary W. Conrad

Specific Aim:

Begin the use of glycomic and proteomic microarrays for characterizing interactions between macromolecules of the extracellular matrix of the corneal stroma.