

## Russell W. Carlson

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***Research conducted in my laboratory is focused on characterizing the molecular basis for the interaction between a bacterium and a plant or animal host cell.***

### Education and Training

North Park College, Chicago IL	Chemistry (Major) Mathematics (Minor)	B.A., 1968
University of Colorado, Boulder	Biochemistry	M.S., 1974
University of Colorado, Boulder	Biochemistry	Ph.D., 1976
University of Colorado, Boulder	Chemistry	NSF and NIH Postdoctoral Fellow, 1976-1978

### Professional Experience

2002-present	Executive Director of Extramural Affairs, Complex Carbohydrate Research Center, University of Georgia, Athens
1999-present	Adjunct Professor of Microbiology, University of Georgia, Athens
1995-present	Professor of Biochemistry, Department of Biochemistry and Molecular Biology and Complex Carbohydrate Research Center, University of Georgia, Athens
1994-1995	Adjunct Professor of Biochemistry, Department of Biochemistry and Molecular Biology and Complex Carbohydrate Research Center, University of Georgia, Athens
1990-1994	Adjunct Associate Professor of Biochemistry, Department of Biochemistry and Complex Carbohydrate Research Center, University of Georgia, Athens
1988-02	Technical Director of Extramural Affairs, Complex Carbohydrate Research Center, University of Georgia, Athens
1985-1988	Professor, Department of Chemistry, Eastern Illinois University, Charleston
1982-1985	Associate Professor, Department of Chemistry, Eastern Illinois University, Charleston
1979-1982	Assistant Professor, Department of Chemistry, Eastern Illinois University, Charleston
1978-1979	Senior Research Chemist, Monsanto Agricultural Products Company, St. Louis, Missouri

### Publications (from a total of 140)

Ferguson, G.P., A. Datta, J. Baumgartner, R.M. Roop II, **R.W. Carlson**, and G.W. Walker. 2004. Similarity to peroxisomal-membrane protein family reveals that *Sinorhizobium* and *Brucella* *BacA* affect lipid-A fatty acids. *Proc. Natl. Acad. Sci. USA* **101**:5012-5017. [PMID: 15044696]

D'Haese, W., J. Glushka, R. De Rycke, M. Holsters, and **R.W. Carlson**. 2004. Structural characterization of extracellular polysaccharides of *Azorhizobium caulinodans* and importance for nodule initiation on *Sesbania rostrata*. *Mol. Microbiol.* **52**: 485-500. [PMID: 15066035]

Gudlavalleti, S.K., A.K. Datta, Y.L. Tzeng, C. Noble, **R.W. Carlson**, and D.S. Stephens. 2004. The *Neisseria meningitidis* serogroup A capsular polysaccharide O-3 and O-4 acetyltransferase. *J. Biol. Chem.* **279**: 42765-42773. [PMID: 15294916]

Ortega, X., T.A. Hunt, S. Loutet, A.D. Vinion-Dubiel, A. Datta, B. Choudhury, J.B. Goldberg, **R. Carlson**, and M.A. Valvano. 2004. Reconstitution of O-specific lipopolysaccharide expression in the *Burkholderia cenocepacia* strain J2315 that is associated with transmission infections in patients with cystic fibrosis. *J. Bacteriol.* **187**: 1324-1333. [PMID: 15687196]

Tamayo, R., B. Choudhury, A. Septer, M. Merighi, **R. Carlson**, and J.S. Gunn. 2005. Identification of *cptA*, a PmrA-regulated locus required for phosphoethanolamine modification of the *Salmonella enterica* serovar Typhimurium lipopolysaccharide core. *J. Bacteriol.* **187**: 3391-3399. [PMID: 15866924]

Ferguson, G.P., A. Datta, **R.W. Carlson**, and G.C. Walker. 2005. Importance of unusually modified lipid A in *Sinorhizobium* stress resistance and legume symbiosis. *Mol. Microbiol.* **56**: 68-80. [PMID: 15773979]

Choudhury, B., **R.W. Carlson**, and J.B. Goldberg. 2005. The structure of the lipopolysaccharide from a galU mutant of *Pseudomonas aeruginosa* serogroup O-11. *Carbohydr. Res.* **340**: 2761-2772. [PMID: 16229827]

- Kahler, C.M., S.L. Schindler, B. Choudhury, J. Glushka, **R.W. Carlson**, and D.S. Stephens. 2006. O-acetylation of the terminal *N*-acetylglucosamine of the lipooligosaccharide inner core in *Neisseria meningitidis*: Influence on inner core structure and assembly. *J. Biol. Chem.* **281**: 19939-19948. [PMID: 16687398]
- Le Quere, A.J.-L., W.J. Deakin, C. Schmeiber, **R.W. Carlson**, W.R. Streit, W.J. Broughton, and L.S. Forsberg. 2006. Structural characterization of a K-antigen capsular polysaccharides essential for normal symbiotic infection in *Rhizobium* sp. NGR234. Deletion of the rkpMNO locus prevents synthesis of 5,7-diacetamido-3,5,7,9-tetra-deoxy-non-2-ulosonic acid. *J. Biol. Chem.* **281**: 28981-28992. [PMID: 16772294]
- Choudhury, B., C. Leoff, E. Saile, P. Wilkins, C.P. Quinn, E.L. Kannenberg, and **R.W. Carlson**. 2006. The structure of the major cell wall polysaccharide of *Bacillus anthracis* is species-specific. *J. Biol. Chem.* **281**: 27932-27941. [PMID: 16870610]
- Mehta, A.S., E. Saile, W. Zhong, T. Buskas, **R. Carlson**, E. Kannenberg, Y. Reed, C.P. Quinn, and G.-J. Boons. 2006. Synthesis and antigenic analysis of the BclA glycoprotein oligosaccharide from the *Bacillus anthracis* exosporium. *Chem. Eur. J.* **12**: 9136-9149. [PMID: 17133642]
- Stahelin, C., L.S. Forsberg, W. D'Haese, M.Y. Gao, **R.W. Carlson**, Z.P. Xie, B.J. Pellock, K.M. Jones, G.C. Walker, W.R. Streit, W.J. Broughton. 2006. Exo-oligosaccharides of *Rhizobium* sp. strain NGR234 are required for symbiosis with various legumes. *J. Bacteriol.* **188**: 6168-6178. [PMID: 16923883]
- Kannenberg, E.L., T. Härtner, L.S. Forsberg, and **R.W. Carlson**. 2007. *Rhizobium leguminosarum* modification of its lipopolysaccharide during symbiotic bacteroid development. In: Current Plant Sciences and Biotechnology in Agriculture. (Proceedings of the 15<sup>th</sup> International Nitrogen Fixation Congress. (F. Dakora, W.E. Newton, C. Elmrich, V. Newton, eds.) Springer, Dordrecht, The Netherlands.
- D'Haese, W., C. Leoff, G. Freshour, K.D. Noel, and **R.W. Carlson**. 2007. *Rhizobium etli* CE3 bacteroid lipopolysaccharides are structurally similar but not identical to those produced by cultured CE3 bacteria. *J. Biol. Chem.* **282**:17101-17113. [PMID: 17420254]
- Mohapatra, N.P., S. Soni, B.L. Bell, R. Warren, R.K. Ernst, A. Muszynski, **R.W. Carlson**, J.S. Gunn. 2007. Identification of an orphan response regulator required for the virulence of *Francisella* spp. and transcription of pathogenicity island genes. *Infect. Immun.* **75**: 3305-3314. [PMID: 17452468]
- Peng, D., W.-G. Hu, B.P. Choudhury, A. Muszynski, **R.W. Carlson**, and X.-X. Gu. 2007. Role of different moieties from the lipooligosaccharide molecule in biological activities of the *Moraxella catarrhalis* outer membrane. *FEBS J.* **274**: 5350-5359. [PMID: 17892485]
- Leoff, C., E. Saile, D. Sue, P. Wilkins, C.P. Quinn, **R.W. Carlson**, and E.L. Kannenberg. 2008. Cell wall carbohydrate compositions of strains from the *B. cereus* group of species correlate with phylogenetic relatedness. *J. Bacteriol.* **190**: 112-121. [PMID: 17981984]
- Choudhury, B., **R.W. Carlson**, and J.B. Goldberg. 2007. Characterization of the lipopolysaccharide from a *wbjE* mutant of the serogroup O11 *Pseudomonas aeruginosa* strain, PA 103. *Carbohydr. Res.* **343**:238-248. [PMID: 18039536]

### Patents

- Stacey, G., Carlson, R.W., and Spaink, H.P. 1992. "Pentasaccharide phytohormones and methods for their use." U.S. Ser. No. 07/822,925
- Carlson, R.W. 1997. "Method for treating LPS-mediated disorders." U.S. Patent No. 5,648,343
- Carlson, R.W. 1999. "LPS Antagonists and Methods of Making and Using the Same." U.S. Patent 5,952,313
- Loh, J.T., Stacey, G., and Carlson, R.W. 2002. "Materials and Methods for the Enhancement of Effective Root Nodulation in Legumes." U.S. Patent 10/160,623

### Collaborative Research Activities

Examples of my group's research activities are exemplified by extensive collaboration with groups performing molecular genetics to determine structure/function of bacterial cell wall carbohydrates in microbe-host interactions. Examples of the microbe-host interactions under examination are:

- *Neisseria meningitidis*-host interactions.
- Nitrogen fixing *Rhizobium*-legume interactions.
- *Pseudomonas aeruginosa*-host interactions.
- *Bacillus anthracis*-host interactions.

[Example publications resulting from these collaborative activities are listed above.]