

Thomas Leustek

Professional Positions

2001 to date **Professor**, Biotechnology Center for Agriculture and the Environment, Department of Plant Biology and Pathology, Rutgers University, New Brunswick, NJ

1998 to 2005 **Director**, Plant Biology Graduate Program, Rutgers University

1997 to 2001 **Associate Professor**, Biotechnology Center for Agriculture and the Environment, Plant Science Department, Rutgers University New Brunswick, NJ

1991 to 1997 **Assistant Professor**, Center for Agricultural Molecular Biology and Plant Science Department, Rutgers University, New Brunswick, NJ

1988 to 1991 **Research Fellow**, Roche Institute of Molecular Biology Department of Biochemistry, Nutley, New Jersey

1986 to 1988 **Postdoctoral Fellow**, Roche Institute of Molecular Biology Department of Biochemistry, Nutley, New Jersey

Education

1987 Ph.D. in Plant Physiology, Rutgers University, New Brunswick, New Jersey 08903

1981 B.A. in Biology, Newark College of Arts and Sciences, Newark, New Jersey 07102

Awards and Recognition

- 2003 & 2004 Scientific Advisory Panel to the United States Department of Agriculture, Plant Biochemistry panel of the National Research Initiative Competitive Grants Program
- 2002 Sustained Research Excellence Award, Cook College and the New Jersey Agricultural Experiment Station
- 2002 to 2005, Advisory board of *The Plant Journal*
- 1999 to date, Scientific Advisory Board, NuCycle Therapy, Inc., 1 Deer Park Dr., Monmouth Junction, NJ 08852
- 1999 to 2000, Scientific Advisory Board, Akkadix Inc., 11099 North Torrey Pines Rd, Suite 200, La Jolla, CA 92037
- 1997 to 2000, Advisory Panel to the National Science Foundation, Integrative Plant Biology Program of the Division of Integrative Biology and Neuroscience
- 1998-1999, Scientific Advisory Panel to Phytotech, Inc., 1 Deer Park Dr., Monmouth Jct., NJ 08852
- 1997, Research Excellence Award Cook College and the New Jersey Agricultural Experiment Station

Patents

Patent WO0049165 A1, Title: Methods for Modulating the Levels of Organic Sulfur Compounds in Plants, Inventors: Leustek, Thomas ;Tarczynski, Mitchell, C., Rutgers University & Pioneer Hi-Bred International, Inc.

Patent WO0055303, Title: Transgenic Plants Having Improved Flavor Properties, Inventors: Leustek, Thomas; Tumer, Nilgun, E; Rutgers University

Publications

57. **Di R, Kim J, Martin MN, Leustek T, Jhoo J, Ho CT, Tumer NE** (2003) Enhancement of the primary flavor compound methional in potato by increasing the level of soluble methionine. *J Agric Food Chem* **51**: 5695-5702.
56. **Tsakraklides GP, Martin M, Chalam, R, Tarczynski M, Schmidt A, Leustek T** (2002) Sulfate reduction is increased in transgenic *Arabidopsis thaliana* expressing 5'-adenylylsulfate reductase from *Pseudomonas aeruginosa*. *Plant J* **32**: 879-889
55. **Ravina CG, Chang C-I, Tsakraklides GP, McDermott JP, Vega JM, Leustek T, Gotor C, Davies JP** (2002) The *sac* mutants of *Chlamydomonas reinhardtii* reveal transcriptional and post-transcriptional control of cysteine biosynthesis. *Plant Physiol* **130**: 2076-2084
54. **Lancien M, Martin M, Hsieh MH, Leustek T, Goodman H, Coruzzi G** (2002) *Arabidopsis glt1-T* mutant defines a role for NADH GOGAT in the non-photorespiratory ammonium assimilatory pathway. *Plant J* **29**: 347-358
53. **Leustek T** (2002) Sulfate Metabolism. In: *The Arabidopsis Book*, eds. C.R. Somerville and E.M. Meyerowitz, American Society of Plant Biologists, Rockville, MD, doi/10.1199/tab.0017 <http://www.aspb.org/publications/arabidopsis/>
52. **Kim J, Lee M, Chalam R, Martin M, Leustek T, Boerjan W** (2002) Constitutive overexpression of cystathionine γ -synthase in *Arabidopsis thaliana* leads to accumulation of soluble methionine and S-methylmethionine. *Plant Physiol* **128**: 95-107
51. **Bick JA, Setterdahl AT, Knaff DB, Chen Y, Pitcher LH, Zilinskas BA, Leustek** (2001) Regulation of the plant-type 5'-adenylylsulfate reductase by oxidative stress. *Biochemistry* **40**: 9040-9048
50. **Sanda SL, Leustek T, Theisen MJ, Garavito M, Benning C** (2001) Recombinant *Arabidopsis* SQD1 converts UDP-glucose and sulfite to the sulfolipid head group precursor UDP-sulfoquinovose *in vitro*. *J Biol Chem* **276**: 3941-3946
49. **Rotte C, Leustek T** (2000) Differential subcellular localization and expression of ATP sulfurylase and APS reductase during ontogenesis of *Arabidopsis thaliana* leaves indicates that cytosolic and plastid forms of ATP sulfurylase may have specialized functions. *Plant Physiol* **124**: 715-724
48. **Gao Y, Schofield O, Leustek T** (2000) Characterization of sulfate assimilation in marine algae focusing on the enzyme 5'-adenylylsulfate (APS) reductase. *Plant Physiol* **123**: 1087-1096
47. **Hatzfeld Y, Lee S, Lee M, Leustek T, Saito K** (2000) Functional characterization of a gene encoding a fourth ATP sulfurylase isoform from *Arabidopsis thaliana*. *Gene* **248**: 51-58
46. **Leustek T, Bick JA** (2000) The evolution of sulfur assimilation in plants. In: *Sulfur nutrition and sulfur assimilation in higher plants*, C Brunold, J-C Davidian, L De Kok, H Rennenberg, I Stulen, eds. Paul Haupt Publishers, Bern, Switzerland, The Netherlands, pp 1-15
45. **Crawford NM, Kahn ML, Leustek T, Long SR** (2000) Chapter 16-Nitrogen and Sulfur. In: *Biochemistry and Molecular Biology of Plants*, BB Buchanan, W Gruissem, RL Jones, eds. American Society of Plant Physiologists, Rockville, MD, pp. 786-849

44. **Leustek T, Martin MN, Bick JA, Davies JP** (2000) Pathways and regulation of sulfur metabolism revealed through molecular and genetic studies. *Annu Rev Plant Physiol Plant Mol Biol* **51**: 141-166
43. **Bick JA, Dennis JJ, Zylstra GJ, Nowack J, Leustek T** (2000) Identification of a new class of 5'-adenylylsulfate (APS) reductase from sulfate-assimilating bacteria. *J Bacteriol* **182**: 135-142
42. **Kim J, Leustek T** (2000) Repression of cystathionine γ -synthase in *Arabidopsis thaliana* produces partial methionine auxotrophy and developmental abnormalities. *Plant Sci* **151**: 9-18
41. **Marty I, Douat C, Tichit L, Kim J, Leustek T, Abagnac G** (2000) The cystathionine- γ -synthase gene involved in methionine biosynthesis is highly expressed and auxin-repressed during wild strawberry (*Fragaria vesca* L.) fruit ripening. *Theor Appl Genet* **100**: 1129-1136
40. **Lee M-S, Leustek T** (1999) Identification of the gene encoding homoserine kinase from *Arabidopsis thaliana* and characterization of the recombinant enzyme derived from the gene. *Arch Biochem Biophys* **372**: 135-142
39. **Chiba Y, Ishikawa M, Kijima F, Tyson RW, Kim J, Yamamoto A, Nambara E, Leustek T, Wallsgrove RM, Naito S** (1999) Evidence for autoregulation of cystathionine γ -synthase mRNA stability in *Arabidopsis*. *Science* **286**: 1371-1374
38. **Kim J, Chiba Y, Yamamoto A, Naito S, Leustek T** (1999) Nucleotide sequence polymorphisms in the cystathionine gamma-synthase gene of *Arabidopsis thaliana* (Accession Nos., AF039206 and AB010888). *Plant Physiol* **120**: 635-636
37. **Leustek T, Saito K** (1999) Sulfate transport and assimilation. *Plant Physiol* **120**: 637-643
36. **Lappartient AG, Vidmar JJ, Leustek T, Glass ADM, Touraine B** (1999) Inter-organ signaling in plants: regulation of ATP sulfurylase and sulfate transporter genes expression in roots mediated by phloem-translocated compound. *Plant J* **18**: 89-95
35. **Lee S, Leustek T** (1999) The affect of cadmium on sulfate assimilation enzymes in *Brassica juncea*. *Plant Science* **141**: 201-207
34. **Raux E, McVeigh T, Peters SE, Leustek T, Warren MJ** (1999) The role of *Saccharomyces cerevisiae* Met1p and Met8p in sirohaem and cobalamin biosynthesis. *Biochem J* **338**: 701-708
33. **Pilon-Smits EAH, Hwang SB, Lytle CM, Zhu YL, Tai JC, Bravo RC, Chen YC, Leustek T, Terry N** (1999) Overexpression of ATP sulfurylase in Indian mustard leads to increased selenate uptake, reduction, and tolerance. *Plant Physiol* **119**: 123-132
32. **Nozaki T, Arase T, Shigeta Y, Asai T, Leustek T, Takeuchi T** (1998) Cloning and bacterial expression of adenosine-5'-triphosphate sulfurylase from the enteric protozoan parasite *Entamoeba histolytica*. *Biochimica et Biophysica Acta - Protein Structure & Molecular Enzymology* **1429**: 284-291
31. **Lee S, Leustek T** (1998) APS kinase from *Arabidopsis thaliana*, genomic organization, expression, and kinetic analysis of the recombinant enzyme. *Biochem Biophys Res Comm* **247**: 171-175
30. **Bick JA, Åslund F, Chen Y, Leustek T** (1998) Glutaredoxin function for the carboxyl terminal domain of the plant-type 5'-adenylylsulfate (APS) reductase. *Proc Natl Acad Sci (USA)* **95**: 8404-8409
29. **Bick JA, Leustek T** (1998) Plant sulfur metabolism-the reduction of sulfate to sulfite. *Current Opinion in Plant Biology* **1**: 240-244
28. **Chen YC, Leustek T** (1998) Three genomic clones from *Arabidopsis thaliana* encoding 5'-adenylylsulfate reductase (Accession Nos. AF016282, AF016283 and AF016284) (PGR98-030). *Plant Physiol* **116**: 869

27. **Campbell M, Hahn F, Poulter CD, Leustek T** (1998) Analysis of the isopentenyl diphosphate isomerase gene family from *Arabidopsis thaliana*. *Plant Molecular Biology* **36**: 323-328
26. **Summers PS, Nolte K, Cooper AJL, Borgeas H, Leustek T, Rhodes D, Hanson AD** (1998) Identification and stereospecificity of the first three enzymes of 3-dimethylsulfoniopropionate biosynthesis in a chlorophyte alga. *Plant Physiol* **116**: 369-378.
25. **Takahashi H, Yamazaki M, Sasakura N, Watanabe A, Leustek T, de Almeida-Engler J, Engler G, Van Montagu M, Saito K** (1997) Regulation of cysteine biosynthesis in higher plants: A sulfate transporter induced in sulfate-starved roots plays a central role in *Arabidopsis thaliana*. *Proc. Natl. Acad. Sci. (USA)* **94**: 11102-11107
24. **Gage DA, Nolte KD, Rhodes D, Leustek T, Cooper AJL, Hanson AD** (1997) Biogenic dimethylsulfide: Synthesis of its precursor 3-dimethylsulfoniopropionate in marine algae. *Nature* **387**: 891-894
23. **Havkinfrenkel D, Dorn R, Leustek T** (1997) Plant tissue culture for production of secondary metabolites. *Food Technology* **51**: 56
22. **Leustek T, Smith M, Murillo M, Singh DP, Smith AG, Woodcock SC, Awan SJ, Warren MJ** (1997) Siroheme biosynthesis in higher plants: analysis of an S-adenosyl-L-methionine-dependent uroporphyrinogen III methyltransferase from *Arabidopsis thaliana*. *J. Biol. Chem.* **272**: 2744-2752
21. **Leustek T** (1997) Molecular genetics of sulfonucleotide reduction in higher plants. *Sulphur Metabolism in Higher Plants*. WJ Cram, LJ De Kok, I Stulen, C Brunold, H Rennenberg, eds., Backhuys Publishers, Leiden, The Netherlands, pp 211-213
20. **Kim J, Leustek T** (1996) Cloning and analysis of the gene for cystathionine- γ -synthase from *Arabidopsis thaliana*. *Plant Molecular Biology* **36**: 1117-11124
19. **Setya A, Murillo M, Leustek T** (1996) Sulfate reduction in higher plants: Molecular evidence for a novel 5'-adenylylphosphosulfate (APS) reductase. *Proc. Natl. Acad. Sci. (USA)* **93**: 13383-13388
18. **Leustek T** (1996) Molecular genetics of sulfate assimilation in plants. *Physiologia Plantarum* **97**: 411-419
17. **Selvan S, Grewal PS, Leustek T, Gaugler R** (1996) Heat-shock enhances thermotolerance of infective juvenile insect-parasitic nematodes *Heterorhabditis bacteriophora* (Rhabditida: Heterorhabditidae). *Experientia* **52**: 727-730
16. **Murillo M, Foglia R, Diller A, Lee S, Leustek T** (1995) Serine acetyltransferase from *Arabidopsis thaliana* can functionally complement the cysteine requirement of a *cysE* mutant strain of *Escherichia coli*. *Cell Molec Biol Res* **41**: 425-433
15. **Murillo M, Leustek T** (1995) ATP sulfurylase from *Arabidopsis thaliana*. and *Escherichia coli* are functionally equivalent but structurally and kinetically divergent. Nucleotide sequence of two ATP sulfurylase cDNAs from *Arabidopsis thaliana* and analysis of a recombinant enzyme. *Arch Biochem Biophys* **323**: 195-204
14. **Belanger F, Leustek T, Chu B, Kriz AK** (1995) Evidence for the thiamine biosynthetic pathway in higher-plant plastids and its developmental regulation. *Plant Molec Biol* **29**: 809-821
13. **Rosenthal E, Leustek T** (1995) A multifunctional protein in *Urechis caupo* has both ATP sulfurylase and APS kinase activities. *Gene* **165**: 243-248
12. **Jain A, Leustek T** (1994) A cDNA clone for 5'-adenylylphosphosulfate kinase from *Arabidopsis thaliana*. *Plant Physiol* **105**: 771-772

11. **Leustek T, Murillo M, Cervantes M** (1994) Cloning of a cDNA encoding ATP sulfurylase from *Arabidopsis thaliana* by functional expression in *Saccharomyces cerevisiae*. *Plant Physiol* **105**: 897-902
10. **Wang H, Goffreda M, Leustek T** (1993) Characteristics of an Hsp70 homolog localized in higher plant chloroplasts similar to DnaK, the Hsp70 of prokaryotes. *Plant Physiol* **102**: 843-850
9. **Leustek T** (1992) Is Grp78 a sensor of cellular secretory activity? In, *Genetic Engineering, Principles and Methods*, Volume 14. JK Setlow, ed., Plenum Press, pp. 125-137
8. **Leustek T, Amir-Shapira D, Toledo H, Brot N, Weissbach H** (1992) Autophosphorylation of 70 kDa heat shock proteins. *Cell Mol Biol* **38**: 1-10.
7. **Leustek T, Toledo H, Brot N, Weissbach H** (1991) Calcium-dependent phosphorylation of the glucose regulated protein, Grp78. *Arch Biochem Biophys* **289**: 256-261.
6. **Amir-Shapira D, Leustek T, Dalie B, Weissbach H, Brot N** (1990) Hsp70 proteins, similar to *Escherichia coli* DnaK, in chloroplasts and mitochondria of *Euglena gracilis*. *Proc. Natl. Acad. Sci. (USA)* **87**: 1749-1752
5. **Leustek T, Kirby EG** (1990) Cell cultures of Douglas-fir grown under conditions of water stress: selection and physiology. *Tree Physiol* **6**: 317-326
4. **Leustek T, Dalie B, Amir-Shapira D, Brot N, Weissbach H** (1989) A member of the Hsp70 family is localized in mitochondria and resembles *Escherichia coli* DnaK. *Proc. Natl. Acad. Sci. (USA)* **86**: 7805-7808
3. **Leustek T, Hartwig R, Brot N, Weissbach H** (1988) The regulation of ribulose biphosphate carboxylase expression in *Rhodospirillum rubrum*. Characteristics of mRNA synthesized in vivo and *in vitro*. *J Bacteriol* **170**: 4065-4071
2. **Leustek T, Kirby EG** (1988) The influence of glutamine on growth and viability of suspension cultures of Douglas-fir after exposure to polyethylene glycol. *Tree Physiol* **4**: 371-380
1. **Kirby EG, Leustek T, Lee MS** (1987) Nitrogen nutrition. In: *Cell and Tissue Culture in Forestry*, Volume 1. General Principles and Biotechnology. JM Bonga, D Durzan, eds. Martinus Nijhoff Publishers, Boston. pp. 67-88

Past Competitive Grants

National Science Foundation, Regulation of Sulfate Assimilation in Plants

National Science Foundation, Methionine Biosynthesis in Higher Plants

National Science Foundation, Molecular Genetics of Sulfate Assimilation in Plants

National Science Foundation, Characterization of the Genes for Sulfate Activation from Higher Plants

US Department of Agriculture, Mechanisms of Electron Transport in Sulfate Assimilation

Office of Naval Research, Biosynthesis of Dimethylsulfoniopropionate (DMSP) in Marine Algae

Rutgers University, Metabolic Profiling in Aid of Gene Discovery

Pioneer Hi-Bred International Inc., Expression and Characterization of PAPS/APS reductases

Pioneer Hi-Bred International, Inc., Methionine Biosynthesis in Higher Plants

NuCycle Therapy Inc. Title: Phase II, Expression of Recombinant Proteins in Plants

NuCycle Therapy Inc. Title: Selenium Enriched Plant Material for Chemoprevention

Teaching

Molecular Genetics- Since 1991 I have had sole responsibility for an upper level undergraduate lecture course in molecular genetics. The course is taught once per year and is a requirement for undergraduate majors in the Biotechnology Curriculum. It attracts 70 to 100 students each time it is taught.

Molecular Genetics Lab- from 1991 to 1996 I was responsible for 30% of the laboratory course that accompanies molecular genetics lecture. I designed the experiments for a section focusing on experiments in eukaryotic molecular genetics using yeast as the model system. The laboratory exercises included the cloning of plant cDNAs by functional complementation of yeast auxotrophic mutants, mating, sporulation and segregation analysis, knock-out gene replacement, plasmid rescue, positive mutant selection strategies, and transformation. Because I have taken on the role of the director of the Plant Biology Graduate Program I no longer participate in molecular genetics lab.

Miscellaneous courses. Since 1996, each year I teach 1 to 4 lectures in the following graduate courses, Plant Physiology, Plant Biochemistry, Introduction to Plant Biology. From 1993 to 1996 I was responsible for half of the graduate course Plant Development. Before 1996 I gave guest lectures in undergraduate courses in Plant Physiology, Proteins and Enzymes, Biochemistry of Organized Systems and Microbial Genetics.