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1977-1978	Computer Scientist, AT&T Bell Laboratories, Murray Hill, NJ, Acoustical and Behavioral Research Department Supervisor: Dr. M.V. Matthews
1978-1984	Masters (Physics, Biophysics) University of Göttingen and Max-Planck-Institute for Biophysical Chemistry, Göttingen
1983-1987	Research Associate, Max-Planck-Institut for Biophysical Chemistry, Department of Membrane Biophysics, Göttingen, FRG
1985-1987	Ph.D. (Biophysics, Plant Cell Physiology), Max-Planck-Institute for Biophysical Chemistry and University of Göttingen
1987	Ph.D. with highest distinction
1987-1989	Feodor-Lynen Fellowship, Alexander v. Humboldt Foundation
1990-1993	Assistant Professor, Biology Department, University of California, San Diego
1993-1998	Associate Professor, Biology Department, University of California, San Diego
1996/1997	Research Sabbatical, Max Planck Institut for Biochemistry, Martinsried, Germany
1998-present	Professor, Department of Biology, University of California, San Diego

Honors

1985	Heinz-Maier-Leibnitz Prize, Deutsche Forschungsgemeinschaft
1991	U.S. Presidential Young Investigator Award, National Science Foundation
1993-1995	Award for Special Creativity, National Science Foundation
1996	Alexander von Humboldt Fellow
1997	Charles Albert Shull Award, American Soc. of Plant Physiologists

Molecular Mechanisms Of Drought Resistanceand Advances On Plant Genes For Clean Up Of Heavy Metals

Guard cells control the opening and closing of stomatal pores on the surface of leaves. Plants lose over 90% of water by evaporation through stomatal pores. In response to drought the plant hormone, abscisic acid (ABA), reduces water loss by triggering closure of stomatal pores. Fresh water is becoming a scarce resource for agricultural production in many developing countries.[1] We have developed approaches, that allow quantitative determination of the function of individual genes and mutations in stomatal guard cell signal transduction pathways.[2,3] In recent research, we found several genes that mediate reduced water loss from plants during drought stress.[4] Data will be presented showing how these genes promote reduction of water loss from plants during drought.

Heavy metal toxicity poses major environmental and health problems. Removal of heavy metals from contaminated soils and waters is costly and inefficient. Recent studies have suggested that metal uptake into plant roots can provide an effective approach for bioremediation of metal contaminated waters and soils. Phytochelatins play major roles in metal detoxification in plants and fungi and have been proposed to be central to heavy metal accumulation. By screening for plant genes mediating metal tolerance, three laboratories have now independently identified a new gene family whose expression results in a dramatic increase in cadmium tolerance.[5-7] Detailed analyses have shown that these genes encode phytochelatin synthases (PCS). Disruption in a yeast PCS gene results in hypersensitivity to Cd^{2+} and Cu^{2+} and inability to synthesize phytochelatins upon Cd^{2+} exposure. These data demonstrate that PCS genes mediate phytochelatin synthesis and metal detoxification in eukaryotes and suggest that PCS genes synergistically with other genes could be useful for engineering plants for removal of heavy metals from contaminated soils and waters.

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4. Pei, Z.-M., et al. *Science* 282:287-290 (1998).
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