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Dr. Fedora Sutton PhD

I received my Ph.D. from Howard University College of Medicine in Biochemistry/Molecular Biology. I was a postdoctoral fellow at the California Institute of Technology in the area of Neurobiology and a staff fellow at the NIH. I switched to Plant Biology in 1990 on moving to SDSU and I served as a Program Director on the NSF BIO/DBI Plant Genome Program. I am a member of ASPB and ASBMB.

Biography

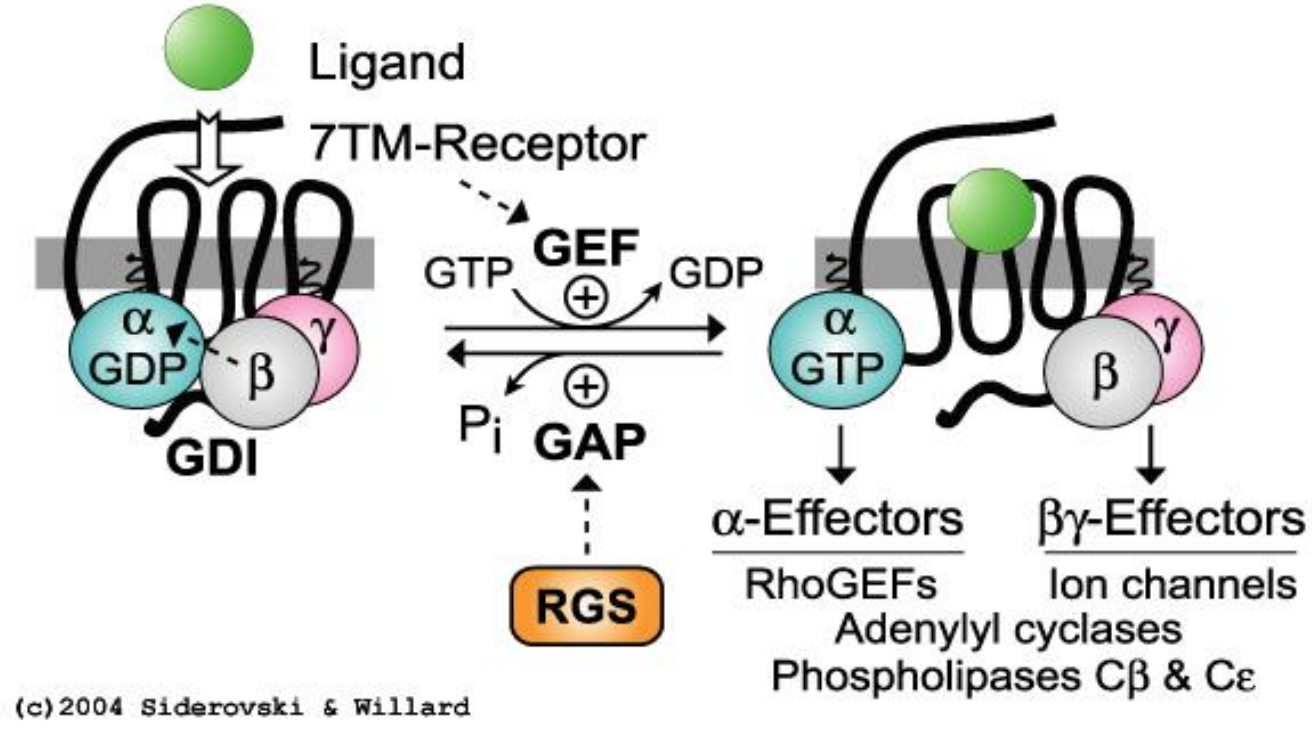
After 24 years at South Dakota State University, I have retired.

I am now VP of Research at MYOBiofuels LLC. and Adjunct Professor at South Dakota State University.

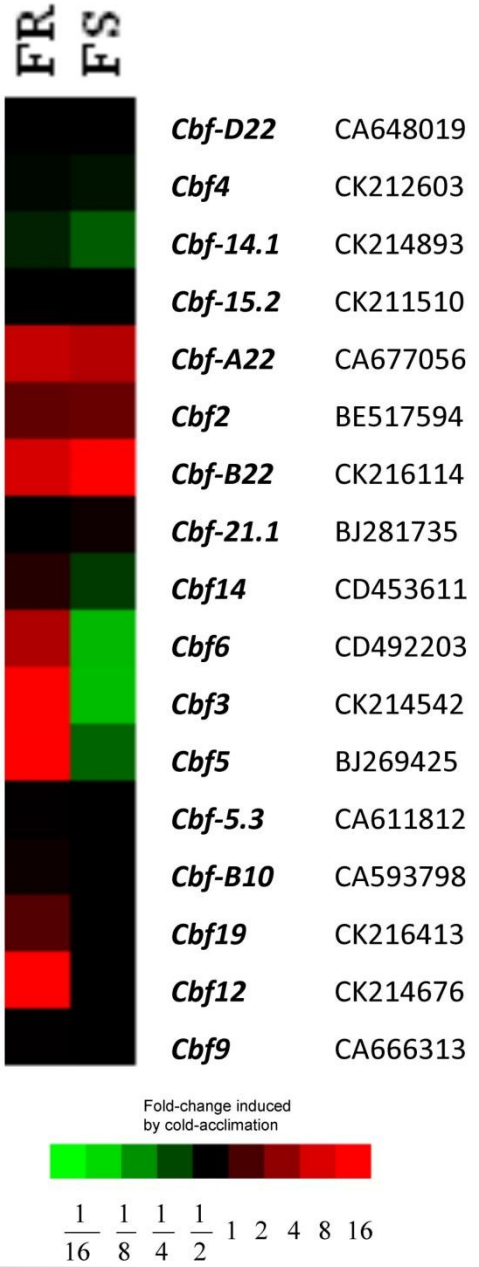
Research interests

- Understanding the role of G-protein coupled receptors (GPCR) in animals cells as they respond to plant metabolites and growth hormones.
- Deciphering signal transduction pathways that modulate genome silencing, gene expression and protein turnover in plant and algal cells.

G-protein coupled receptors(GPCR)
Identification of plant ligands that control GPCR signal transduction pathways in animal tissues such as brain and pancreas.



Techniques: Yeast 2 hybrid screens, Xenopus oocyte expression, standard molecular biology techniques including In vitro transcription and microinjections



GENE EXPRESSION

Comparative gene expression allows for the association of levels of transcription of specific genes between Plants of varying characteristics.

Here we compare cold-acclimation induced mRNA levels for several transcription factor *cbf* genes between two winter wheat lines varying In freeze survival (FR, 75 % survival; FS 25 % survival).

BMC Plant Biology 2009, **9**:34 doi:10.1186/1471-2229-9-34

GENE EXPRESSION

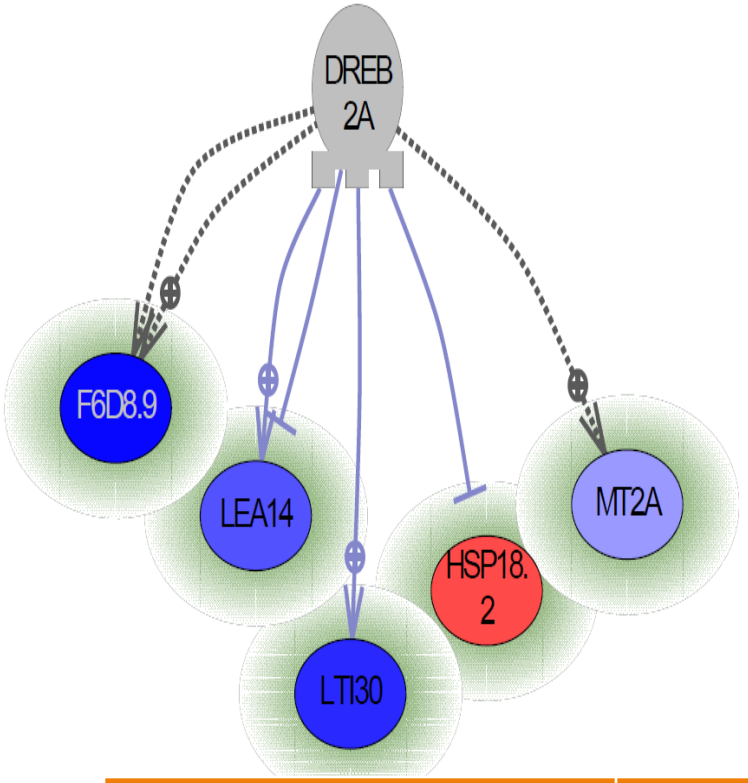
Comparative gene expression led to the identification of genes that are cold acclimation induced but not associated with differential freeze survival between FR and FS winter wheat lines.

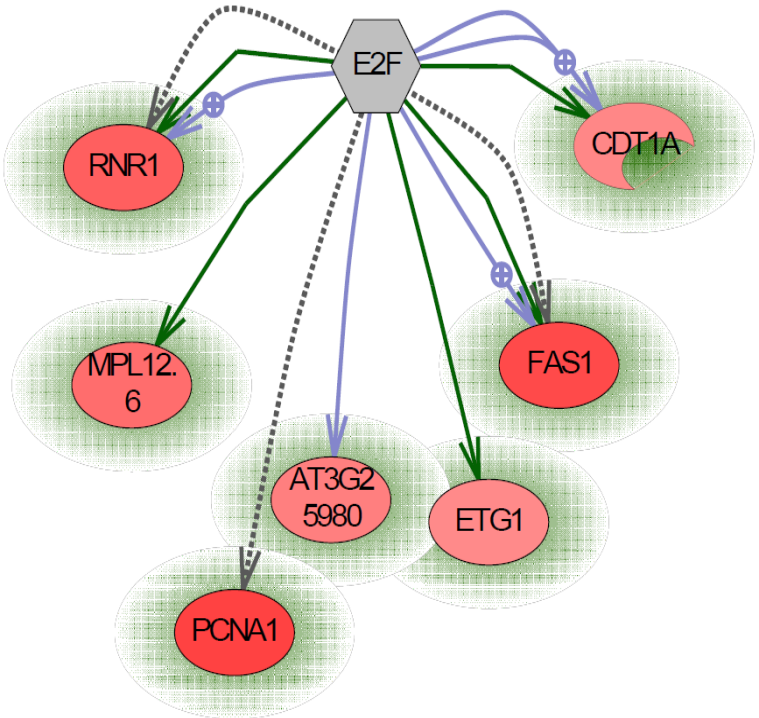
BMC Plant Biology 2009, **9**:34 doi:10.1186/1471-2229-9-34

In the study of gene expression, it is not sufficient to describe the changes in mRNA levels. Most importantly, it is necessary to identify pathways that are modulated by the stimulus. Such information leads to a better understanding of the processes involved in achieving the physiological status of the organism.

Pathways of two transcription factors DREB2A and E2F were studies.

Funct Integr Genomics. 2013 Mar;13(1):57-65. doi: 10.1007/s10142-012-0303-2

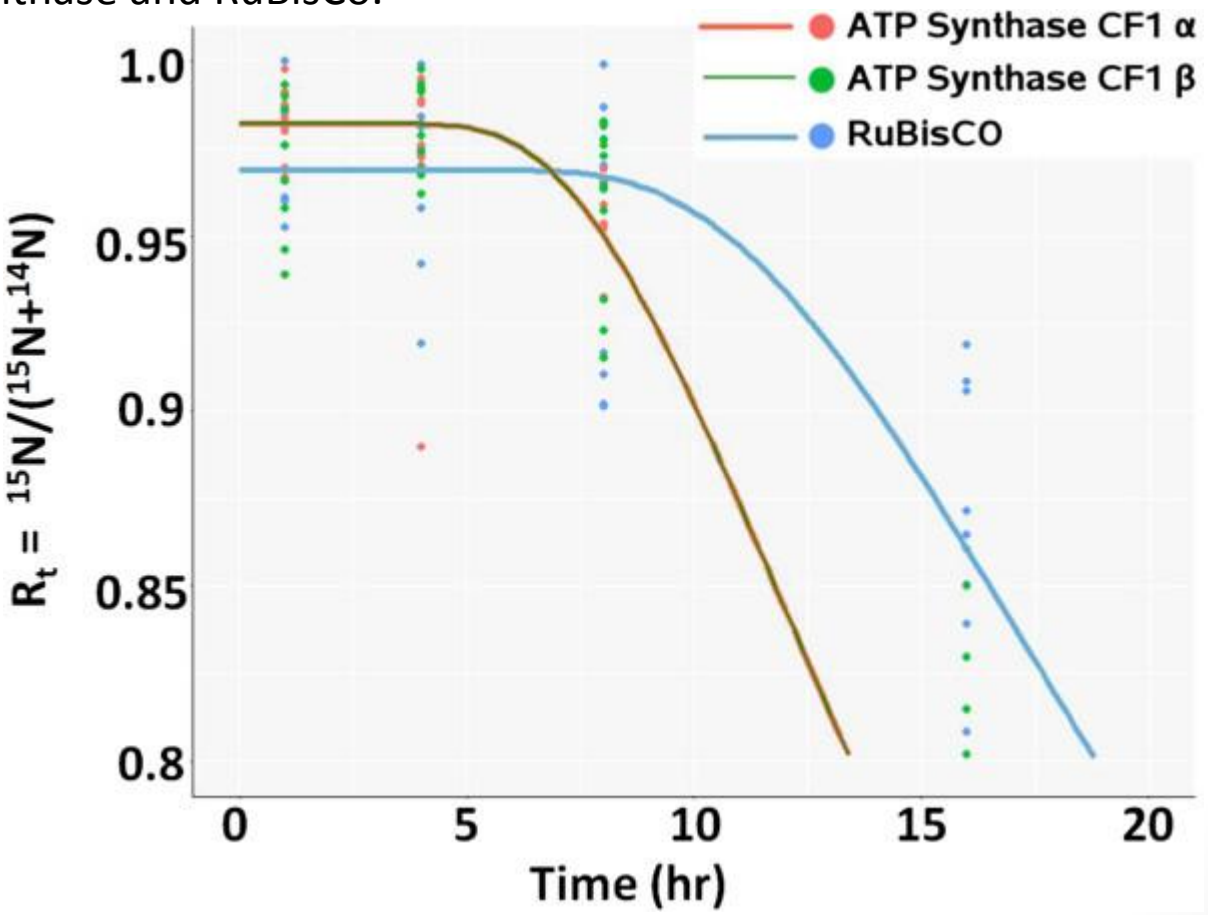




Pathways	# of Genes	Median Fold Change	P-value
Neighbors of DREB2A	**5**	**20.34**	**0.0028**
Neighbors of E2F	**7**	**-9.94**	**0.0039**

Proteomics

It is not sufficient to know that proteins are present, to understand the biological processes and how physiological conditions are maintained.
It is also important to know the lifetime of the proteins. 15N was used to determine the half lives of ATP synthase and RuBisCo.



Sauer ML, Xu B, Sutton F (2014) Proteome Sci. 2014; 12: 14. Mar 3, doi: 10.1186/1477-5956-12-14

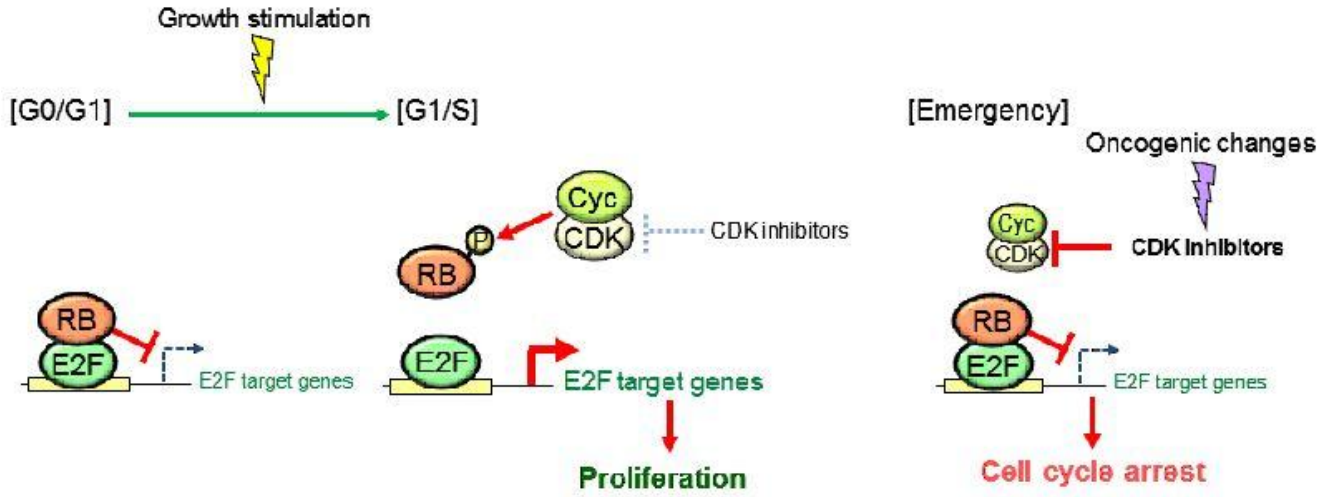
Synchronization of pathways

Preparing an organism to withstand abiotic stress is about the synchronization of the pathways to achieve:

1. an optimal or near optimal tissue water content
2. Cessation of cell proliferation (quiescence).

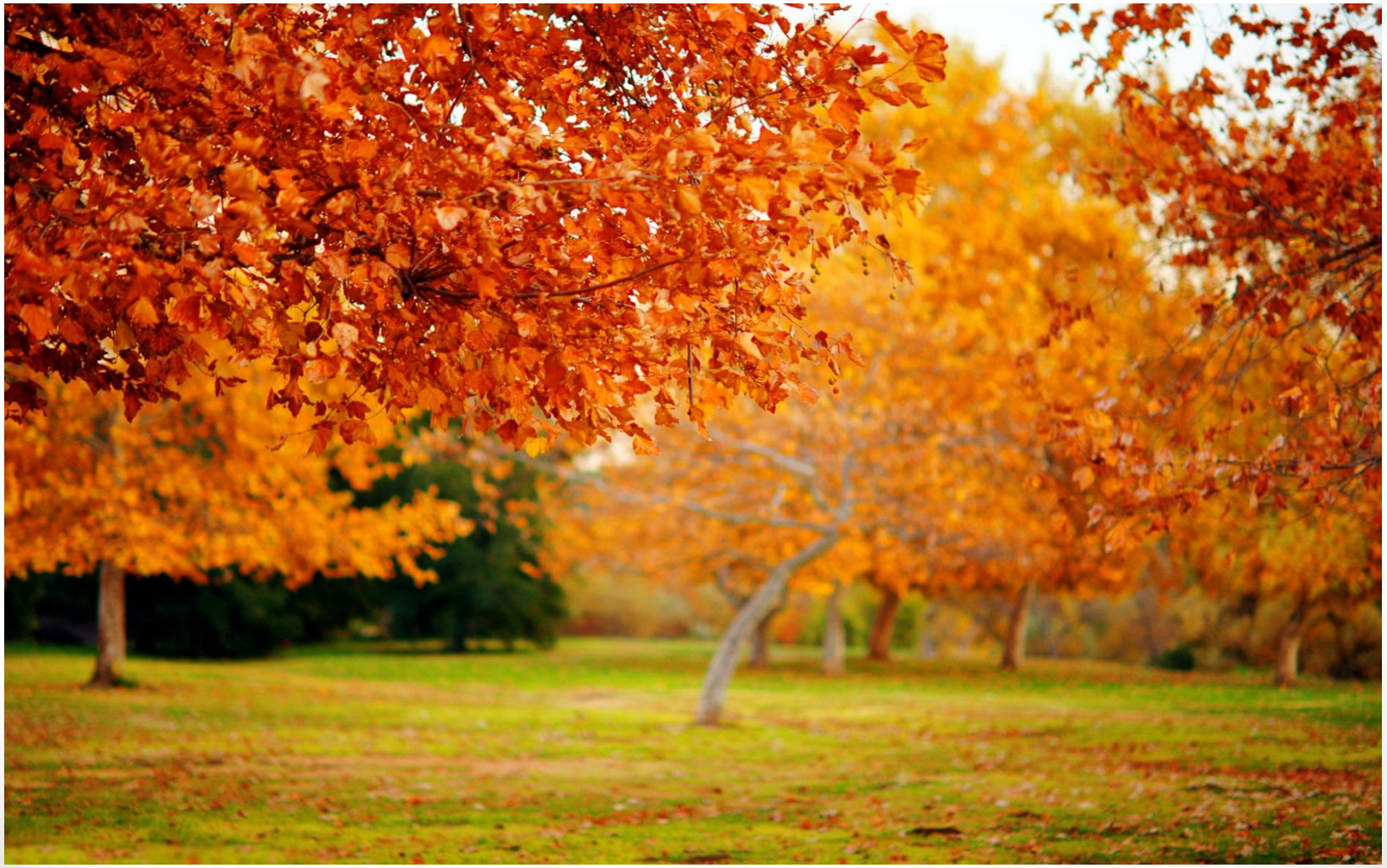
In winter wheat, this involves synchronization of the E2F and DREB2A pathways.

Modulation of the E2F pathway upon reduction of expression of E2F results in as an alternative or in addition to removal of E2F by complex formation with RB (figure below)



"Future Aspects of Tumor Suppressor Gene", *book edited by Yue Cheng, ISBN 978-953-51-1063-7, Published: April 10, 2013 under CC BY 3.0 license*

Autumn, the cold acclimation period when plants must stop proliferation (E2F transcription factor levels reduced resulting in the genes controlled by E2F no longer induced or repressed. Cells become quiescent). Other pathways such as Neighbors of DREB2A are also modulated to control tissue water content in preparing plants to withstand Freezing temperatures.



Approved by
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