Curriculum Vitae

ANTHONY R. CASHMORE

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Date of Birth Auckland, New Zealand; 1-22-1941

Citizenship New Zealand; 1-22-1941
United States; 3-01-2000

Education

University of New Zealand, Auckland, 1959-62 B.Sc. (1962)
University of Auckland, New Zealand, 1962-66
M.Sc. (1st Class Honors in Chemistry, 1963); Ph.D. (Chemistry, 1966).

Professional Experience

1966-67	Research Scientist Department of Scientific and Industrial Research Biochemistry Division, Palmerston North, New Zealand
1968	Postdoctoral Fellow University Chemical Laboratories, Cambridge, England
1969-70	Postdoctoral Fellow Medical Research Council, Laboratory of Molecular Biology, Cambridge, England
1971-72	Research Associate Department of Molecular Biology, University of California, Berkeley, California
1972-79	Research Scientist Department of Scientific and Industrial Research, Biochemistry Division, Palmerston North, New Zealand
1979-80	Visiting Assistant Professor The Rockefeller University, New York, NY 10021
1980-85	Assistant Professor The Rockefeller University, New York, NY 10021
1986	Associate Professor The Rockefeller University, New York, NY 10021
1986-2010	Professor of Biology Department of Biology, University of Pennsylvania, Philadelphia, PA 19104

2010- Emeritus Professor of Biology
Department of Biology, University of Pennsylvania, Philadelphia, PA 19104

Administrative Positions

1986-2006 Director, Plant Science Institute
University of Pennsylvania, Philadelphia, PA 19104

1997-2008 Director, Molecular Biology Track, Masters Program in Biotechnology

Honors

1962 Sir George Grey Scholar
1968-70 Sir Walter Mulholland Fellowship
2003 Elected Member of the National Academy of Sciences

Editorial Positions

Editorial Board: Plant Molecular Biology (1987-94)
Editorial Advisory Board: The Plant Journal (1993-95)
Editor, PNAS (2007-present)

National Academy Membership

Chair, Plant Biology Section, 2007-2010
Member, Class Membership Committee, 2007-09
Member, PNAS Editorial Board, 2007-2016

Invited Lectures

1988 4th International Congress of Cell Biology; Montreal
European Photomorphogenesis Symposium; Spetsai
The 2nd International Congress of Plant Molecular Biology; Jerusalem
Penn State Symposium in Plant Physiology; Penn State
UCLA Symposium on the Molecular Basis of Plant Development; Steamboat Springs, Colorado
Woods Hole Course on Plant Molecular Biology; Woods Hole

1989 VIIth International Congress on Photosynthesis; Stockholm
FASEB Conference on Plant Gene Expression; Copper Mountain, Colorado
European Photomorphogenesis Symposium; Freiburg
UCLA Symposium on Plant Gene Transfer; Park City, Utah

1990 Genetics Mini-symposium; Duke University
UK Society for Experimental Biology Symposium; Glasgow, UK
NATO Advanced Research Workshop on Phytochrome; Chichester, UK
Fourth International Conference on Arabidopsis Research; Vienna
NATO/EMBO workshop on Plant Molecular Biology; West Germany
Annual meeting of the American Society of Plant Physiologists; Indianapolis, Indiana
Molecular and Cellular Biology Colloquium; Noble Foundation, Oklahoma

1991 The Genetic Dissection of Plant Cell Processes; UCLA Symposia, Keystone, Colorado
Biochemistry and Molecular Biology of Inducible Enzymes in Higher Plants; Society for Experimental Biology Symposium, Birmingham, UK.
Developmental Biology Symposium (sponsored by the US National Academy of Sciences); Shanghai, China
Gordon Conference: Plant Molecular Biology

The University of Massachusetts at Amherst
The University of Maryland at College Park
The Salk Institute for Biological Studies, La Jolla
Cold Spring Harbor Summer Course: Molecular and Developmental Biology of Plants
Queenstown Molecular Meeting, New Zealand
Beltsville Symposium in Agricultural Research: Photomorphogenesis in Plants
Third Congress of the International Society for Plant Molecular Biology, Tucson, Arizona
Symposium on Gene Expression and Gene Regulation (sponsored by the Chinese Academy of Sciences and the US National Academy of Sciences); Shanghai, China
Genetics Symposium: University of North Carolina, Chapel Hill

1992 Rutgers, The State University of New Jersey
Plant Gene Expression Center, Albany, CA
Cold Spring Harbor Laboratory Course in Plant Molecular Biology (Course Organizer)
Plant Photoreceptors and Photoperception; St. John's College, Cambridge, England
EMBO Workshop on Molecular Chronobiology, University of Leicester
The University of Michigan, Ann Arbor
Yale University

1993 International Course on Structure & Manipulation of the Plant Genome; Irapuato, Mexico
Gordon Conference on Signal Transduction and Membrane Proteins
European Symposium on Photomorphogenesis in Plants; Pisa, Italy
XV International Botanical Congress, Tokyo (session organizer)
Photoregulation in Plants, Satellite Workshop; Tokyo Metropolitan University
Saga University, Saga, Japan

1994 Rutgers, The State University of New Jersey
Cold Spring Harbor Laboratory Course in Plant Molecular Biology
Mid Atlantic Plant Molecular Biology Society, Beltsville, MD
University of California, Los Angeles
University of Texas at Austin

1995 University of Pennsylvania, University Park
University of Georgia, Athens
International Course on Plant Genome Structure, Irapuato, Mexico
Keystone Symposium on Signal Transduction in Plants, Hilton Head
American Society for Photobiology, Washington
Photobiology Meeting, Cambridge, England

1996 Annual Symposia in Plant Physiology, University of California, Riverside
Biology Department, Cornell University, Ithaca
Biology Department, Stanford University
Monsanto Company, St. Louis
Biology Department, Washington University, St. Louis
Plant Molecular Biology Gordon Conference
FASEB Conference, Plant Signal Transduction, Copper Mountain
International Conference on UV/Blue Light: Perception and Responses in Plants and Microorganisms; Marburg
12th International Congress on Photobiology, Vienna
HARL Workshop on Light and Development in Plants, Tokyo

NIBB Symposium on Photobiology, Okazaki

1997 U.C. Davis Spring Symposium, "Information Processing System in Plants: Their Evolution and Function"
5th International Congress of Plant Molecular Biology, Singapore
International Symposium of Photobiochemistry, Moscow
European Photobiology Conference, Leicester
International Prize for Biology, Kyoto

1998 Korean Society for Molecular Biology

1999 International Course on Structure and Manipulation of the Plant Genome; Irapuato, Mexico
European Society on Photomorphogenesis, Berlin
Department of Cell Biology and Molecular Genetics, University of Maryland
Flavins and Flavoproteins 99, Universität Konstanz, Germany
Michigan State University
University of Idaho
University of California, Berkeley, CA
Symposium on Plant Signal Transduction, ICGEB, New Delhi
Bioregulation of Radiation Response, Kyoto, Japan

2000 Department of Biology, Temple University
Gordon Conference on Photosensory Receptors and Signal Transduction, Barga, Italy.
Research on Biological Rhythms, Jacksonville Fl
International Congress on Photobiology, San Francisco
Shade Avoidance, 2000; Leicester, England
Royal Netherlands Academy of Arts and Sciences, Amsterdam
German Science Foundation, Ruhr Universitat Bochum, Germany

2001 University of Michigan, Ann Arbor
Scandinavian Society for Plant Physiology, Roros, Norway
Plant Photobiology 2001, University of Missouri
Salk Institute, La Jolla

2002 University of Arizona, Tucson
University of Georgia, Athens
Gordon Conference, Il Ciocco, Italy
Environmental Signals and Plant Biotechnology, Seoul, Korea
International Symposium on Photosensory Biology, Jeju, Korea
International Symposium on Flavins and Flavoproteins, Cambridge, England
Plant Genetic Engineering, Beijing, China
Shanghai Institute of Plant Physiology & Ecology, Chinese Academy of Sciences, Shanghai, China

2003 Symposium on "Signals, Sensing and Plant Primary Metabolism" Potsdam, Germany
Molecular Biology Symposium, Queenstown, New Zealand
University of Texas, Southwestern Medical Center
University of Delaware

2004 RITE, Nara Japan
Yamada Conference "Light Sensing and Signal Transduction in Plant Photomorphogenesis" Okazaki Japan

International Congress on Photobiology, Jeju, Korea

2005 ENEA (Italian National Agency For New Technologies, Energy and the Environment) Casaccia Research Center, Rome, Italy

2006 Frontiers of Plant Biology, Changsha, China

2009 Penn Science Café: Free Will and the Criminal Justice System

2010 University of Freiburg, Germany

2012 Jiaotong University, Shanghai, China

Review Panels (1995-)

NIH Molecular Biology Study Section; February 1995
NSF Panel on Biochemistry of Gene Expression; October, 1996
NIH Molecular Biology Study Section; June 1998
NIH Genetics Study Section; 1999—2003

University Committees

SAS Personnel Committee (1987-90)
Committee on Molecular and Structural Biology (1988-89)
Committee to Search for Chair in Genetics (1990-91)
Research Foundation Natural Science and Engineering Review Panel (1991-93)
Committee to Review Biochemistry/Biophysics (1991-92)
Executive Committee for Graduate Group in Molecular Biology (1992-93)
Committee to Search for Chair in Biochemistry/Biophysics (1992-94)
SAS Natural Sciences Divisional Planning Subcommittee (1992-93)
Council of University Scholars (1993-)
Committee to Search for Faculty in Biochemistry/Biophysics (1994-97)
SAS Planning and Priorities Committee (1994-97)
Committee to search for SAS Dean (1997)
Committee to arrange a Masters program in Biotechnology (1996-97)
SAS Personnel Committee (2000-02)

Research Interests

My research interests involve studies of plant gene expression, signal transduction and circadian rhythms. Specifically, we are interested in both the mechanism of transcriptional control of light- and circadian-regulated nuclear genes and the photoreceptors and signal transduction pathways modulating these processes. These studies involve the disciplines of molecular biology, genetics, cell biology and biochemistry.

Training Grants (1996-2000)

PI for training grant in Structural Basis of Signal and Energy Transduction in Plants — this was a four-year interschool training grant from DOE/NSF/USDA with a total budget of $385,000.

Select graduate and postdoctoral students & their present positions (as of 2016):

Michael Timko, Professor of Biology, University of Virginia, Charlottesville, VI
Neil Hoffman, Director, Biotechnology Regulatory Services,
Animal Plant Health Inspection Service, USDA, Beltsville, MA
Eran Pichersky, Professor of Biology, University of Michigan, Ann Arbor, MI
Giovanni Giuliano, Senior Research Scientist, ENEA (Italian National Agency for New Technologies, Energy and the Environment), Casaccia Research Center, Italy
Carmen Castresana, Senior Research Scientist, Centro Nacional de Biotecnología, Campus Universidad Autónoma, Cantoblanco, Madrid, Spain
Robert Donald, Research Scientist, Merck Research Laboratories, Rahway, NJ.
Ulrike Schindler, Executive Director, Amgen Research GmbH, Regensburg, Germany.
Kenton Ko, Professor of Biology, Queen's University, Kingston, Ontario, Canada.
Jose Jarillo, Senior Research Scientist, Senior Research Scientist, INIA Departamento de Biotecnología, Madrid, Spain
Antonio Granell, Senior Research Scientist, Instituto de Biologia Molecular y Celular de Plantas Valencia, Spain
Juan Capel, Professor of Biology, Professor of Biology, Universidad de Almeria, Almeria, Spain
Margaret Ahmad, Professor of Biology, Universite Paris, Paris, France.
Chentao Lin, Professor of Biology, UCLA, Los Angeles, CA.
Hong-Quan Yang, Professor of Biology, Institute of Plant Physiology and Ecology, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai and School of Agriculture and Biology, Jiaotong University, Shanghai, China.

Patents awarded

5728925 : Chimaeric gene coding for a transit peptide and a heterologous polypeptide

The HY4 gene of *Arabidopsis thaliana*

Publications

1. Cashmore, A.R. and Petersen, G.B. (1969). The degradation of DNA by hydrazine: A critical study of the suitability of the reaction for the quantitative determination of purine nucleotide sequences. Biochim. Biophys. Acta 174:591-603.

2. Smith, J.D., Anderson, K., Cashmore, A.R., Hooper, M.L., and Russell, R.L. (1970). Studies on the structure and synthesis of *Escherichia coli* tyrosine transfer RNA. Cold Spr. Harb. Symp. Quant. Biol. 35:21-27.

3. Cashmore, A.R. (1970). Aminoacylation of methoxyamine modified tyrosine transfer RNA. Febs. Letters 12:90-95.

4. Cashmore, A.R., Brown, D.M., and Smith, J.D. (1971). Selective reaction of methoxyamine with cytosine bases in tyrosine transfer ribonucleic acid. J. Mol. Biol. 59:359-373.

5. Cashmore, A.R. (1971). Interaction between loops I and III in the tyrosine suppressor tRNA. Nature 230:236-239.

6. Chang, S.E., Cashmore, A.R., and Brown, D.M. (1972). Selective modification of uridine and guanosine residues in tyrosine transfer ribonucleic acid. J. Mol. Biol. 68:455-464.

7. Cashmore, A.R., Seelye, R.N., Cain, B.F., Mack, H., Schmidt, R., and Hecker, E. (1976). The structure of prostratin: A toxic tetracyclic diterpene ester from *Pimelea prostrata*. Tetrahedron Letters 20:1737-1738.

8. Cashmore, A.R. (1976). Protein synthesis in plant leaf tissue: The sites of synthesis of the major proteins. J. Biol. Chem. 251:2848-2853.

9. Gray, R.E. and Cashmore, A.R. (1976). RNA synthesis in plant leaf tissue: The characterization of messenger RNA species lacking and containing polyadenylic acid. J. Mol. Biol. 108:595-608.

10. Cashmore, A.R. and Petersen, G.B. (1978). The degradation of DNA by hydrazine: Identification of 3-ureidopyrazole as a product of the hydrazinolysis of deoxycytidylic acid residues. Nucleic Acids Research 5:2485-2491.

11. Cashmore, A.R., Broadhurst, M.K., and Gray, R.E. (1978). Cell-free synthesis of leaf protein: Identification of an apparent precursor of the small subunit of ribulose-1,5-bisphosphate carboxylase. Proc. Natl. Acad. Sci. USA 75:655-659.

12. Cashmore, A.R. (1979). Reiteration frequency of the gene coding for the small subunit of ribulose-1,5-bisphosphate carboxylase. Cell 17:383-388.

13. Schmidt, G.W., Bartlett, S., Grossman, A.R., Cashmore, A.R. and Chua, N.-H. (1980). *In vitro* synthesis, transport, and assembly of the constituent polypeptides of the light-harvesting chlorophyll a/b protein complex. In: Genome Organization and Expression in Plants, ed., C.J. Leaver (Plenum Press, New York), pp. 337-351.

14. Cashmore, A.R. and Chua, N.-H. (1980). The characterization of leaf messenger RNAs and their use in the synthesis of complementary DNAs. In: Genome Organization and Expression in Plants, ed., C.J. Leaver (Plenum Press, New York), pp. 363-371.

15. Schmidt, G.W., Bartlett, S.G., Grossman, A.R., Cashmore, A.R., and Chua, N.-H. (1981). Biosynthetic pathways of two polypeptide subunits of the light-harvesting chlorophyll a/b protein complex. J. Cell Biol. 91:468-478.

16. Broglie, R.M., Bellemare, G., Bartlett, S.G., Chua, N.-H., and Cashmore, A.R. (1981). Cloned DNA sequences complementary to mRNAs encoding precursors to the small subunit of ribulose-1,5-bisphosphate carboxylase and a chlorophyll a/b binding polypeptide. Proc. Natl. Acad. Sci. USA 78:7304-7308.

17. Cashmore, A.R. (1982). The isolation of poly A^+ messenger RNA from higher plants. In: Methods of Chloroplast Molecular Biology, eds., M. Edelman, R.B. Hallick and N.-H. Chua (Elsevier/North-Holland Biomedical Press, Amsterdam) pp. 387-392.

18. Cashmore, A.R. (1982). Full-length complementary DNA transcripts of leaf poly A^+ messenger RNA. In: Methods in Chloroplast Molecular Biology, eds., M. Edelman, R.B. Hallick and N.-H. Chua (Elsevier/North-Holland Biomedical Press, Amsterdam) pp. 533-542.

19. Coruzzi, G., Broglie, R., Cashmore, A.R., and Chua, N.-H. (1983). Nucleotide sequences of two pea cDNA clones encoding the small subunit of ribulose-1,5-bisphosphate carboxylase and the major chlorophyll a/b-binding thylakoid polypeptide. J. Biol. Chem. 258:1399-1402.

20. Cashmore, A.R. (1983). Nuclear genes encoding the small subunit of ribulose-1,5-bisphosphate carboxylase. In: Genetic Engineering of Plants, eds., T. Kosuge, C.P. Meredith, and A. Hollaender (Plenum Press, New York) pp. 29-38.

21. Timko, M.P. and Cashmore, A.R. (1983). Nuclear genes encoding the constituent polypeptides of the light-harvesting chlorophyll a/b protein complex from pea. In: Plant Mol. Biol. -UCLA Symposia on Molecular and Cellular Biology, ed., R.B. Goldberg (Alan R. Liss, Inc., New York) pp. 403-412.

22. Cashmore, A.R. (1984). Structure and expression of a pea nuclear gene encoding a chlorophyll a/b-binding polypeptide. Proc. Natl. Acad. Sci. USA 81:2960-2964.

23. Herrera-Estrella, L., Van den Broeck, G., Maenhaut, R., Van Montagu, M., Schell, J., Timko, M., and Cashmore, A.R. (1984). Light-inducible and chloroplast-associated expression of a chimaeric gene introduced into *Nicotiana tabacum* using a Ti plasmid vector. Nature 310:115-120.

24. Van den Broeck, G., Timko, M.P., Kausch, A.P., Cashmore, A.R., Van Montagu, M., and Herrera-Estrella, L. (1985). Targeting of a foreign protein to chloroplasts by fusion to the transit peptide from the small subunit of ribulose-1,5-bisphosphate carboxylase. Nature 313:358-363.

25. Timko, M.P., Kausch, A.P., Hand, J.M., Cashmore, A.R., Herrera-Estrella, L., Van den Broeck, G., and Van Montagu, M. (1985). Structure and expression of nuclear genes encoding polypeptides of the photosynthetic apparatus. In: The Molecular Biology of the Photosynthetic Apparatus, eds., C. Arntzen, L Bogorad, S Bonitz, and K. Steinback (Cold Spring Harbor, New York) pp. 381-396.

26. Herrera-Estrella, L., Van den Broeck, G., Schell, J., Van Montagu, M., Timko, M., Kausch, A., and Cashmore, A.R. (1985). Use of chimeric genes to study light-inducible gene expression and chloroplast import of the small subunit of ribulose-1,5-bisphosphate carboxylase. In: The Molecular Biology of the Photosynthetic Apparatus, eds., C. Arntzen, l. Bogorad, S. Bonitz, and K. Steinback (Cold Spring Harbor, New York) pp. 397-405.

27. Cashmore, A.R., Szabo, L., Timko, M., Kausch, A., Van den Broeck, G., Schreier, P., Bohnert, H., Herrera-Estrella, L., Van Montagu, M., and Schell, J. (1985). Import of polypeptides into chloroplasts. Bio/Technology 3:803-808.

28. Timko, M.P., Kausch, A.P., Castresana, C., Fassler, J., Herrera-Estrella, L., Van den Broeck, G., Van Montagu, M., and Cashmore, A.R. (1985). Expression of RuBP carboxylase small subunit genes involves sequences with enhancer-like properties. In: Plant Genetics-UCLA Symposia on Molecular and Cellular Biology, ed., M. Freeling (Alan R. Liss, Inc., New York) pp. 461-476.

29. Pichersky, E., Bernatzky, R., Tanksley, S.D., Breidenbach, R.W., Kausch, A.P., and Cashmore, A.R. (1985). Molecular characterization and genetic mapping of two clusters of genes encoding chlorophyll a/b-binding proteins in *Lycopersicon esculentum* (Tomato). Gene 40: 247-258.

30. Timko, M.P., Kausch, A.P., Castresana, C., Fassler, J., Herrera-Estrella, L., Van den Broeck, G., Van Montagu, M., Schell, J., and Cashmore, A.R. (1985). Light regulation of plant gene expression by an upstream enhancer-like element. Nature 318:579-582.

31. Simpson, J., Timko, M.P., Cashmore, A.R., Schell, J., Van Montagu, M., and Herrera-Estrella, L. (1985). Light-inducible and tissue-specific expression of a chimaeric gene under

control of the 5'-flanking sequence of a pea chlorophyll a/b-binding protein gene. EMBO J. 4:2723-2729.

32. Pichersky, E., Bernatzky, R., Tanksley, S.D., and Cashmore, A.R. (1986). Evidence for selection as a mechanism in the concerted evolution of *Lycopersicon esculentum* (tomato) genes encoding the small subunit of ribulose-1,5-bisphosphate carboxylase/oxygenase. Proc. Natl. Acad. Sci. USA 83:3880-3884.

33. Pichersky, E., Bernatzky, R., Tanksley, S.D., Malik, V.S., and Cashmore, A.R. (1986). Genomic organization and evolution of the RBCS and CAB gene families in tomato and other higher plants. In: Tomato Biotechnology, ed., D. Evans (Alan R. Liss, Inc., New York).

34. Piechulla, B., Pichersky, E., Cashmore, A.R., and Gruissem, W. (1986). Expression of nuclear and plastid genes for photosynthesis-specific proteins during tomato fruit development and ripening. Plant Molecular Biology 7: 367-376.

35. Szabo, L.J., and Cashmore, A.R. (1987). Targeting nuclear gene products into chloroplasts. In: Advances in Plant Gene Research, eds., B. Hohn, T. Hohn, P. King, J. Schell, D.D.S. Verma (Springer-Verlag, New York).pp. 321-336.

36. Pichersky, E., Hoffman, N.E., Malik, V.S., Bernatzky, R., Tanksley, S.D., Szabo, L., and Cashmore, A.R. (1987). The tomato *Cab*-4 and *Cab*-5 genes encode a second type of CAB polypeptides localized in Photosystem II. Plant Molecular Biology 9:109-120.

37. Pichersky, E., Hoffman, N.E., Bernatzky, R., Piechulla, B., Tanksley, S.D., and Cashmore, A.R. (1987). Molecular characterization and genetic mapping of DNA sequences encoding the Type I chlorophyll a/b-binding polypeptide of Photosystem I in *Lycopersicon esculentum* (tomato). Plant Molecular Biology 9:205-216.

38. Timko, M.P., Herdies, L., de Almeida, E., Cashmore, A.R., Leemans, J., and Krebbers, E. (1987). Genetic engineering of nuclear components of the photosynthetic apparatus in *Arabidopsis*. In: Impact of Chemistry on Biotechnology, eds., H. Phillips, S. Shoemaker, R.M. Ottenbrite, R.D. Middlekauff (ACS Books, Inc., Washington).

39. Hoffman, N.E., Pichersky, E., and Cashmore, A.R. (1987). A tomato cDNA encoding a biotin-binding protein. Nucl. Acids Res. 15:3928.

40. Castresana, C., Staneloni, R., Malik, V., and Cashmore, A.R. (1987). Molecular characterization of two clusters of genes encoding the Type I CAB polypeptides of PSII in *Nicotiana plumbaginifolia*. Plant Mol. Biol. 10:117-126.

41. Sugita, M., Manzara, T., Pichersky, E., Cashmore, A.R., and Gruissem, W. (1987). Genome organization sequence analysis and expression of all five genes encoding the small subunit of ribulose-1,5-bisphosphate carboxylase/oxygenase from tomato. Mol. Gen. Genet. 209:247-256.

42. Hoffman, N.E., Pichersky, E., Malik, V.S., Castresana, C., Ko, K., Darr, S.C. and Cashmore, A.R. (1987). A cDNA clone encoding a photosystem I protein with homology to photosystem II chlorophyll a/b-binding polypeptides. Proc. Natl. Acad. Sci. USA 84:8844-8848.

43. Hoffman, N.E., Pichersky, E., Malik, V.S., Ko, K. and Cashmore, A.R. (1988). Isolation and sequence of a tomato cDNA clone encoding subunit II of the photosystem I reaction center. Plant Mol. Biol. 10:435-445.

44. Castresana, C., Garcia-Luque, I., Alonso, E., Malik, V.S., and Cashmore, A.R. (1988). Both positive and negative regulatory elements mediate expression of a photoregulated CAB gene from *Nicotiana plumbaginifolia*. EMBO J. 7:1929-1936.

45. Giuliano, G., Pichersky, E., Malik, V., Timko, M.P., Scolnik, P.A., and Cashmore, A.R. (1988). An evolutionarily conserved protein binding sequence upstream of a plant light-regulated gene. Proc. Natl. Acad. Sci. USA. 85:7089-7093.

46. Krebbers, E., Seurinck, J., Herdies, L., Cashmore, A.R. and Timko, M.P. (1988).. Four genes in two diverged subfamilies encode the ribulose-1,5-bisphosphate carboxylase small subunit polypeptides of *Arabidopsis thaliana*. Plant Mol. Biology. 11, 745-759.

47. Giuliano, G., Hoffman, N.E., Ko, K., Scolnik, P.A. and Cashmore, A.R. (1988). A light-entrained circadian clock controls transcription of several plant genes. EMBO J. 7:3635-3642

48. Ueda, T., Pichersky, E., Malik, V.S., and Cashmore, A.R. (1989). Level of expression of the tomato *rbcS-3A* gene is modulated by a far-upstream promoter element in a developmentally regulated manner. The Plant Cell, 1, 217-227

49. Unger, E.A., Hand, J.M., Cashmore, A.R., and Vasconcelos, A.C. (1989). Isolation of a cDNA encoding mitochondrial citrate synthase from *Arabidopsis thaliana*. Plant Mol. Biol. 13, 411-418.

50. Hand, J.M., Szabo, L.J., Vasconcelos, A.C., and Cashmore, A.R. (1989). The transit peptide of a chloroplast thylakoid membrane protein is functionally equivalent to a stromal- targeting sequence. EMBO J., 8,3195-3206

51. Ko, K., and Cashmore, A.R. (1989). Targeting of proteins to the thylakoid lumen by the bipartite transit peptide of the 33 kD oxygen-evolving protein. EMBO J., 8, 3187-3194

52. Ko K., Granell, A., Bennett, J., and Cashmore, A.R. (1989). Isolation and characterization of cDNAs from *Lycopersicon esculentum* and *Arabidopsis thaliana* encoding the 33 kd protein of the photosystem II-associated oxygen evolving complex. Plant Mol. Biol., 14, 217-227.

53. Datta N., and Cashmore, A.R. (1989). Binding of a pea nuclear protein to promoters of certain photoregulated genes is modulated by phosphorylation. The Plant Cell, 1, 1069-1077

54. Donald R.G.K., and Cashmore, A.R. (1990). Mutation of either G-box or I-box sequences profoundly affects expression from the *Arabidopsis rbcS-1A* promoter. EMBO J., 9, 1717-1726

55. Donald, R.G.K., Schindler, U., Batschauer, A., and Cashmore, A.R. (1990) The plant G-box promoter sequence activates transcription in *Saccharomyces cerevisiae* and is bound *in vitro* by a yeast activity similar to GBF, the plant G-box binding factor. EMBO J., 9, 1727-1735

56. Schindler, U., and Cashmore, A.R. (1990). Photoregulated gene expression may involve ubiquitous DNA binding proteins. EMBO J., 9, 3415-3427

57. Wehmeyer, B., Cashmore, A. R. and Schafer, E. (1990). Photocontrol of the expression of genes encoding chlorophyll a/b binding proteins and small subunit of ribulose-1,5-bisphosphate carboxylase in etiolated seedlings of *Lycopersicon esculentum* (L.) and *Nicotiana tabacum* (L.). Plant Physiol. 93 : 990-997.

58. Schindler, U., Ecker, J. R. and Cashmore, A. R. (1990). An *Arabidopsis thaliana* leucine zipper protein that binds to G-box promoter sequences. In NATO ASI Series; Phytochrome properties and biological action, ed., B. Thomas (Springer-Verlag), 157-165.

59. Schindler, U., Ecker, J. R. and Cashmore, A. R. (1991). An *Arabidopsis thaliana* G-box-binding protein similar to the wheat leucine zipper protein identified as HBP-1. Society for Experimental Biology Symposium: Molecular Biology of Plant Development, ed., G Jenkins and W. Schuch, 211-218.

60. Klimczak, L. J., Schindler,U. and Cashmore, A. R. (1992). DNA binding activity of the *Arabidopsis* G-box binding factor GBF1 is stimulated by phosphorylation by casein kinase II from broccoli. The Plant Cell, 4, 87-98.

61. Schindler, U., Menkens, A. E., Beckmann, H., Ecker, J. R. and Cashmore, A. R. (1992). Heterodimerization between light-regulated and ubiquitously expressed *Arabidopsis* GBF bZip proteins. EMBO J. 11 : 1261-1273.

62. Schindler, U., Terzaghi, W. B., Beckmann, H., Kadesch, T. and Cashmore, A. R. (1992). DNA binding site preferences and transcriptional activation properties of the *Arabidopsis* transcription factor GBF1. EMBO J. 11 : 1275-1289.

63. McGrath, J. M., Terzaghi, W. B., Sridhar, P., Cashmore, A. R. and Pichersky, E. (1992). Sequence of the fourth and fifth photosystem II type chlorophyll a/b-binding protein genes of *Arabidopsis thaliana* and evidence for the presence of a full complement of the extended CAB gene family. Plant Mol. Biol., 19 :725-733.

64. Ko, K., Bornemisza, O., Kourtz, L., Ko, Z. W., Plaxton, W. C. and Cashmore, A. R. (1992). Isolation and characterization of a cDNA clone encoding a cognate 70-kDa heat shock protein of the chloroplast envelope. J Biol Chem. 267 : 2986-2993.

65. Granell, A., Pereto, J.G., Schindler, U., Cashmore, A.R. (1992). Nuclear factors binding to the extensin promoter exhibit differential activity in carrot protoplasts and cells. Plant Mol. Biol. 18 : 739-748.

66. Schindler, U., Beckmann, H. and Cashmore, A. R. (1992). TGA1: a distinct class of *Arabidopsis thaliana* bZIP protein which competes with members of the GBF family for binding to the G-box-like element TGACGTGG. The Plant Cell. 4 : 1309-1319.

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