2017

**Curriculum Vitae of Professor Yongyuth Yuthavong**

***Name, Address and Personal Data:***

Yongyuth Yuthavong

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Born May 4, 1944, Lopburi, Thailand. Thai citizen, male, married, 2 children

***Education:***

1966 B. Sc. (1st Class Hons.), Chemistry, University of London

1969 D. Phil., Organic Chemistry, University of Oxford

***Present Positions:***

Advisor to the President, National Science and Technology Development Agency (NSTDA)

Senior Research Fellow, National Centre for Genetic Engineering and Biotechnology, NSTDA

***Past Positions:***

1969-96, Department of Biochemistry, Faculty of Science, Mahidol University

1972-74, Post-doctoral fellow, Molecular Biology Institute, University of California, Los Angeles

From 1983, Professor of Biochemistry, Mahidol University

1985-91, Director, National Centre for Genetic Engineering and Biotechnology, Thailand

1990, Visiting Professor, University of California, San Francisco

1992-98, Director, National Science and Technology Development Agency

1998-06, Acting Director, Thailand Graduate Institute of Science and Technology, NSTDA

1999-2003, President, Thai Academy of Science and Technology

2004-06, Senior Advisor, National Science and Technology Development Agency

2005-06, Chairman, Institute for Promotion of Science and Technology Teaching

2006-08, Minister, Ministry of Science and Technology

2008, Distinguished Scholar in Residence, Harvard School of Public Health, Harvard University

2014-15, Deputy Prime Minister, in charge of social development

***Awards and Distinctions:***

1966 Gold Medal Award for Academic Distinction from Samaggi Samagom (Thai Students Association in Britain)

1984 Outstanding Scientist of Thailand Award from Foundation for Promotion of Science and Technology, and Science Society of Thailand

1992 Elected Fellow, and 2013-15, Vice President, Third World Academy of Sciences, Trieste, Italy

1997 Elected Foreign Fellow, Australian Academy of Technological Sciences and Engineering

1998 Honorary Doctorate, Biochemistry, Prince of Songkla University

1998 ASEAN Science and Technology Meritorious Service Award from ASEAN Committee on Science and Technology

2002 Outstanding Government Scholar Award from Government Scholars Association

2003 Award for Highest Citation for Research (Life Science) from Thailand Research Fund

2004 Nikkei Asia Award for Science, Technology and Innovation from Nihon Keizai Shimbun, Japan

2004 Outstanding Person of the Nation from National Identity Board.

2005 Mahidoltayakorn (Outstanding Alumnus) Award, Mahidol University.

2005 Honorary Doctorate of Science, Mahidol University.

2009 Honorary Doctorate, Biochemistry, Suranaree University of Technology.

2011 Honorary Doctorate, Chemistry, Thammasat University

***Royal Decorations:***

Knight Grand Cordon (Special Class) of the Most Noble Order of the White Elephant

Knight Grand Cordon (Special Class) of the Most Exalted order of the Crown

***Fellowships and Grants:***

1962-1969, Thai Government Scholarship for study in the UK

1972-1974, Post-Doctoral Fellowship at University of California, Los Angeles, USA

From 1974, various research grants including EU (1997-2000, 2001-2004), Wellcome Trust (1999-2002, 2004-2007), Medicines for Malaria Ventures (2000-2009)

***Professional Functions and Associations:***

***International:***

Member of the Scientific and Technical Advisory Board (2001-04), Steering Committee of the Scientific Working Group on Biomedical Sciences (1983-84), on Chemotherapy of Malaria (1988-97), on Drug Discovery Research (1998), and Working Group on Genome to Drugs and Diagnostics (2001-2005), UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases. Chairman, ASEAN Subcommittee on Biotechnology (1986-92), ASEAN Subcommittee on Infrastructure and Resources Development (1999-2002), Advisory Body on ASEAN Plan of Action on Science and Technology for Development (2002-04). Honorary Associate, Institute for Biotechnological Studies, UK (1986-87). Editorial Board Member, Biochemical Education (International Union of Biochemistry) (1979-84). Editorial Board Member, Parasitology Today (UK) (1991-2000). Editor-in-Chief, ASEAN Journal of Science and Technology for Development (1991-92). Member of Scientific Advisory Committee, Drugs for Neglected Diseases Initiative (2003-07). Member of Scientific Boards, Grand Challenges for Global Health Program (2003-10) and Grand Challenges Canada (2009-present). Member of the Steering Committee, Intermediate Biotechnology Service, International Service for National Agricultural Research, Netherlands (1991-2000). Member, WHO Expert Group on R&D and Financing (2008-2009). Chairman, Thematic Reference Group on Innovation and Technology Platforms for Health Interventions, WHO/TDR (2010-2011). Chairman, Intergovernmental Bioethics Committee, UNESCO (2012-15), and Member, International Bioethics Committee, UNESCO (from 2016). Member, Roll Back Malaria Partnership Board, from 2016.

***National:***

Chairman, Executive Boards of National Centre for Genetic Engineering and Biotechnology, National Metal and Materials Technology Centre, and National Electronics and Computer Technology Centre (1992-98). Editor-in-Chief, ScienceAsia (Journal of the Science Society of Thailand) (1975-84, 1999-2000). Member, National Research Council of Thailand, Chemical and Pharmaceutical Sciences Branch (1991-2014). Member, Science Committee of the Thai National Commission for UNESCO (1984-present). Member, Executive Committee, Science Society of Thailand (1974-89). Fellow, Thai Academy of Science and Technology (1997-present, 1999-2003, Foundation Chairman 2001-07). Member, National Education Council (2004-10), Chairman, Subcommittee on Education Reform in the Second Decade (2008-09), Member, Education Reform Policy Committee and Chairman, Promotion of Participation in Education Management (2009-12). Chairman, Foundation for Promotion of Science and Technology (2011-14).Chairman, Assessment Board, Thailand Research Foundation (from 2016). Advisor on Social and Sustainable Development, Crown Properties Bureau (from 2015). Committee Member, Thailand Sustainable Development Foundation (from 2016).

***Research Interests and Contributions:***

Chemotherapy and molecular biology of malaria: Characterisation of the parasite folate pathway and enzymes as potential drug targets; mechanism-based development of antimalarials, biochemical alterations of red cells in malarial infection; interaction of genetically variant red blood cells and malarial parasites.

Policies related to science and technology, especially biotechnology.

***Other Contributions:***

Advisor to Minister of Science, Technology and Energy (1981-1986, 1991-1992). Member, Prime Minister's Advisory Committee on Science and Technology Policy (1988-1991). Member, Council of Trustees and Executive Board, Thailand Development Research Institute (from 1984). Member, Board of Directors (1993-2002) and Board of Trustees (2002-present), Thailand Environment Institute. Member, Policy Board (1993-1998) and Assessment Board (2002-06), Thailand Research Fund. Member, Ministry of University Affairs Council (1992-98). Member, Srinakarinwirote University Council (from 1992). Member, Suranaree Technology University Council (1993-2005). Member, King Mongkut’s University of Technology Thonburi Council (1993-2014). Member, Thammasat University Council (from 1994-2011). Member, Rajabhat Institute Council (1995-1998). Member, Chiang Mai University Council (1998-2000). Member, Mahasarakham University Council (2003-14). Member, Mahidol University Council (2006-14). Member, Board of Trustees, Asian Institute of Technology (2005-12). Member, Civil Service Assessment Committee (Ministry of Science, Technology and Environment) (2000-02). Member, Board of Directors, Kasikorn Bank (2000-14). Member (from 1994) and Chairman (from 2006), Thailand Toray Science Foundation. Chairman, Foundation for Promotion of Gifted Persons in Science and Technology (from 2001). Member, Government Committee on Right to Information on Science, Technology and Environment (2001-2006). Member, L’Oreal/UNESCO Women in Science Committee (Thailand) (from 2002). Chairman, Hydro and Agro Informatics Institute, Ministry of Science and Technology (from 2009). Member, Executive Council, Mahidol Wittayanusorn School (2009-2013). Chairman, Committee on ICT for Social Equity (2012-14).

***Publications:***

156 research and review articles in international scientific journals. Numerous publications on policy and broad aspects of science and technology. Author/co-author of 23 books and manuals. Co-owner of 14 patents/patent applications. H-Index = 35.

***Scientific Research and Review Articles***

1. Lowe, G. and Yuthavong,Y (1971) Kinetic Specificity in Papain Catalysed Hydrolyses. *Biochem. J .* **124**, 107-115.

2. Lowe, G. and Yuthavong, Y. (1971) pH Dependence and Structure-Reactivity Relationships in the Papain-Catalysed Hydrolyses of Anilides. *Biochem. J.* **124**, 117-122.

3. Yuthavong, Y. and Ruenwongsa, P. (1973) Kinetics of the Reaction of the Masked Sulphydryl Groups of Haemoglobins A, E and New York with p-Chloromercuribenzoate. *Biochim. Biophys. Acta* **303**, 44-51

4. Boyer, P. D., Wolcott, R. G., Yuthavong, Y. and Degani, C. (1974) Phosphorylation Mechanisms in Adenosine Triphosphate Formation and Utilization. *Biochem. Soc. Trans.* **2**, 27-30.

5. Yuthavong, Y., Feldman, N. and Boyer, P. D. (1975) Some Chemical Characteristics of Dimethylsuberimidate and its Effect on Sarcoplasmic Reticulum Vesicles. *Biochim. Biophys. Acta*, **382**, 116-124.

6. Ruenwongsa, P. and Yuthavong, Y. (1975) Studies on the Subunit Dissociation of the Abnormal Haemoglobins E and New York. *J. Med. Ass. Thailand* **58**, 253-258.

7. Yuthavong, Y., Ruenwongsa, P., Benyajati, C. and Suttimool, W. (1975) Studies on the Structural Stability of Haemoglobin E. *J. Med. Ass. Thailand* **58**, 351-356.

8. Chaimanee, P. and Yuthavong, Y. (1977) Binding of Haemoglobin to Spectrin of Human erythrocytes. *FEBS Lett.* **78**, 119-123.

9. Yuthavong, Y., Ucchin, P. and Sari, R. (1977) Different States of Sarcoplasmic Reticulum Membrane in the Presence of Acetyl Phosphate and Adenosine Triphosphate. *Life Sci.* **21**, 713-718.

10. Yuthavong, Y. and Suttimool, V. (1978) Rate Constants of Acylation Steps in Papain-Catalysed reactions. *Biochim. Biophys. Acta***523**, 198-206.

11. Yuthavong, Y. (1978) Quenching of Intrinsic Fluorescence Accompanies the Activation of Prococoonase. *Experientia* **34**., 440-441.

12. Wilairat, P., Yuthavong, Y. and Khungvanlert, R. (1978) Effect of Membrane Modification on Cell Fusion of Hen Erythrocytes Induced by Dimethyl Sulfoxide. *Life Sci.* **22**, 1993-1998.

13. Siriwittayakorn, J. and Yuthavong, Y. (1979) Relation between Low Acetylcholinesterase Activity and Membrane Lipids in Paroxysmal Nocturnal Haemoglobinuria. *Brit. J. Haematol.* **41**, 393-398.

14. Burapakusolsri, N., Wilairat, P. and Yuthavong, Y. (1979) An Examination of Complement Proteins on Membranes of Paroxysmal Nocturnal Haemoglobinuria (PNH) and PNH-Like Red Cells. *Brit. J. Haematol.* **41**, 393-398.

15. Yuthavong, Y., Wilairat, P., Panijpan, B. Potiwan, C. and Beale, G. H. (1979) Alterations in Membrane Proteins of Mouse Erythrocytes Infected with Different Species and Strains of Malaria Parasites. *Comp. Biochem. Physiol.* **63B**, 83-85.

16. Chaimanee, P. and Yuthavong, Y. (1979) Phosphorylation of Membrane Proteins from *Plasmodium berghei*-Infected Red Cells. *Biochem. Biophys. Res. Commun.* **87**, 953-959.

17. Yuthavong, Y. (1980) Distribution of Chloroquine in Normal, Pronase-Treated and Malaria-Infected Red Cells. *Life Sci.* **26**, 1899-1903.

18. Jearnpipatkul, A., Govitrapong, P. Yuthavong, Y., Wilairat, P. and Panijpan, B. (1980) Binding of Antimalarial Drugs to Hemozoin from *Plasmodium berghei*. *Experientia* **36**, 1063-1064.

19. Nakornchai, S., Satarug, S., Potiwan, C. and Yuthavong, Y. (1980) Enhanced Fusion Capacity of Malaria(P. berghei)-Infected Red Cells. *Cell Biol. Int. Rep.***4**, 933-940.

20. Liewsaree, P., Yuthavong, Y., Wilairat, P. and Komaratat, P. (1980) Protein and Lipid Composition of Sarcoplasmic Reticulum from Dystrophic Muscles of Vitamin E-Deficient Rabbits. *Nutr. Rep. Int.* **22**, 853-862.

21. Yuthavong, Y. and Wilairat, P. (1981) The Biochemistry of Malaria. *Biochem. Ed.* **9**, 122-127.

22. Suthipark, U., Krungkrai, J., Jearnpipatkul, A., Yuthavong, Y. and Panijpan, B. (1982) Superoxide Dismutase in Mouse Red Blood Cells Infected with *Plasmodium berghei*. *J . Parasitol.* **68**, 337-339.

23. Pattanakitsakul, S. and Yuthavong, Y. (1982) Heterogeneity in Filterability of Erythrocytes from Malaria *Plasmodium berghei*)-Infected Blood. *Experientia* **38**, 626-628.

24. Sirawaraporn, W., Panijpan, B. and Yuthavong, Y. (1982) *Plasmodium berghei*: Uptake and Distribution of Chloroquine in Infected Mouse Erythrocytes. *Exp. Parasitol.* **54**, 260-270.

25. Yuthavong, Y. and Krungkrai, J. (1982) Ca2+ Uptake of Erythrocytes in Malarial Infection. In *The Application of Micromethods for the Investigation of Tropical Disease Pathogens*, Michal, F. ed., TDR, WHO, pp.209-212.

26. Krungkrai, J. and Yuthavong, Y. (1983) Enhanced Ca2+ Uptake of Mouse Erythrocytes in Malarial (*Plasmodium berghei*) Infection. *Mol. Biochem. Parasitol.* **7**, 227-235.

27. Krungkrai, J. and Yuthavong, Y. (1983) Reduction of Ca2+ Uptake Induce by Ionophore A23187 of Red Cells from Malaria (*Plasmodium berghei*)-Infected Mice. *Cell Biol. Int. Rep.***7**, 237-243.

28. Tungpradabkul. S., Wilairat, P., Panyim, S. and Yuthavong, Y. (1983) Analysis of DNA from Various Species and Strains of Malarial Parasites by Restriction Endonuclease Fingerprinting. *Comp. Biochem. Physiol.* **74B**.,481-485.

29. Ruenwongsa, P., Hutadilok, N. and Yuthavong, Y. (1983) Stimulation of Ca2+ Uptake in the Human Liver Fluke *Opisthorchis viverrini* by Praziquantel. *Life Sci.* **32**, 2529-2534.

30. Nakornchai, S., Sathitudsahakorn, C. Chongchirasiri, S. and Yuthavong, Y. (1983) Mechanism of Enhanced Fusion Capacity of Mouse Red Cells Infected with Plasmodium berghei. *J. Cell Sci.* **69**, 313-317.

31. Sirawaraporn, W. and Yuthavong, Y (1984) Kinetic and Molecular Properties of Dihydrofolate Reductase from Pyrimethamine-Resistant *Plasmodium chabaudi.* *Mol. Biochem. Parasitol.* **10**, 355-367.

32. Rochanakij, S., Thebtaranonth, Y., Yenjai, C. and Yuthavong, Y. (1985) Nimbolide, a Constituent of *Azadirachta indica*, Inhibits *Plasmodium falciparum* in Culture. *Southeast Asian J. Trop. Med. Pub. Hlth.* **16**, 66-72.

33. Bray, D. H., Connolly, J. D., Peters, W., Phillipson, J. D., Robinson, B. L., Vella, A., Thebtaranonth, Y., Warhurst, D. C. and Yuthavong, Y. (1985) Antimalarial Activity of Some Limonoids. *Trans. Roy. Soc. Trop. Med. Hyg.* **79**, 426.

34. Yuthavong, Y. (1985) Alterations of Erythrocyte Membrane in Malarial Infection. *J. Sci. Soc. Thailand* 11, 56-65.

35. Yuthavong, Y., Panijpan, B., Ruenwongsa, P. and Sirawaraporn, W. (1985) Biochemical Aspects of Drug Action and Resistance in Malaria Parasites. *Southeast Asian J. Trop. Med. Pub. Hlth.* **16**, 459-472.

36. Krungkrai, J., Yuthavong, Y. and Webster, H. K. (1985) Guanosine Triphosphate Cyclohydrolase in Plasmodium falciparum and Other Plasmodium Species. *Mol. Biochem. Parasitol.* **17**, 265-276.

37. Wilairat, P., Tirawanchai, N., Intapruk, C.,Tungpradabkul, S., Sertsrivanich, R., Panyim, S. and Yuthavong, Y. (1985) Recombinant DNA Techniques as Potential Diagnostic Means. *Annali dell Instituto Superiore di Sanita***21**, 299-306.

38. Tripatara, A. and Yuthavong, Y. (1986) Effects of Inhibitors on Glucose Transport in Malaria (*Plasmodium berghei*)-Infected Erythrocytes. I*nt. J. Parasitol.* **16**, 441-446.

39. Chaimanee, P. and Yuthavong, Y. (1986) Characteristics of Membrane Protein Phosphorylation in *Plasmodium berghei*-Infected Mouse Erythrocytes. *J. Protozool.* **33**, 446-454.

40. Sirawaraporn, W. and Yuthavong, Y. (1986) Potentiating Effect of Pyrimethamine and Sulfadoxine against Dihydrofolate Reductase from Pyrimethamine-Sensitive and Pyrimethamine-Resistant *Plasmodium chabaudi*. *Antimicrob. Ag. Chemother.* **29**, 899-905.

41. Bunyaratvej, A., Butthep, P., Yuthavong, Y., Fucharoen, S., Khusmith, S., Yoksan, S. and Wasi, P. (1986) Increased Phagocytosis of *P. falciparum*-Infected Erythrocytes with Haemoglobin E. *Acta Haematol.* **76**, 155-158.

42. Yuthavong, Y. (1986) The Interaction between the Malaria Parasite and the Red Cell Membrane. *Southeast Asian J. Trop. Med. Pub. Hlth.***17**, 635-641.

43. Krungkrai, S. R., and Yuthavong, Y. (1987) The Antimalarial Action of Qinghaosu and Artesunate in Combination with Agents Which Modulate Oxidant Stress on *Plasmodium falciparum*. *Trans. Roy. Soc. Trop. Med. Hyg.* **81**,710-714.

44. Krungkrai, J., Yuthavong, Y. and Webster, H. K. (1987) A High Performance Liquid Chromatography Assay for Pteroylpolyglutamate Hydrolase. *J. Chromatog. Biomed. App.* **417**, 47-56.

45. Yuthavong, Y. and Limpaiboon, T. (1987) Relationship of Phosphorylation of Membrane Proteins with Osmotic Fragility and Filterability of *Plasmodium berghei*-Infected Mouse Erythrocytes. *Biochim. Biophys. Acta* **929**, 278-287.

46. Chaimanee, P. and Yuthavong, Y. (1987) Characterization of Phosphorylated Proteins in Malaria Infected Erythrocytes. In *Current Trends in Life Sciences, XIII. Biomembranes: Structure, Biogenesis and Transport*, Today and Tomorrow's Publishers, New Delhi, pp. 77-81.

47. Yuthavong, Y. (1987) Molecular Biology of Antimalarials from Natural Products. In *Natural Products with Antimalarial Potential*, Mahidol University, Bangkok, pp. 71-80 (in Thai).

48. Yuthavong, Y., Butthep, P., Bunyaratvej, S. and Fucharoen, S. (1987) Inhibitory Effect of 0-Thalassaemia/Haemoglobin E Erythrocytes on *P. falciparum* growth In Vitro. *Trans. Roy. Soc. Trop. Med. Hyg.* **81**, 903-906.

49. Prapunwattana, P., O'Sullivan, W. J. and Yuthavong, Y. (1988) Depression of *Plasmodium falciparum* Dihydroorotate Dehydrogenase Activity in In Vitro Culture by Tetracycline. *Mol. Biochem. Parasitol.* **27**, 119-124.

50. Yuthavong, Y., Butthep. P., Bunyaratvej, A., Fucharoen, S. and Khusmith, S. (1988) Impaired Parasite Growth and Increased Susceptibility to Phagocytosis of *P. falciparum*-Infected a-Thalassemia and/or Hemoglobin Constant Spring Erythrocytes. *Am. J. Clin. Pathol.* **89**, 521-525.

51. Vanderkooi, G., Prapunwattana, P. and Yuthavong, Y. (1988) Evidence for Electrogenic Accumulation of Mefloquine by Malarial Parasites. *Biochem. Pharmacol.* **37**, 3623-3631.

52. Krungkrai, J., Webster, H. K. and Yuthavong, Y. (1989) De Novo and Salvage Biosynthesis of Pteroyl Pentaglutamates in the Human Malaria Parasite, *Plasmodium falciparum*. *Mol. Biochem. Parasitol.* **32**, 25-38.

53. Krungkrai, J., Webster, H. K. and Yuthavong, Y. (1989) Characterization of Cobalamin-Dependent Methionine Synthase Purified fron the Human Malaria Parasite, *Plasmodium falciparum*. *Parasitol. Res.* **75**, 512-517.

54. Krungkrai, J., Webster, H. K. and Yuthavong, Y. (1989) A High-Performance Liquid Chromatographic Assay for Thymidylate Synthase from Human Malaria Parasite, *Plasmodium falciparum*. *J. Chromatog. Biomed. App.* **487**, 51-59.

55. Yuthavong, Y, Butthep, P., Bunyaratvej, A. and Fucharoen, S. (1989) Decreased Sensitivity to Artesunate and Chloroquine of *Plasmodium falciparum* Infecting Hemoglobin H and/or Hemoglobin Constant Spring Erythrocytes. *J Clin. Invest.* **83**, 502-505.

56. Kiatfuengfoo, R., Suthipongchai, T., Prapunwattana, P. and Yuthavong, Y. (1989) Mitochondria as the Site of Action of Tetracycline on *Plasmodium falciparum. Mol. Biochem. Parasitol.* **34***,* 109-116.

57. Kamchonwongpaisan, S., Bunyaratvej, A., Wanachiwanawin, W. and Yuthavong, Y. (1989) Susceptibility to Hydrogen Peroxide of *Plasmodium falciparum* Infecting Glucose 6-Phosphate Dehydrogenase-Deficient Erythrocytes. *Parasitology* **99**, 171-174.

58. Yuthavong, Y., Bunyaratvej, A., and Kamchonwongpaisan, S. (1990) Increased Susceptibility of Malaria-Infected Variant Erythrocytes to Mononuclear Phagocyte System. *Blood Cells***16**, 591-597.

59. Sirawaraporn, W., Sirawaraporn, R., Cowman, A. F., Yuthavong, Y. and Santi, D. V. (1990) Heterologous Expression of Active Thymidylate Synthase-Dihydrofolate Reductase from Plasmodium falciparum. *Biochemistry* **29**, 10779-10785.

60. Krungkrai, J., Webster, H. K. and Yuthavong, Y. (1990) Folate and Cobalamin Metabolism in *Plasmodium falciparum. Parasitol. Today* **6**, 388-391.

61. Myint-Oo, Yuthavong, Y. and O'Sullivan, W. J. (1991) Malaria in South-East Asia. *Today's Life Sci.* **3(7)**, 42-46

62. Sae-Ung, N., Bunyaratvej, A., Fucharoen, S. and Yuthavong, Y. (1992) Reduced Deformability and *Plasmodium falciparum* Invasion of Thalassemic Erythrocytes and Erythrocytes with Abnormal Hemoglobins. *Blood* **79**, 2460-2463.

63. Kamchonwongpaisan,S., Vanitcharoen, N. and Yuthavong, Y. (1992) The Mechanism of Antimalarial Action of Artemisinin (Qinghaosu). In *Lipid-Soluble Antioxidants: Biochemistry and Clinical Applications.* Ong, A. SA. H. and Packer, L. (eds), Birkhauser-Verlag, Basel, pp. 363-372.

64. Pookanjanatavip, M., Yuthavong, Y., Greene, P. J. and Santi, D. V. (1992) Subunit Complementation of Thymidylate Synthase. *Biochemistry***31**, 10303-10309

65. Ittarat, I., Webster, H. K. and Yuthavong, Y. (1992) High-Performance Liquid Chromatographic Determination of Dihydroorotate Dehydrogenase of Plasmodium falciparum and Effects of Antimalarials on Enzyme Activity. *J. Chromatog. Biomed. App.***582**, 57-64

66. Meshnick, S. R., Yang, Y.-Z., Lima, V., Kuypers, F., Kamchonwongpaisan, S. and Yuthavong, Y. (1993) Iron-Dependent Free Radical Generation from the Antimalarial Agent Artemisinin (Qinghaosu). *Antimicrob. Ag. Chemother.* **37**, 1108-1114

67. Yuthavong, Y. and Wilairat, P. (1993) Protection against Malaria by Thalassaemia and Haemoglobin Variants. *Parasitol. Today* **9**, 241-245

68. Sirawaraporn, W., Prapunwattana, P., Yuthavong, Y. and Santi, D. V. (1993) The Dihydrofolate Reductase Domain of *Plasmodium falciparum* Thymidylate Synthase-Dihydrofolate Reductase: Gene Synthesis, Expression, and Anti-folate Resistant Mutants. *J. Biol. Chem.* **268**, 21637-21644.

69. Asawamahasakda, W. and Yuthavong, Y. (1993) The Methionine Synthesis Cycle and Salvage of Methyltetrahydrofolate from Host Red Cells in the Malaria Parasite (*Plasmodium falciparum*). *Parasitology.***107**, 1-10.

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73. Kamchonwongpaisan, S., Paitayatat, S., Thebtaranonth, Y., Wilairat, P. and Yuthavong, Y. (1995) Mechanism-Based Development of New Antimalarials: Synthesis of Derivatives of Artemisinin Attached to Iron Chelators. *J. Med. Chem.* **38**, 2311-2316.

74. Yuthavong, Y. (1996) The Malarial Folate Pathway and Molecular Targets for Antimalarial Development. *J. Sci. Soc. Thailand* **22**, 181-186.

75. Prapunwattana, P., Sirawaraporn, W., Yuthavong, Y. and Santi, D.V. (1996) Chemical Synthesis of the Plasmodium falciparum Dihydrofolate reductase-Thymidylate Synthase Gene. *Mol. Biochem. Parasitol.* **83**, 93-106.

76. Sirawaraporn, W., Sathitkul, T., Sirawaraporn, R., Yuthavong, Y. and Santi, D.V. (1997) Antifolate-Resistant Mutants of *Plasmodium falciparum* Dihydrofolate Reductase. *Proc. Nat. Acad. Sci. USA* **94**, 1124-1129.

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79. Bunyaratvej, A., Butthep, P., Kaewkettong, P. and Yuthavong, Y. (1997) Malaria Protection in Hereditary Ovalocytosis: Relation to Red Cell Deformability, Red Cell Parameters and Degree of Ovalocytosis. *Southeast Asian J. Trop. Med. Pub. Health* **28 Suppl 3**, 38-42.

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