Geoff McFadden: 20 most significant papers

[**IF**= journal impact factor] [**C** = times cited as at June 30th 2009]

[8]. McFadden, G.I. and M. Melkonian, (1986) Use of HEPES buffer for algal culture media and electron microscopy. *Phycologia*. **25**: 551-557. [IF 1.6] [C 111]

Methods paper that stimulated widespread use of improved electron microscopic technique. More than 100 citations.

[15]. McFadden, G.I., D. Schulze, B. Surek, J.L. Salisbury, and M. Melkonian, (1987) Basal body reorientation mediated by Ca^{++}-modulated contractile protein. *J Cell Biol*. **105**: 903-912. [IF 11.6] [C 110]

First identified role for centrin protein, a core protein in centrioles/centrosomes, which are keystone structures in the eukaryotic cell

[44]. McFadden, G.I., P.R. Gilson, C.J.B. Hofmann, G.J. Adcock, and U.G. Maier, (1994) Evidence that an amoeba acquired a chloroplast by retaining part of an engulfed eukaryotic alga. *Proc. Natl Acad. Sci. USA*. **91**: 3690-3694. [IF 10.4] [C 83]

First molecular examination of green algal secondary endosymbiosis. Demonstrates how an amoeba cannibalized a green alga to acquire a plastid. Launched chlorarachniophyte as an important model for secondary endosymbiotic acquisition of plastids

[54]. Gilson, P.R. and G.I. McFadden, (1996) The miniaturized nuclear genome of a eukaryotic endosymbiont contains genes that overlap, genes that are cotranscribed, and the smallest known spliceosomal introns. *Proc. Natl Acad. Sci. USA*. **93**: 7737-7742. [IF 10.4] [C 79]

First sequence data from the endosymbiont nucleus in this important model for secondary endosymbiotic acquisition of plastids. Identified smallest ever introns.

[55]. McFadden, G.I., M.E. Reith, J. Munholland, and N. Lang-Unnasch, (1996) Plastid in human parasites. *Nature*. **381**: 482. [IF 30.9] [C 200]

First paper to identify the relict plastid of malaria parasites. Proposed herbicides as potential antimalarials.

[74]. Waller, R.F., P.J. Keeling, R.G.K. Donald, B. Striepen, E. Handman, N. Langunnasch, A.F. Cowman, G.S. Besra, D.S. Roos, and G.I. McFadden, (1998) Nuclear-encoded proteins target to the plastid in *Toxoplasma gondii* and *Plasmodium falciparum. Proc. Natl Acad. Sci. USA*. **95**: 12352-12357. [IF 10.4] [C 361]

First identification of targeting of nuclear encoded gene products to the relict plastid of human parasites. Fatty acid biosynthesis first identified function of the relict plastid. New drug discovered that targets fatty acid biosynthesis. First new drug to emerge from the malaria genome project.

[75]. Durnford, D.G., J.A. Deane, S. Tan, G.I. McFadden, E. Gantt, and B.R. Green, (1999) A phylogenetic assessment of the eukaryotic light-harvesting antenna proteins, with implications for plastid evolution. *J. Mol. Evol.* **48**: 59-68. [IF 2.7] [C 117]

First evolutionary analysis of chlorophyll binding proteins, a keystone of photosynthesis, in all major groups of plants and algae. More than 100 citations.

[78]. Keeling, P.J., J.D. Palmer, R.G.K. Donald, D.S. Roos, R.F. Waller, and G.I. McFadden, (1999) Shikimate pathway in apicomplexan parasites. *Nature*. **397**: 219-220. [IF 30.9] [C 33]

Rebutted the suggestion that malaria parasite plastid harbours a shikimate pathway and provided evidence that the pathway is cytosolic. Rationalised the poor efficacy of herbicides like RoundUp™ and Zero™ against malaria parasites.

[83]. McFadden, G.I. and D.S. Roos, (1999) Apicomplexan plastids as drug targets. *Trends Microbiol.* **6**: 328-333. [IF 7.7] [C 110]

Review of drug action against the recently discovered relict chloroplast of malaria parasites. Detailed examination of target genes, possible modes of action and therapeutic potential.

[86]. Beech, P.L., T. Nheu, T. Schultz, S. Herbert, T. Lithgow, P.R. Gilson, and G.I. McFadden, (2000) Mitochondrial FtsZ in a chromophyte alga. *Science*. **287**: 1276-1279. [IF 29.7] [C 101]

First proof that mitochondria utilise bacterial division machinery to divide. Demonstrated that division of human and yeast mitochondria is highly derived process

[92]. Waller, R.F., M.B. Reed, A.F. Cowman, and G.I. McFadden, (2000) Protein trafficking to the plastid of *Plasmodium falciparum* is via the secretory pathway. *Embo J.* **19**: 1794-802. [IF 8.7] [C 214]

First characterisation of the two-step mode of protein targeting to the relict plastid of malaria parasites. First use of GFP in human malaria parasite.

[107]. Gardner, M.J., N. Hall, E. Fung, O. White, M. Berriman, R.W. Hyman, J.M. Carlton, A. Pain, K.E. Nelson, S. Bowman, I.T. Paulsen, K. James, J.A. Eisen, K. Rutherford, S.L. Salzberg, A. Craig, S. Kyes, M.S. Chan, V. Nene, S.J. Shallom, B. Suh, J. Peterson, S. Angiuoli, M. Pertea, J. Allen, J. Selengut, D.

Haft, M.W. Mather, A.B. Vaidya, D.M. Martin, A.H. Fairlamb, M.J. Fraunholz, D.S. Roos, S.A. Ralph, G.I. McFadden, L.M. Cummings, G.M. Subramanian, C. Mungall, J.C. Venter, D.J. Carucci, S.L. Hoffman, C. Newbold, R.W. Davis, C.M. Fraser, and B. Barrell, (2002) Genome sequence of the human malaria parasite *Plasmodium falciparum. Nature*. **419**: 498-511. [IF 30.9] [C 1,356]

Landmark paper in malaria research. My lab comprises two of 45 authors but we had two sentences in the abstract, a figure and were responsible for annotating 500 of the 5,600 genes.

[114]. Foth, B.J., S.A. Ralph, C.J. Tonkin, N.S. Struck, M. Fraunholz, D.S. Roos, A.F. Cowman, and G.I. McFadden, (2003) Dissecting apicoplast targeting in the malaria parasite *Plasmodium falciparum. Science*. **299**: 705-8. [IF 29.7] [C 149]

First combination of bioinformatics and strategic in vivo point mutagenesis to examine how leader sequences target proteins to the relict plastid of malaria parasite. Featured in textbook Discovering Genomics, Proteomics and Bioinformatics 2nd ed. (Campbell AM and Heyer LJ 2006)

[117]. Waller, R.F., P.J. Keeling, G.G. van Dooren, and G.I. McFadden, (2003) A green algal apicoplast ancestor. *Science*. **301**: 49. [IF 29.7] [C 35]

Debunked the prominently published notion that the malaria parasite plastid arose from a green algal endosymbiont. Presented evidence for a red algal origin.

[123]. Ralph, S.A., G.G. van Dooren, R.F. Waller, M.J. Crawford|, M. Fraunholz, B.F. Foth, C.J. Tonkin, D.S. Roos, and G.I. McFadden, (2004) Metabolic maps and functions of the *Plasmodium falciparum* apicoplast. *Nature Reviews Microbiol*. **2**: 203-216. [IF 15.0] [C 168]

Assembles a comprehensive model of metabolic pathways in the relict plastid of malaria parasites from the genome data and targeting knowledge. Exceptional impact in short time frame.

[124]. Tonkin, C.J., G.G. Van Dooren, T.P. Spurck, N.S. Struck, R.T. Good, E. Handman, A.F. Cowman, and G.I. McFadden, (2004) Localization of organellar proteins in *Plasmodium falciparum* using a novel set of transfection vectors and a new immunofluorescence fixation method. *Mol Biochem Parasitol*. **137**: 13-21. [IF 2.8] [C 78]

Introduced new microscopy technology that is now almost universally adopted in malaria research. Top 10 cited article for Mol Biochem. Parasitology in 2006. Cover illustration.

[133]. Gilson, P.R., V. Su, C.H. Slamovits, M.E. Reith, P.J. Keeling, and G.I. McFadden, (2006) Complete nucleotide sequence of the chlorarachniophyte

nucleomorph: Nature's smallest nucleus. *Proc Natl Acad Sci U S A*. **103**: 9566-71. [IF 10.4] [C 45]

Reports genome of the remnant nucleus of a secondary endosymbiont. Examines reasons for endosymbiont nucleus retention and principles of genome reduction. Attracted a commentary in PNAS and news coverage in Nature and Science.

[134]. Mullin, K.A., L. Lim, S.A. Ralph, T.P. Spurck, E. Handman, and G.I. McFadden, (2006) Membrane transporters in the relict plastid of malaria parasites. *Proc Natl Acad Sci U S A*. **103**: 9572-7. [IF 10.4] [C 21]

Identifies first proteins in secondary plastid membrane and the engine of the apicoplast. Connects blood glucose via parasite glycolysis to apicoplast carbon, energy and reducing power pathways.

[135]. Saliba, K.J., R.E. Martin, A. Broer, R.I. Henry, C.S. McCarthy, M.J. Downie, R.J. Allen, K.A. Mullin, G.I. McFadden, S. Broer, and K. Kirk, (2006) Sodium-dependent uptake of inorganic phosphate by the intracellular malaria parasite. *Nature*. **443**: 582-5. [IF 30.9] [C 16]

Identifies parasite's transporter for acquiring the essential nutrient phosphate. Combines bioinformatics, transporter characterization & localization by molecular genetic tagging to resolve the mystery of how parasites exploit the host to steal nutrients.

[159]. Tonkin, C.J., B.J. Foth, S.A. Ralph, N. Struck, A.F. Cowman, and G.I. McFadden, (2008) Evolution of malaria parasite plastid targeting sequences. *Proc Natl Acad Sci U S A*. **105**: 4781-5. [IF 10.4] [C 1]

Used computer algorithm to generate artificial targeting peptides for which genes were synthesised and tested in parasites. The key point of our findings is that the order of amino acids and peptides mediating import of proteins into the plastid of malaria parasites is not important, only the overall content.