

## Journal Publications

- McClain, W.H. and Champe, S.P. (1967) Detection of a peptide determined by the *rIIB* cistron of phage T4. Proc. Natl. Acad. Sci. USA, **58**: 1182-1188
- McClain, W.H. and Champe, S.P. (1970) Genetic alterations of the *rIIB* cistron polypeptide of phage T4. Genetics, **66**: 11-21
- McClain, W.H. (1970) UAG suppressor coded by bacteriophage T4. FEBS Lett., **6**: 99-101
- McClain, W.H., Marchin, G.L. and Neidhardt, F.C. (1971) Phage induced conversion of host valyl-tRNA synthetase. In Ciba Symposium: Strategy of the Viral Genome. Churchill, London. pp. 191-201
- McClain, W.H., Guthrie, C. and Barrell, B.G. (1972) Eight transfer RNAs induced by infection of *Escherichia coli* with bacteriophage T4. Proc. Natl. Acad. Sci. USA, **69**: 3703-3707
- McClain, W.H., Guthrie, C. and Barrell, B.G. (1973) The *psu<sub>1</sub>* amber suppressor gene of bacteriophage T4: Identification of its amino acid and transfer RNA. J. Mol. Biol., **81**: 157-171
- Barrell, B.G., Coulson, A.R. and McClain, W.H. (1973) Nucleotide sequence of a glycine transfer RNA coded by bacteriophage T4. FEBS Lett., **37**: 64-69
- Guthrie, C. and McClain, W.H. (1973) Conditionally lethal mutants of bacteriophage T4 defective in production of a transfer RNA. J. Mol. Biol., **81**: 137-155
- Guthrie, C., Seidman, J.G., Altman, S., Barrell, B.G., Smith, J.D. and McClain, W.H. (1973) Identification of transfer RNA precursor molecules made by bacteriophage T4. Nature New Bio., **246**: 6-11
- Barrell, B.G., Seidman, J.G., Guthrie, C. and McClain, W.H. (1974) Transfer RNA biosynthesis: The nucleotide sequence of a precursor to serine and proline transfer RNAs. Proc. Natl. Acad. Sci. USA, **71**: 410-416
- Deutscher, M.P., Foulds, J. and McClain, W.H. (1974) Transfer ribonucleic acid nucleotidyltransferase plays an essential role in the normal growth of *Escherichia coli* and in the biosynthesis of some bacteriophage T4 transfer ribonucleic acids. J. Biol. Chem., **249**: 6696-6699
- Seidman, J.G., Comer, M.M. and McClain, W.H. (1974) Nucleotide alterations in the bacteriophage T4 glutamine transfer RNA that affect ochre suppressor activity. J. Mol. Biol., **90**: 677-689

- Comer, M.M., Guthrie, C. and McClain, W.H. (1974) An ochre suppressor of bacteriophage T4 that is associated with a transfer RNA. *J. Mol. Biol.*, **90**: 665-676
- Guthrie, C., Seidman, J.G., Comer, M.M., Bock, R.M., Schmidt, F.J., Barrell, B.G. and McClain, W.H. (1974) The biology of bacteriophage T4 transfer RNAs. In *Processing of RNA. Brookhaven Symposia in Biology*, **26**: 106-123
- McClain, W.H., Marchin, G.M., Neidhardt, F.C., Chace, K.V., Rementer, M.L. and Hall, D.H. (1975) A gene of bacteriophage T4 controlling the modification of host valyl-tRNA synthetase. *Virology*, **67**: 385-394
- Comer, M.M., Foss, K. and McClain, W.H. (1975) A mutation of the wobble nucleotide of a bacteriophage T4 transfer RNA. *J. Mol. Biol.*, **99**: 283-293
- Schmidt, F.J. (1975) A novel function of *Escherichia coli* transfer RNA nucleotidyltransferase. *J. Biol. Chem.*, **250**: 8399-8403
- Schmidt, F. J., Seidman, J.G. and Bock, R.M. (1975) Transfer ribonucleic acid biosynthesis. Substrate specificity of Ribonuclease P. *J. Biol. Chem.* **251**: 2440-2445
- Seidman, J.G. and McClain, W.H. (1975) Three steps in conversion of large precursor RNA into serine and proline transfer RNAs. *Proc. Natl. Acad. Sci. USA*, **72**: 1491-1495
- Seidman, J.G., Schmidt, F.J., Foss, K. and McClain, W.H. (1975) A mutant of *Escherichia coli* defective in removing 3' terminal nucleotides from some transfer RNA precursor molecules. *Cell*, **5**: 389-400
- McClain, W.H. and Seidman, J.G. (1975) Genetic perturbations that reveal tertiary conformation of tRNA precursor molecules. *Nature*, **257**: 106-110
- Seidman, J.G., Barrell, B.G. and McClain, W.H. (1975) Five steps in the conversion of a large precursor RNA into bacteriophage proline and serine transfer RNAs. APPENDIX: Sequence derivation of bacteriophage T4 proline transfer RNA. *J. Mol. Biol.*, **99**: 733-760
- McClain, W.H., Barrell, B.G. and Seidman, J.G. (1975) Nucleotide alterations in bacteriophage T4 serine transfer RNA that affect the conversion of precursor RNA into transfer RNA. *J. Mol. Biol.*, **99**: 717-732
- Mazzara, G.P. and McClain, W.H. (1977) Cysteine transfer RNA of *Escherichia coli*: nucleotide sequence and unusual metabolic properties of the 3' C-C-A terminus. *J. Mol. Biol.*, **117**: 1061-1079

- McClain, W.H. (1977) Seven terminal steps in a biosynthetic pathway leading from DNA to transfer RNA. *Acc. Chem. Res.*, **10**: 418-425
- Kao, S.-H. and McClain, W.H. (1977) U-G-A suppressor of bacteriophage T4 associated with arginine transfer RNA. *J. Biol. Chem.*, **252**: 8254-8257
- Mazzara, G.P., Seidman, J.G., McClain, W.H., Yesian, H., Abelson, J. and Guthrie, C. (1977) Nucleotide sequence of an arginine transfer ribonucleic acid from bacteriophage T4. *J. Biol. Chem.*, **252**: 8245-8253
- McClain, W.H., Seidman, J.G. and Schmidt, F.J. (1978) Evolution of the biosynthesis of 3'-terminal C-C-A residues in T-even bacteriophage transfer RNAs. *J. Mol. Biol.*, **119**: 519-536
- Schmidt, F.J. and McClain, W.H. (1978) An *Escherichia coli* ribonuclease which removes an extra nucleotide from a biosynthetic intermediate of bacteriophage T4 proline transfer RNA. *Nucl. Acids Res.*, **5**: 4129-4140
- Moen, T.L., Seidman, J.G. and McClain, W.H. (1978) A catalogue of transfer RNA-like molecules synthesized following infection of *E. coli* by T-even bacteriophages. *J. Biol. Chem.*, **253**: 7910-7917
- Schmidt, F.J. and McClain, W.H. (1978) Transfer RNA biosynthesis: alternate orders of ribonuclease P cleavage occur *in vitro* but not *in vivo*. *J. Biol. Chem.*, **253**: 4730-4738
- Foss, K., Kao, S.-H. and McClain, W.H. (1979) Three suppressor forms of bacteriophage T4 leucine transfer RNA. *J. Mol. Biol.*, **135**: 1013-1021
- Guthrie, C. and McClain, W.H. (1979) Rare transfer ribonucleic acid essential for phage growth. Nucleotide sequence comparison of normal and mutant T4 isoleucine-accepting transfer ribonucleic acid. *Biochemistry* **18**: 3786-3795
- McClain, W.H. (1979) A role for ribonuclease III in the synthesis of bacteriophage T4 transfer RNAs. *Biochem. Biophys. Res. Commun.*, **86**: 718-724
- Mazzara, G.P., Plunkett, G. III and McClain, W.H. (1980) Maturation events leading to transfer RNA and ribosomal RNA. pp. 439-545. In *Cell Biology, a Comprehensive Treatise*, Vol. 3, Chapter 11, (Goldstein, L. and Prescott, D.M., eds.) Academic Press, New York.
- Mazzara, G.P. and McClain, W.H. (1980) Transfer RNA synthesis. PP. 3-27. In: *Transfer RNA, Part II: Biological Aspect* (Söll, D., Abelson, J.N. and Schimmel, P.R., eds.) Cold Spring Harbor Press.

- Kao, S.-H. and McClain, W.H. (1980) Roles of bacteriophage T4 gene 5 and gene s products in cell lysis. *J. Virol.*, **34**: 104-107
- Kao, S.-H. and McClain, W.H. (1980) A baseplate protein of bacteriophage T4 with both structural and lytic functions. *J. Virol.*, **34**: 95-103
- Robertson, H.D., Pelle, E.G. and McClain, W.H. (1980) RNA processing in an *E. coli* strain deficient in both RNase P and RNase III. PP. 107-122. In: *Transfer RNA, Part II: Biological Aspect* (Söll, D., Abelson, J.N. and Schimmel, P.R., eds.) Cold Spring Harbor Press.
- Mazzara, G.P., Plunkett, G. III and McClain, W.H. (1981) DNA sequence of the transfer RNA region of bacteriophage T4: Implications for transfer RNA synthesis. *Proc. Natl. Acad. Sci. USA*, **78**: 889-892
- Plunkett, G. III, Mazzara, G.P. and McClain, W.H. (1981) Characterization of bacteriophage T4 band D RNA, a low-molecular-weight RNA of unknown function. *Arch. Biochem. Biophys.*, **210**: 298-306
- Nicholas Jr., H.B. and Graves, S.B. (1983) Clustering of Transfer RNAs by Cell Type and Amino Acid Specificity. *J. Mol. Biol.*, **171**: 111-118
- McClain, W.H. and Foss, K. (1984) Hybrid transfer RNA genes in phage T4. *Cell*, **38**: 225-231
- Guerrier-Takada, C., McClain, W.H. and Altman, S. (1984) Cleavage of tRNA precursors by the RNA subunit of *E. coli* ribonuclease P (M1 RNA) is influenced by 3'-proximal CCA in the substrates. *Cell*, **38**: 219-224
- Atilgan, T., Nicholas Jr., H.B. and McClain, W.H. (1986) A statistical method for correlating tRNA sequence with amino acid specificity. *Nucl. Acids Res.*, **14**: 375-380
- McClain, W.H., Foss, K., Mittelstadt, K.L. and Schneider, J. (1986) Variants in clones of gene-machine-synthesized oligodeoxynucleotides. *Nucl. Acids Res.*, **14**: 6770
- McClain, W.H., Foss, K., Schneider, J., Guerrier-Takada, C. and Altman, S. (1987) A suppressor and novel mutants of phage T4 tRNA<sup>Gly</sup>. *J. Mol. Biol.*, **193**: 223-226
- Nicholas Jr., H.B., Chen, Y.-M. and McClain, W.H. (1987) Comparison of tRNA sequences. *Computer Applications in the Biosciences*, **3**: 53
- McClain, W.H. and Nicholas Jr., H.B. (1987) Differences between transfer RNA molecules. *J. Mol. Biol.*, **194**: 635-642

- Nicholas Jr., H.B. and McClain, W.H. (1987) An algorithm for discriminating sequences and its application to yeast transfer RNA. *Computer Applications in the Biosciences*, **3**: 177-181
- McClain, W.H. and Seidman, J.G. (1987) Genetic conversion of G·C base-pairs to A·U base-pairs in a transfer RNA. *J. Mol. Biol.*, **197**: 605-608
- Foss, K. and McClain, W.H. (1987) Rapid site-specific mutagenesis in plasmids. *Gene*, **59**: 285-290
- Lawrence, N., Wesolowski, D., Gold, H., Bartkiewicz, M., Guerrier-Takada, C., McClain, W.H. and Altman, S. (1987) Characteristics of RNase P in various organisms. *Cold Spring Harbor Symposia on Quantitative Biology*, **52**: 233-238
- McClain, W.H., Guerrier-Takada, C. and Altman, S. (1987) Model substrates for an RNA enzyme. *Science*, **238**: 527-530
- McClain, W.H. and Foss, K. (1988) Changing the identity of a tRNA by introducing a G·U wobble pair near the 3' acceptor end. *Science*, **240**: 793- 796
- McClain, W.H. and Foss, K. (1988) Nucleotides that contribute to the identity of *Escherichia coli* tRNA<sup>Phe</sup>. *J. Mol. Biol.*, **202**: 697-709
- McClain, W.H., Wilson, J.H. and Seidman, J.G. (1988) Genetic analysis of structure and function in phage T4 tRNA<sup>Ser</sup>. *J. Mol. Biol.*, **202**: 549-553
- McClain, W.H. (1988) Specific duplications fostered by a DNA structure containing adjacent inverted repeat sequences. *J. Mol. Biol.* **204**: 27-38. APPENDIX: McClain, W.H. and Chen, Y.-M. (1988) More duplications via adjacent inverted repeat sequences. *J. Mol. Biol.*, **204**: 38-40
- McClain, W.H. and Foss, K. (1988) Changing the acceptor identity of a transfer RNA by altering nucleotides in a "variable pocket". *Science*, **241**: 1804-1807
- McClain, W.H., Chen, Y.-M., Foss, K. and Schneider, J. (1988) Association of transfer RNA acceptor identity with a helical irregularity. *Science*, **242**: 1681- 1684
- McClain, W.H., Foss, K., Jenkins, R.A. and Schneider, J. (1990) Nucleotides that determine *Escherichia coli* tRNA<sup>Arg</sup> and tRNA<sup>Lys</sup> acceptor identities revealed by analyses of mutant opal and amber suppressor tRNAs. *Proc. Natl. Acad. Sci. USA*, **87**: 9260-9264

- McClain, W.H., Foss, K., Jenkins, R.A. and Schneider, J. (1991) Rapid determination of nucleotides that define tRNA<sup>Gly</sup> acceptor identity. Proc. Natl. Acad. Sci. USA, **88**: 6147-6151
- McClain, W.H., Foss, K., Jenkins, R.A. and Schneider, J. (1991) Four sites in the acceptor helix and one site in the variable pocket of tRNA<sup>Ala</sup> determine the molecule's acceptor identity. Proc. Natl. Acad. Sci. USA, **88**: 9272-9276
- McClain, W.H. (1993) Transfer RNA identity. Federation of American Societies for Experimental Biology, **7**: 72-78
- McClain, W.H. (1993) Identity of *Escherichia coli* tRNA<sup>Cys</sup> determined by nucleotides in three regions of tRNA tertiary structure. J. Biol. Chem., **268**: 19398-19402
- McClain, W.H. (1993) Rules that govern tRNA identity in protein synthesis. J. Mol. Biol., **234**: 257-280
- McClain, W.H., Schneider, J. and Gabriel, K. (1993) Association of tRNA<sup>Gln</sup> acceptor identity with phosphate-sugar backbone interactions observed in the crystal structure of the *Escherichia coli* glutamyl-tRNA synthetase-tRNA<sup>Gln</sup> complex. Biochimie, **75**: 1125-1136
- McClain, W.H., Schneider, J. and Gabriel, K. (1994) Distinctive acceptor-end structure and other determinants of *Escherichia coli* tRNA<sup>Pro</sup> identity. Nucl. Acids Res., **22**: 522-529
- McClain, W.H. (1995) The tRNA Identity Problem: Past, Present and Future. PP 335-347. In: Transfer RNA (Söll, D. and RajBhandary, U.L., eds.) American Society for Microbiology, Washington, D.C.
- Nicholas, Jr., H.B. and McClain, W.H. (1995) Searching tRNA sequences for relatedness to aminoacyl-tRNA synthetase families. J. Mol. Evol., **40**: 482-486
- Gabriel, K., Schneider, J. and McClain, W.H. (1996) Functional evidence for indirect recognition of G·U in tRNA<sup>Ala</sup> by alanyl-tRNA synthetase. Science, **271**: 195-197
- McClain, W.H., Schneider, J. and Gabriel, K. (1996) Specific function of a G·U wobble pair from an adjacent helical site in tRNA<sup>Ala</sup> during recognition by alanyl-tRNA synthetase. RNA, **2**: 105-109
- McClain, W.H., Schneider, J., Bhattacharya, S. and Gabriel, K. (1998) The importance of tRNA backbone-mediated interactions with synthetase for aminoacylation. Proc. Natl. Acad. Sci. USA, **95**: 460-465

- Cermakian, N., McClain, W.H. and Cedergren, R. (1998) tRNA nucleotide 47: An evolutionary enigma. *RNA*, **4**: 928-936
- McClain, William H., Gabriel, K., Bhattacharya, S., Jou, Y-Y. and Schneider, J. (1999) Functional compensation by particular nucleotide substitutions of a critical G·U wobble base pair during aminoacylation of transfer RNA. *J. Mol. Biol.*, **286**: 1025-1032
- Gabriel, K. and McClain, W.H. (1999) A set of plasmids constitutively producing different RNA levels in *Escherichia coli*. *J. Mol. Biol.*, **290**: 385-390
- McClain, W.H., Jou, Y.Y., Bhattacharya, S., Gabriel, K. and Schneider, J. (1999) The reliability of *in vivo* structure-function analysis of tRNA aminoacylation. *J. Mol. Biol.*, **290**: 391-409
- Chang, K.-Y., Varani, G., Bhattacharya, S., Choi, H. and McClain, W.H. (1999) Correlation of deformability at a tRNA recognition site and aminoacylation specificity. *Proc. Natl. Acad. Sci. USA*, **96**: 11764-11769
- Strazewski, P., Biala, E., Gabriel, K. and McClain, W.H. (1999) The relationship of thermodynamic stability at a G·U recognition site to tRNA aminoacylation specificity. *RNA*, **5**: 1490-1494
- Varani, G and McClain, W.H. (2000) The G·U wobble base pair. *EMBO Reports* **1**: 18-23
- McClain, W.H. and Gabriel, K. (2001) Construction of an *Escherichia coli* knockout strain for functional analysis of tRNA<sup>Asp</sup>. *J. Mol. Biol.* **310**: 537-542
- Gabriel, K. and McClain, W.H. (2001) Plasmid systems to study RNA function in *Escherichia coli*. *J. Mol. Biol.* **310**: 543-548
- Moulinier, L., Eiler, S., Eriani, G., Grangloff, J., Thierry, J.-C., Gabriel, K., McClain, W.H. and Moras, D. (2001) The structure of an AspRS-tRNA<sup>Asp</sup> complex reveals a tRNA dependent control mechanism. *EMBO J.* **20**: 5290- 5301
- Choi, H., Otten, S., Schneider, J. and McClain, W.H. (2002) Genetic perturbations of RNA reveal structure-based recognition in protein-RNA interaction. *J. Mol. Biol.* **324**: 573-576
- Choi, H., Otten, S. and McClain, W.H. (2002) Isolation of novel tRNA<sup>Ala</sup> mutants by library selection in a tRNA<sup>Ala</sup> knockout strain. *Biochimie* **84**: 705-711

- Choi, H., Gabriel, K., Schneider, J., Otten, S. and McClain, W. H. (2003) Recognition of acceptor-stem structure of tRNA<sup>Asp</sup> by *Escherichia coli* aspartyl-tRNA synthetase. *RNA* **9**: 386-393
- Lee, D. and McClain, W.H. (2004) Aptamer redesigned tRNA is nonfunctional and degraded in cells. *RNA* **10**: 7-11
- McClain, W.H., Gabriel, K., Lee, D. and Otten, S. (2004) Structure-function analysis of tRNA<sup>Gln</sup> in an *Escherichia coli* knockout strain. *RNA* **10**: 795-804
- McClain, W.H. (2005) tRNA aminoacylation: The crucial roles of tRNA deformability and backbone-mediated interactions by synthetase. In "The Aminoacyl-tRNA Synthetases" (Eds. M. Ibba, C. Francklyn, S. Cusack), Landes Biosciences. pp. 266-270.  
<http://www.eurekah.com/chapter.php?chapid=1283&bookid=73&catid=54>
- Mathews, M.B., Altman, S. and McClain, W.H. (2005) Hugh Dunbar Robertson (1943-2005). *RNA* **11**: 1751-1752
- McClain, W.H. (2006) Surprising contribution to aminoacylation and translation of non-Watson-Crick pairs in tRNA. *Proc. Natl. Acad. Sci. USA*, **103**: 4570- 4575
- McClain, W. H. (2010) The discovery of ribonuclease P and enzymatic activity of its RNA subunit. In "Ribonuclease P" (Eds. F. Liu and S. Altman), Springer. pp. v-ix.
- McClain, W.H., Lai, L.B. and Gopalan, V. (2010) Trials, travails and triumphs: An account of RNA catalysis in RNase P. *J. Mol. Biol.*, **397**: 627-645. doi: 10.1016/j.jmb.2010.01.038
- McClain, W. H. (2010) Discovery of a mini-RNase P in archaea. *Proc. Natl. Acad. Sci. USA*, **107**: 22371-22372