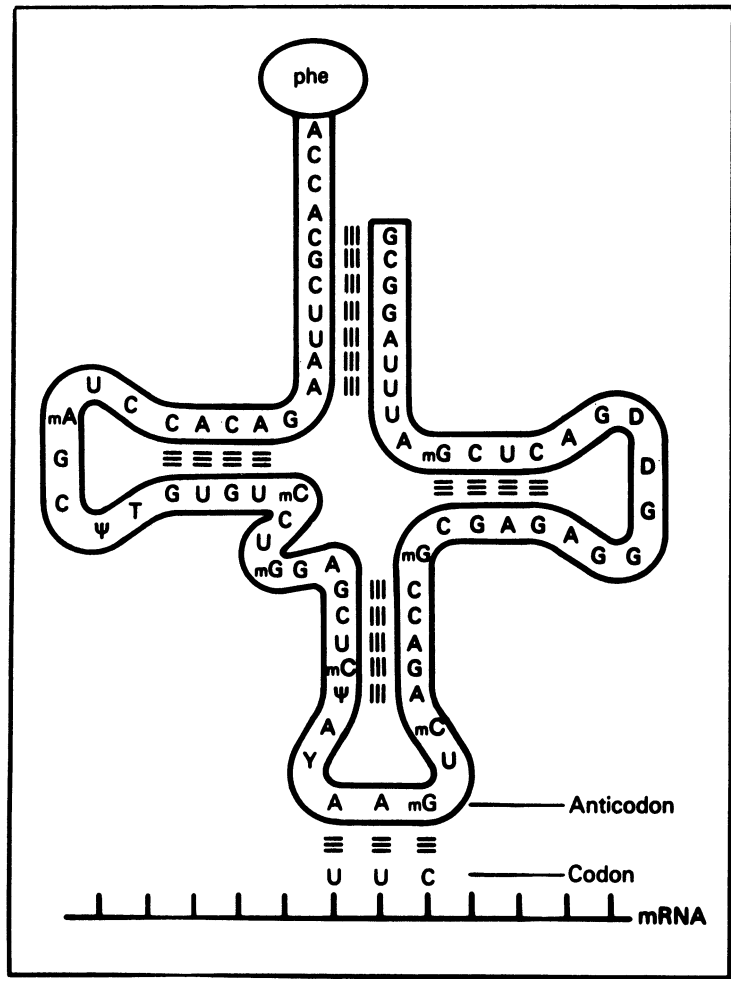

Figure 2.19. The structure of the transfer RNA (tRNA) molecule and the manner in which the anticodon of tRNA associates with the codon on mRNA by complementary base pairing. The amino acid corresponding to this codon (UUC) is phenylalanine which is bound to the opposite end of the tRNA molecule. Many tRNA molecules contain unusual bases, such as methyl cytosine (mC) and pseudouridine (ψ). (With permission, from T. D. Brock, K. M. Brock, and D. M. Ward, *Basic Microbiology with Applications*, 3d ed., Pearson Education, Upper Saddle River, NJ, 1986, p. 138.)

fers so greatly in composition from its environment, it must expend energy to maintain itself away from thermodynamic equilibrium. Thermodynamic equilibrium and death are equivalent for a cell.

All organisms except viruses contain large amounts of water (about 80%). About 50% of dry weight of cells is protein, and the proteins are largely enzymes (proteins that act as catalysts). The nucleic acid content (which contains the genetic code and machinery