



**FIGURE 3.2. Suppressor mutations** show that the universal genetic code is not constrained to be exactly as it is. **Nonsense mutations** generate stop codons that prematurely terminate translation of the protein. They can be suppressed by mutations in a transfer RNA that enables the tRNA to recognize the stop codon as an amino acid and so allow translation of the protein to be completed. In effect, these mutations have changed the genetic code. (A) Translation of the wild-type sequence is terminated by a UGA stop codon. (B) A mutation changes CAG (which coded for glutamine, Gln) to a stop codon, UAG, causing premature termination of translation. (C) A mutation in one of the transfer RNAs that codes for tyrosine (Tyr) changes the anticodon to AUC. This recognizes the UAG nonsense mutation, and so a full-length protein is produced, with tyrosine substituted for glutamine. (Recall that U in RNA corresponds to T in DNA.)