

In 1966, Crick postulated the '*wobble hypothesis*' to account for the degeneracy of genetic code. According to wobble hypothesis, the first two bases of a codon pair according to the normal base-pairing rules with the first two bases of the anticodon. Base-pairing at the third position is wobble, *i.e.*, not precise; U in the third position of anticodon may pair with A or G in the codon, G may pair with C or U, and I (inosinic acid having the base hypoxanthine) may pair with U, C or A (Table 34.2). For example, phenylalanine tRNA (tRNA^{phe}) from yeast having the anticodon AAG translates equally well the codons UUU and UUC. Similarly, a tRNA specific for alanine (tRNA^{ala}), isolated again from yeast, has the anticodon CGI, and is able to pair with the codons GCU, GCC and GCA, all the codons coding for alanine.

However, the *wobble hypothesis* can explain degeneracy only at the third position of the codon, and, at best this can account only for three codons for each amino acid. The remaining cases of degeneracy must be due to different varieties of tRNA for a single amino acid, but this type of degeneracy need not be limited to such cases only.

A scrutiny of the 64 codons reveals the following: (1) in 8 codon families all the four codons having the same first two bases code for the same amino acid, (2) in 7 codon pairs, either of the two pyrimidines at the third position has the same meaning, (3) in 5 codon pairs the same is true for the purines at the third position, and (4) in only 3 cases the particular base at the third position confers a specific meaning, *viz.*, AUG codes for methionine, UGG codes for tryptophan and UGA is a nonsense codon.

Table 34.2. The pairing behaviour at the third base of codon with the first base of the anticodon (which corresponds to the third base of the codon) according to the wobble hypothesis.

Base in the first position of the anticodon	Bases recognised in the third position of the codon
U (usually modified)	A or G
C	G only
A (usually modified)	U only
G	C or U
I	U, C or A