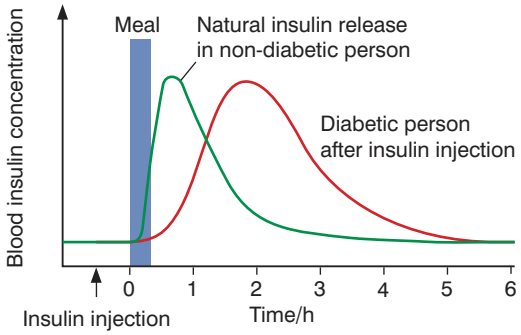


Figure 7 Insulin concentrations in the blood of a diabetic person following an insulin injection (injections also contain a slow-acting form of insulin which produces an effect for up to 12 hours; after that the insulin level falls to zero).

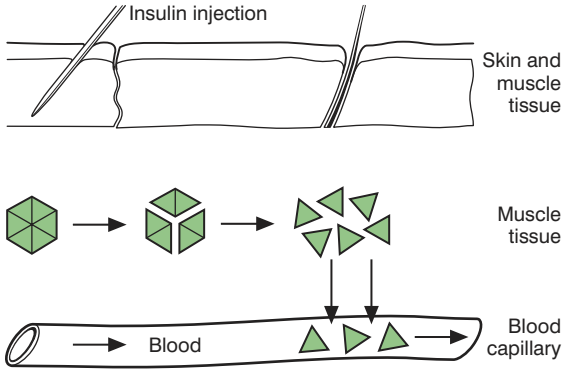


Figure 9 Injecting insulin. Although the insulin hexamers are too large to pass through the blood capillary membrane, the monomers are able to do so.

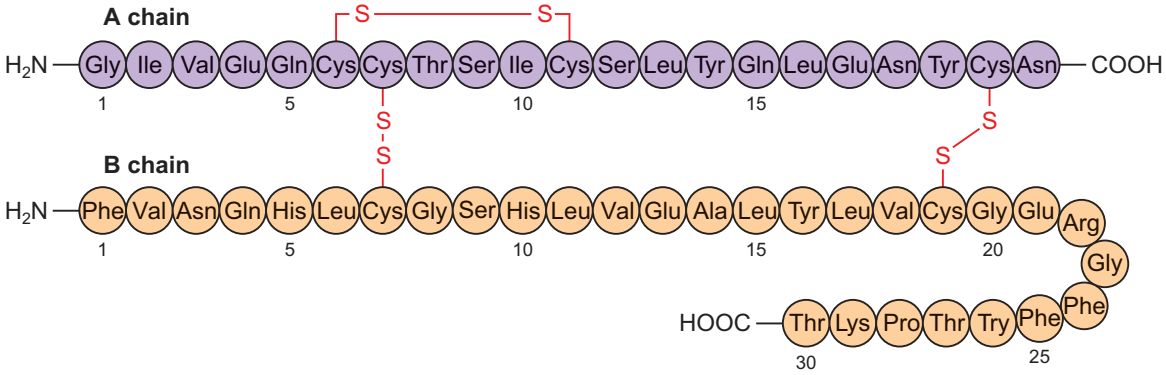


Figure 11 Human insulin. The two chains are held together by –S–S– links.

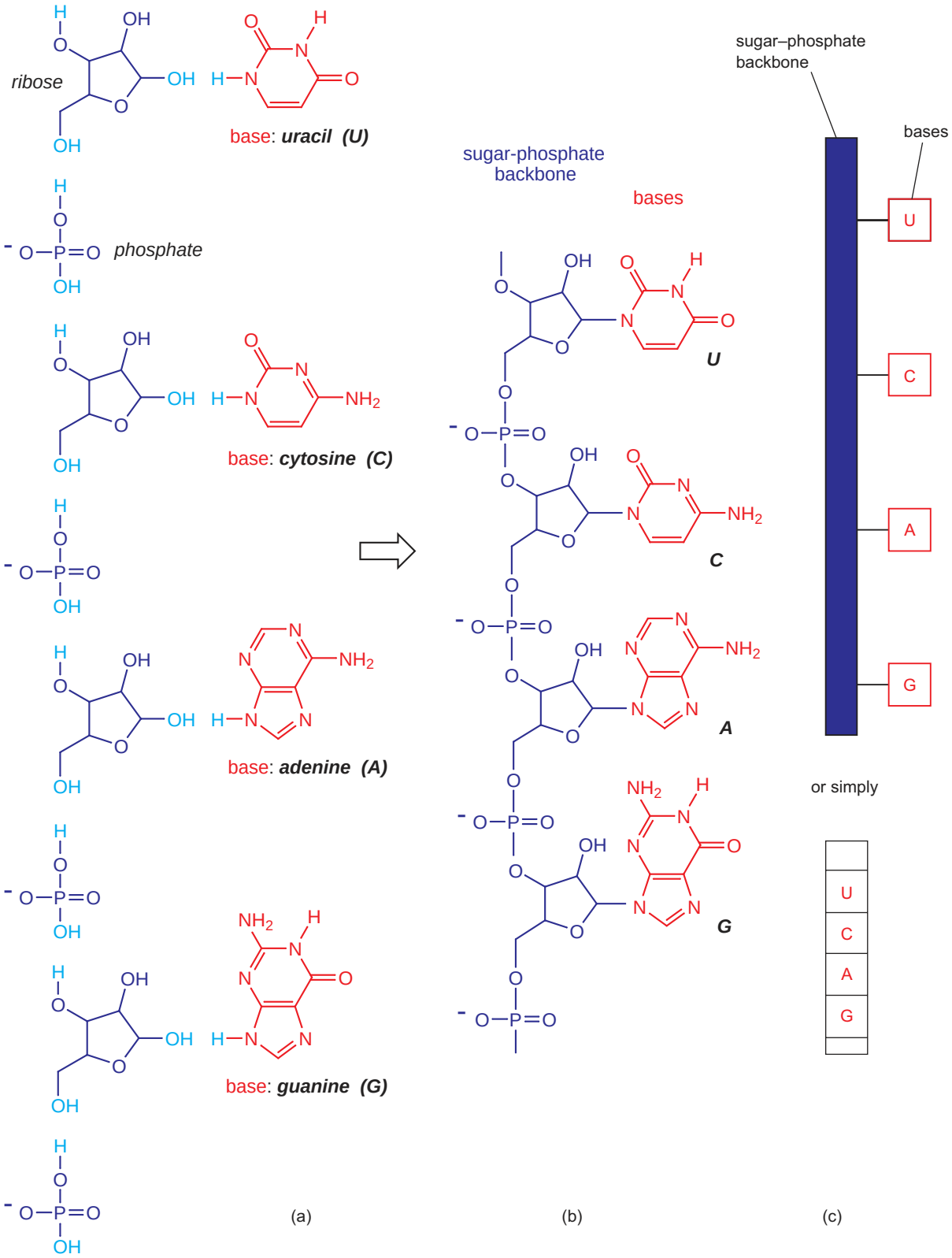


Figure 14 Representations of the structure of RNA: (a) how groups join together; (b) a skeletal formula; and (c) two simpler ways of showing the structure.

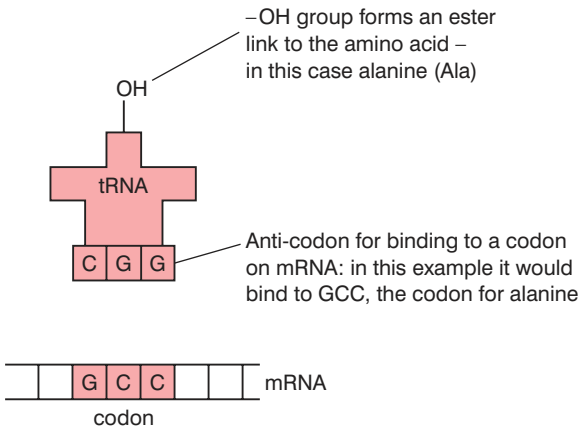


Figure 15 Schematic representation of a tRNA molecule showing the three bases which form the anti-codon.

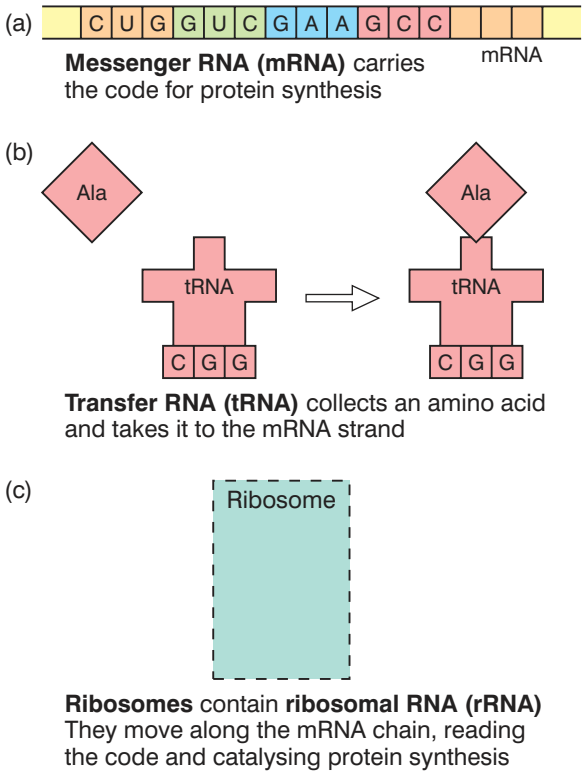


Figure 16 The roles of the different types of RNA.

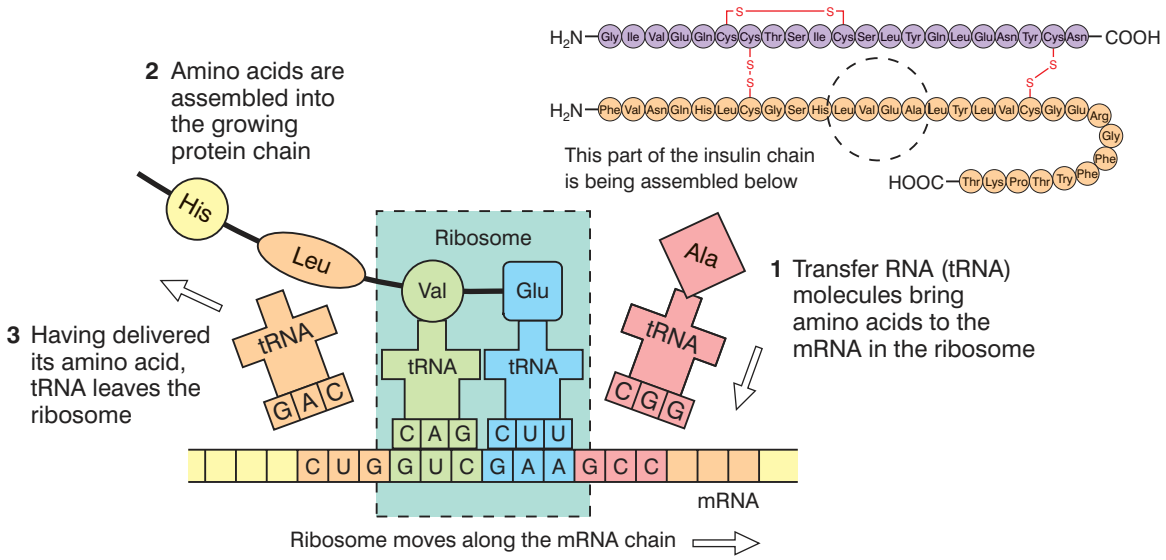


Figure 17 Protein synthesis and the reading of codons on mRNA.

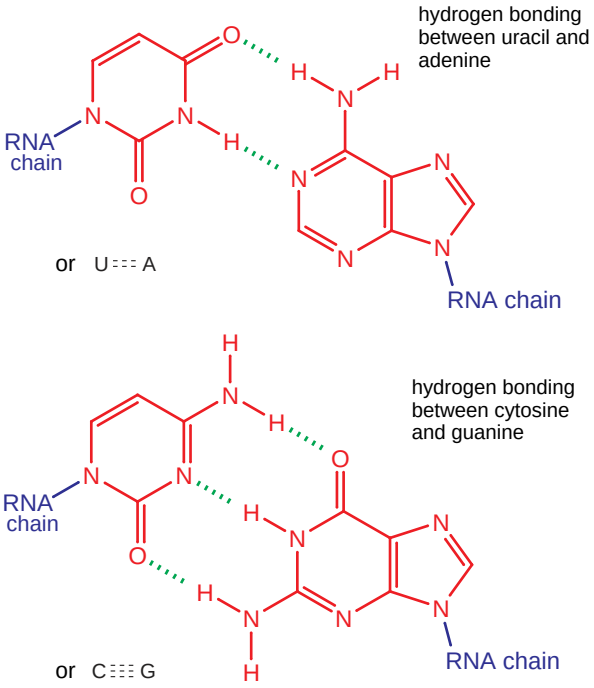


Figure 18 Molecular recognition and bases on RNA (the symbol --- is used to represent two hydrogen bonds; ≡ represents three hydrogen bonds).

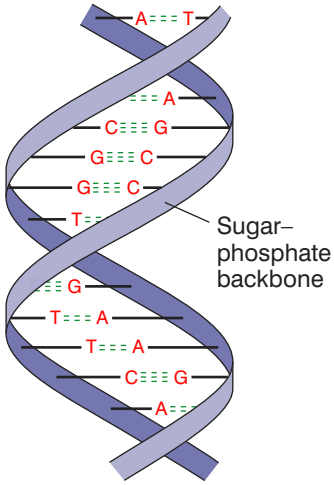


Figure 20 An illustration of the DNA double helix.

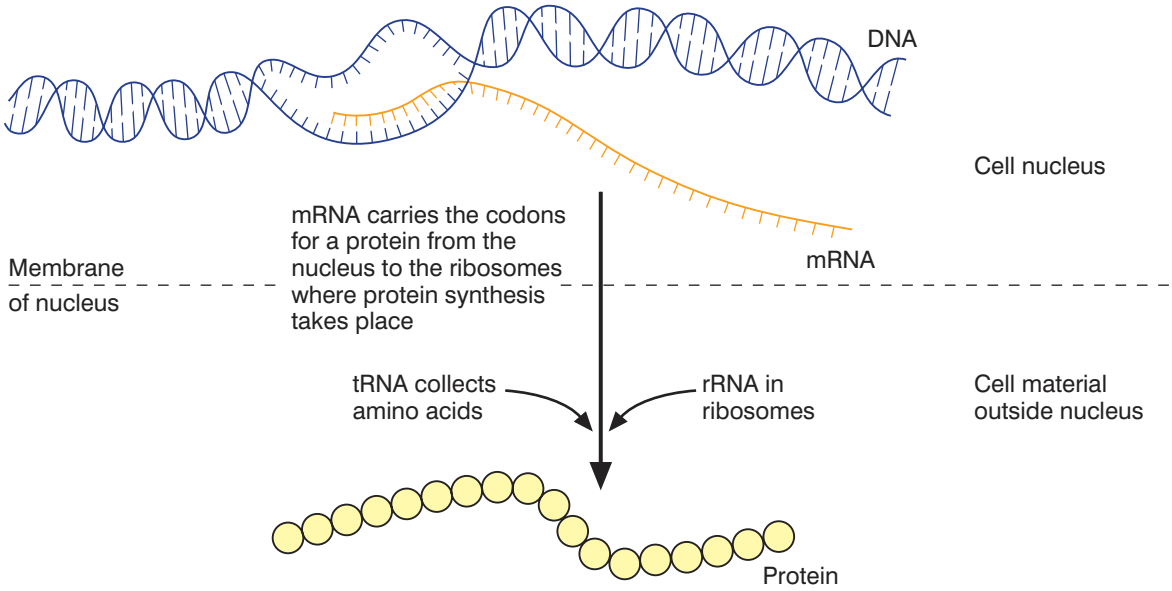


Figure 23 A summary of protein synthesis in higher organisms.

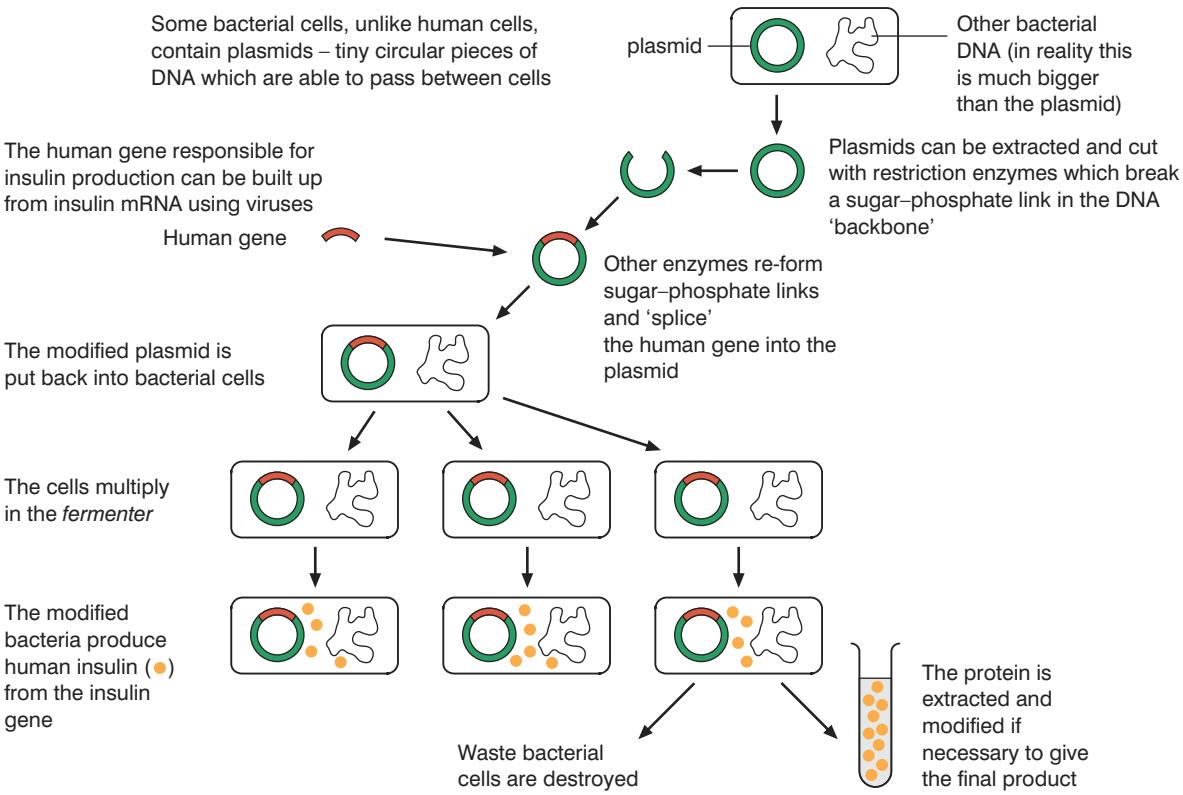


Figure 29 An illustration of the general approach used to produce a sample of insulin by genetic engineering.

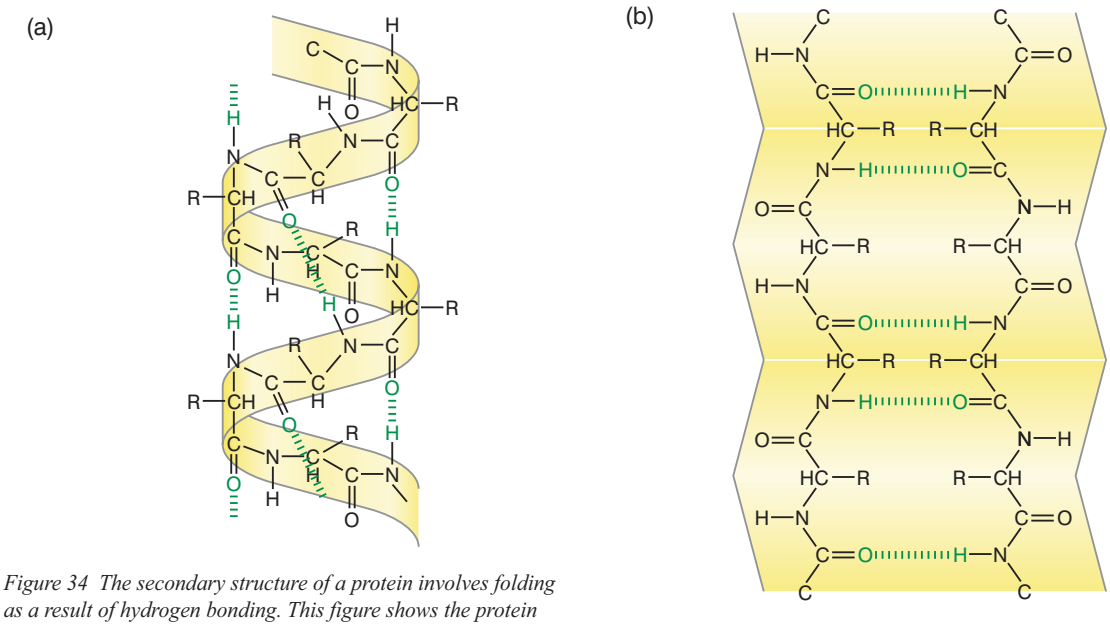


Figure 34 The secondary structure of a protein involves folding as a result of hydrogen bonding. This figure shows the protein chain folded into (a) a helix and (b) a sheet.

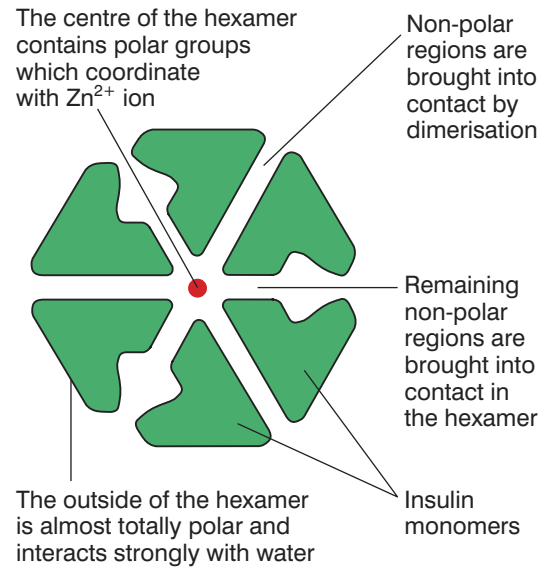


Figure 38 An insulin hexamer.

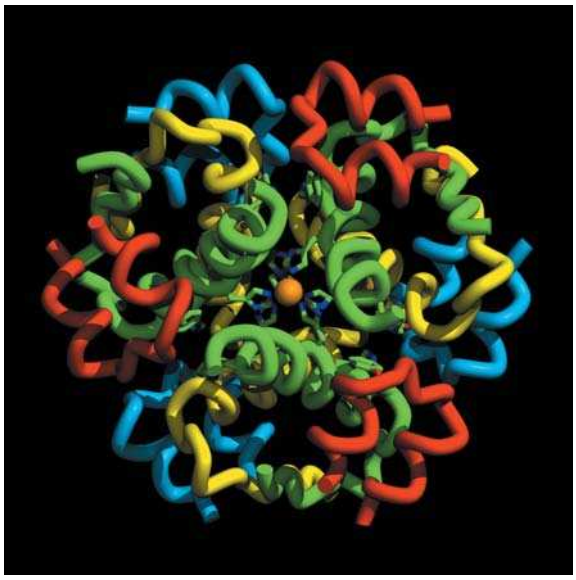


Figure 40 A ribbon diagram of the insulin hexamer.

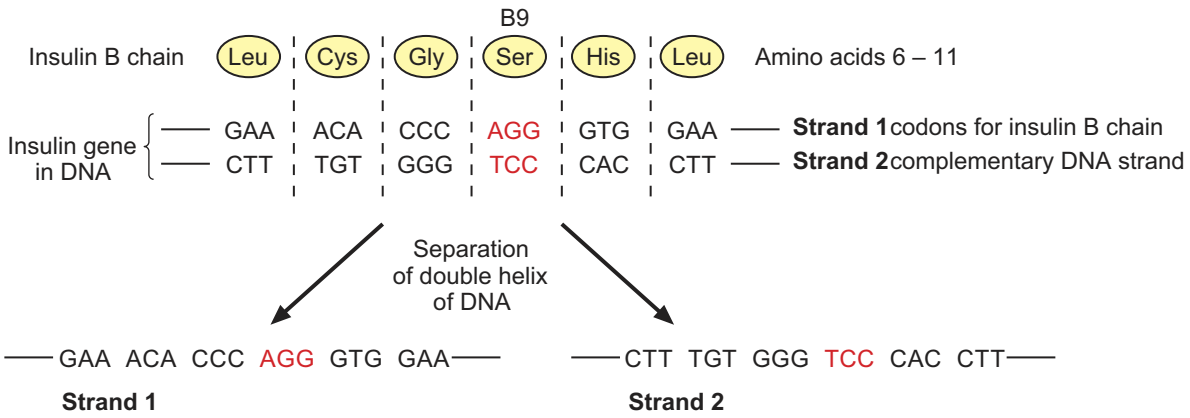


Figure 45 Part of the human insulin gene which codes for the B chain around B9 (serine).

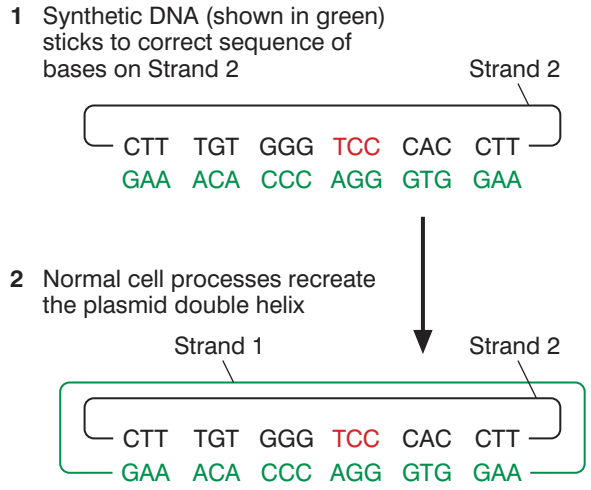


Figure 46 The cell recognises the small piece of synthetic DNA and incorporates it into a plasmid.

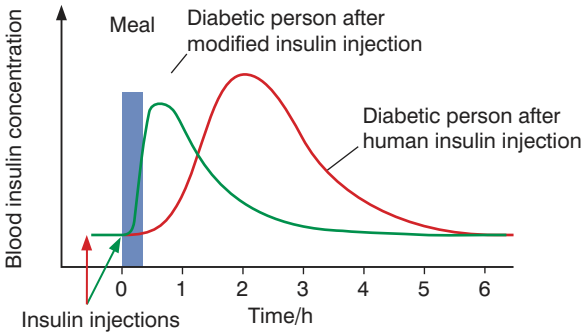
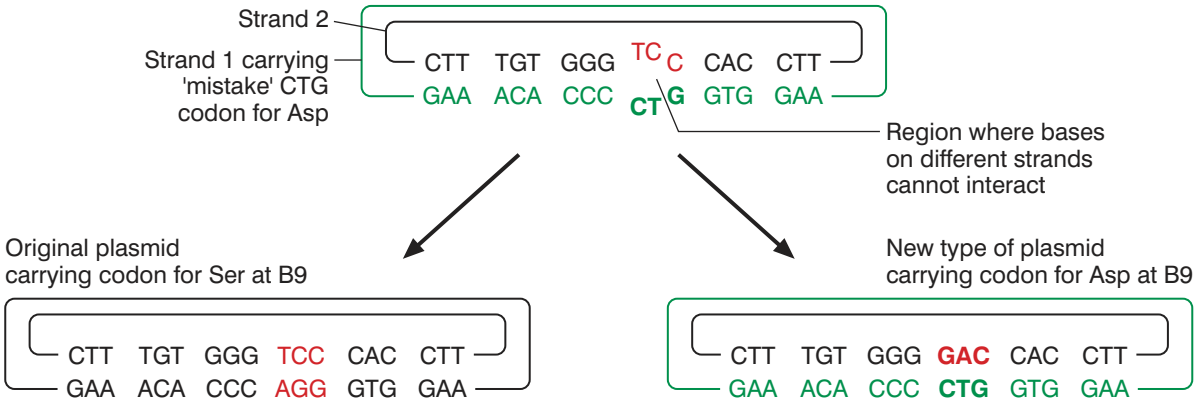


Figure 48 Insulin concentrations in diabetic patients using human insulin and modified insulin: human insulin is injected 30 min before the meal; modified insulin is injected immediately before the meal.

Figure 47 The cell tolerates a change to one of the bases in the piece of DNA and incorporates the synthetic DNA into a plasmid. When the cell divides, two different plasmids are formed – one carries the normal human insulin gene, the other the gene for modified insulin.



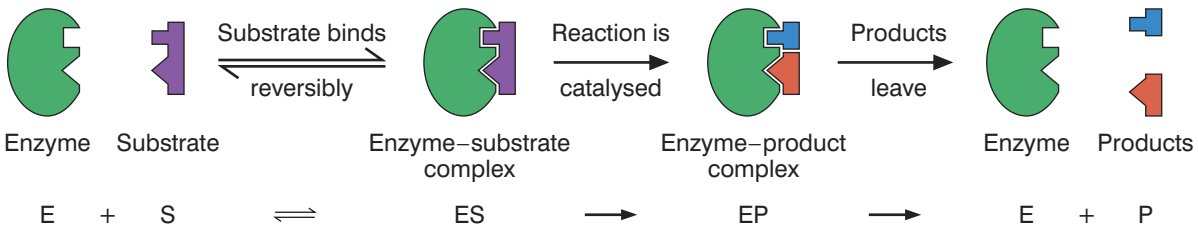


Figure 52 Illustration of the 'lock and key' model of enzyme catalysis.

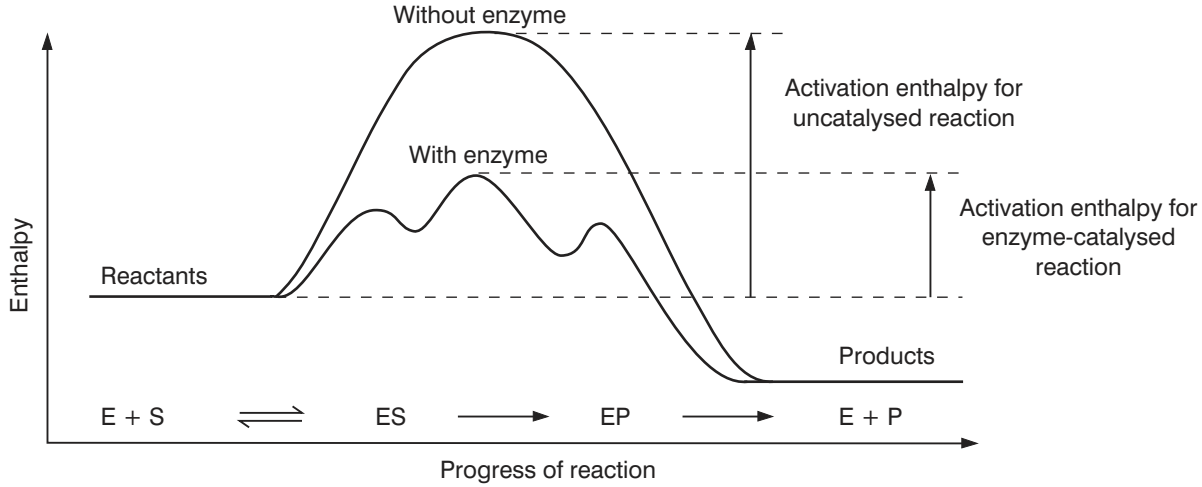


Figure 53 Lowering of the activation enthalpy barrier in an enzyme-catalysed reaction.