

Locate and open the learning object, *What is a protein?*

- Go to the screen 'Proteins in the human body'.

1. Name three proteins found in the human body.

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- Go to the screen 'What is a protein?'

2. List key features of a protein. How do proteins differ from each other?

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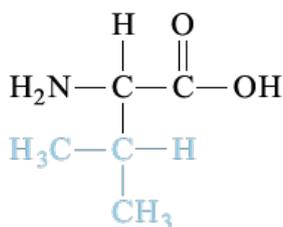
- Go to the screen 'What do proteins look like'. Explore different visualisations of insulin. Each combination of style and colour shows a different view of this protein. Select the text alternative to view labelled features of insulin.

3. Why is it useful to have different representations of the protein insulin?

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- Go to the screen 'Amino acids'.

4. Label the amine and carboxyl groups on this image of the amino acid, valine. Circle the part that is coloured lighter and label it 'R group'.



5. Compare amino acids cysteine and methionine. Other than the carbon backbone, what is similar about these two amino acids? What is different?

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6. What do you think might be the role of the R group?

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• Go to the screen 'Building the chain'.

7. Watch the animation of peptide bond formation. What is produced in this reaction?

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8. What happens to the R group during peptide bond formation?

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• Go to the screen 'The amino acid code'.

9. Complete this table as you translate mRNA codons into amino acids. The first two have been done for you.

mRNA codon	UUU	GUG	AAC	CAA	CAC	CUG	UGC	GGU	UCA	CAC
amino acid	Phe	Val								

10. The genetic code is a set of rules that determines how four nucleotides of DNA (A, G, T and C) translate into 20 amino acids. The rules state that a three-letter combination, called a codon, codes for each amino acid. How many amino acids could be coded for if nucleotides were read singularly or in pairs?

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11. A triplet code results in some amino acids having more than one codon. This is called a degenerate or redundant code. When might redundancies be an advantage?

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