



# Function Finders: BLAST!

## Activity Guide



Decode DNA sequences and discover the proteins they code for using online scientific databases.

Suitable for: age 16+

Estimated duration: 30 minutes

### You will need:

- Worksheets
- Pen/Pencil
- Codon Wheels
- Computer or tablet with internet

### Introduction

Function Finders: BLAST! introduces learners to an online scientific database used by scientists to store and study proteins.

DNA sequence is converted into a string of amino acids that form the functional protein. There are 20 different amino acids and the order and combinations of amino acids that make up a protein determine the protein's unique function in the body. The human genome contains over 20,000 protein-coding genes.

This activity demonstrates the concept of how genes encode proteins. Learners use a codon wheel to translate DNA sequences into amino acid chains. Using this information, they then search for the proteins that contain those sequences using the UNIPROT database and find out what the proteins do.

### Running the activity

#### How to complete the activity

1. Learners translate their DNA sequence into an amino acid chain using the Codon Wheel.
2. Learners use uniprot to search for each amino acid sequence, finding what protein it comes from.
3. Learner discuss their answers, using the discussion points and prompts.

#### How to use the codon wheel

1. Identify your first 'codon' or 'triplet' - three DNA letters in a row.
2. Start in the middle of the codon wheel and work outwards, each time using the next DNA letter to guide you through the wheel.
3. For example, for the codon CAT, find C in the inner most circle, then follow out to A, then to T. This gives the letter H.

#### Discussing the answers

In Discussion Guide we provide some prompt questions and additional information about the proteins to encourage a group discussion about the role and relevance of difference proteins.