

Name:

Date:

WP1 – PDBe Worksheet

The sodium-potassium pump is found in cellular membranes – its main job is to generate an ion gradient by pumping sodium ions out of the cell, and potassium ions in. To do this it gets energy from ATP. As more and more sodium leaves the cell, an electrical gradient and a concentration gradient are created. These gradients are vital for tasks such as transmitting nerve signals and controlling the osmotic pressure in cells.

Visit the PDBe homepage (www.ebi.ac.uk/pdbe) and load up the summary page for the sodium-potassium pump 2zxe. Explore the information and answer the questions below.

1. Which species is this protein from? State its scientific name, and find out its common name online.
2. View the protein in 3D using the 'Visualisation' tab or loading up the structure into PyMol. What do you notice about this protein? Describe the key structural features you can see.
3. What is the most common secondary structure present in this protein? What do you know about this secondary structure?
4. How many different polypeptide (macromolecular) chains are present in this molecule? Why do you think it's beneficial to have more than one?
5. Using the structure analysis tab, you'll find details of each of the macromolecules in the protein. By combining the number of amino acids in each polypeptide chain, work out the total number of amino acids in the protein pump.

