

- Known as 9+2 arrangement
- Pairs of parallel microtubules slide over each other causing the cilia to move in a beating motion

Organelles of protein synthesis

- Key function of cell is to synthesise proteins (including enzymes) for internal use and for secretion
- A significant proportion of the internal structure of a cell is required for this process
- Ribosomes, endoplasmic reticulum, and golgi apparatus are closely linked and coordinate the production of proteins and their preparation for different roles within the cell
- Cytoskeleton plays a key role in coordinating protein synthesis

Endoplasmic reticulum

- Endoplasmic reticulum (ER) is a network of membranes enclosing flattened sacs called cisternae
- Connected to outer membrane of nucleus. There's two types:
 - Smooth endoplasmic reticulum - responsible for lipid and carbohydrate synthesis, and storage
 - Rough endoplasmic reticulum - has ribosomes bound to the surface and is responsible for the synthesis and transport of proteins
- Secretory cells, release hormones or enzymes have more rough endoplasmic reticulum than cells that don't release proteins

Ribosomes

- Can be free-floating in the cytoplasm or attached to endoplasmic reticulum, forming rough endoplasmic reticulum
- Not surrounded by a membrane
- Constructed of RNA molecules made in cells nucleolus
- Site of protein synthesis
- Mitochondria and chloroplasts contain ribosomes, as do prokaryotic cells

Golgi apparatus

- Similar in structure to smooth endoplasmic reticulum
- Compact structure formed of cisternae, does not contain ribosomes
- Role in modifying proteins and 'packaging' them into vesicles
- May be secretory vesicles, if proteins are destined to leave the cell
- Or
- May be lysosomes, which stay in the cell

Protein production

- Proteins are synthesised on the ribosomes bound to the endoplasmic reticulum (1)