7) Asexual reproduction

Under adverse condition certain Gram +ve bacteria like Bacillus sp., Clostridium sp. etc. and some G. Gram-ve bacteria like E. coli produce a thick walled heat and chemical resistant body called endospore. Generally one endospore is formed in a cell which may occupy a central, subterminal or terminal position.

Structure of endospore :- Mature endospore consist of two parts viz.

i) Spore integuments — It is the outer covering which encloses the protoplast or core. From inner to outer it consist of four layers, viz.

a) Inner membrane — It is the inner most unite membrane.

b) Cortex — It is a multi laminate structure which is formed in between the inner and outer membrane.

c) Outermembrane – It is also a unite membrane which lies outside the cortex.

d) Spore coat — The spore coat is an electron dense layer formed outside the outermembrane. It is made up of keratin like protein which consist about 80% of the total spare protein.

ii) Protoplast or core — It is the central portion which contains the DNA, ribosome, t-RNA, and enzymes.

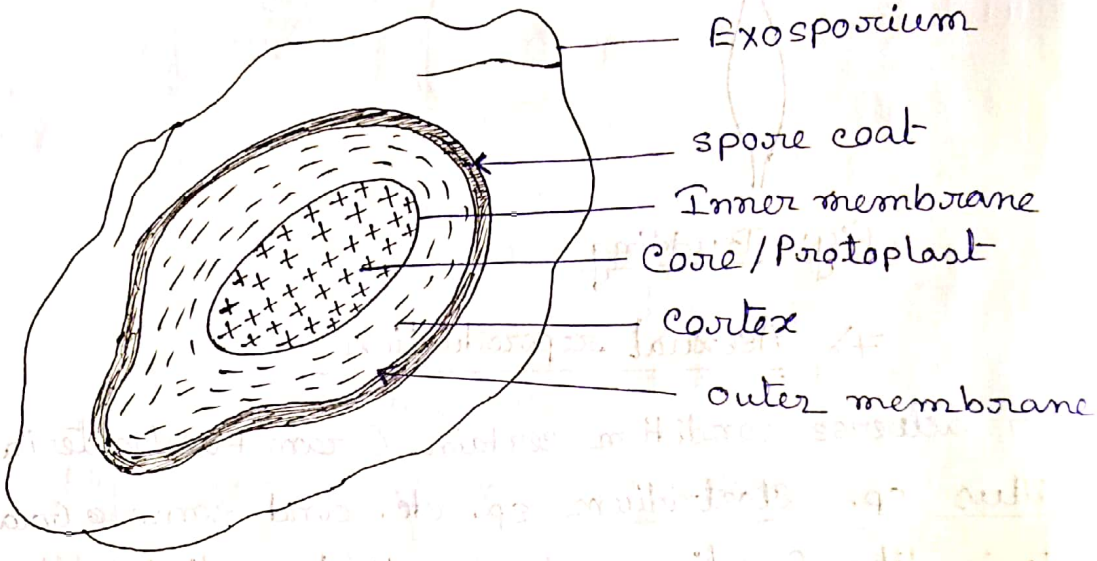

Fig:- Bacterial endospore

Formation of endospore — Endospore formation in Bacillus takes place through a number of stages viz.

i) Stage 0 :- It represent the vegetative cells. In this stage the vegetative cell contain two nuclear bodies.

ii) Formation of axial filament — In this stage the two compact nuclear bodies fuse and it is redistributed to form an axial chromatin thread called the axial filament.

iii) Spore septum formation — In this stage a septum is laid down from the mesosome near one end of the cell. As a result the cell becomes asymmetrically partition by the spore septum. The nuclear material also divides so that each compartment contains atleast one complete chromosome. The spore septum divides the bacterial cell into a smaller and a larger compartment. The smaller compartment is called the fore spore while the larger compartment is called mother cell.

iv) Engulfment of forespore — In this stage the membrane of the mother cell invaginates towards the pole of the cell and engulf the fore spore. The fore spore is thus enclosed by two concentric sets of membrane i.e. one of its own and the other derived from the mother cell.

v) Formation of cortex — The cortex is developed in between the inner and outer fore spore membrane. It takes place due to the deposition of peptidoglycan.

vi) Early coat synthesis — In this stage proteinaceous spore coat is formed surrounding the outer membrane.

vii) Maturation stage — In this stage water is with-drawn and the mature spore is considerably dehydrated. The cortex plays an important role in dehydration.

viii) Libercation of spore — During this stage the spore is libercated by the autolysis of mother cell.

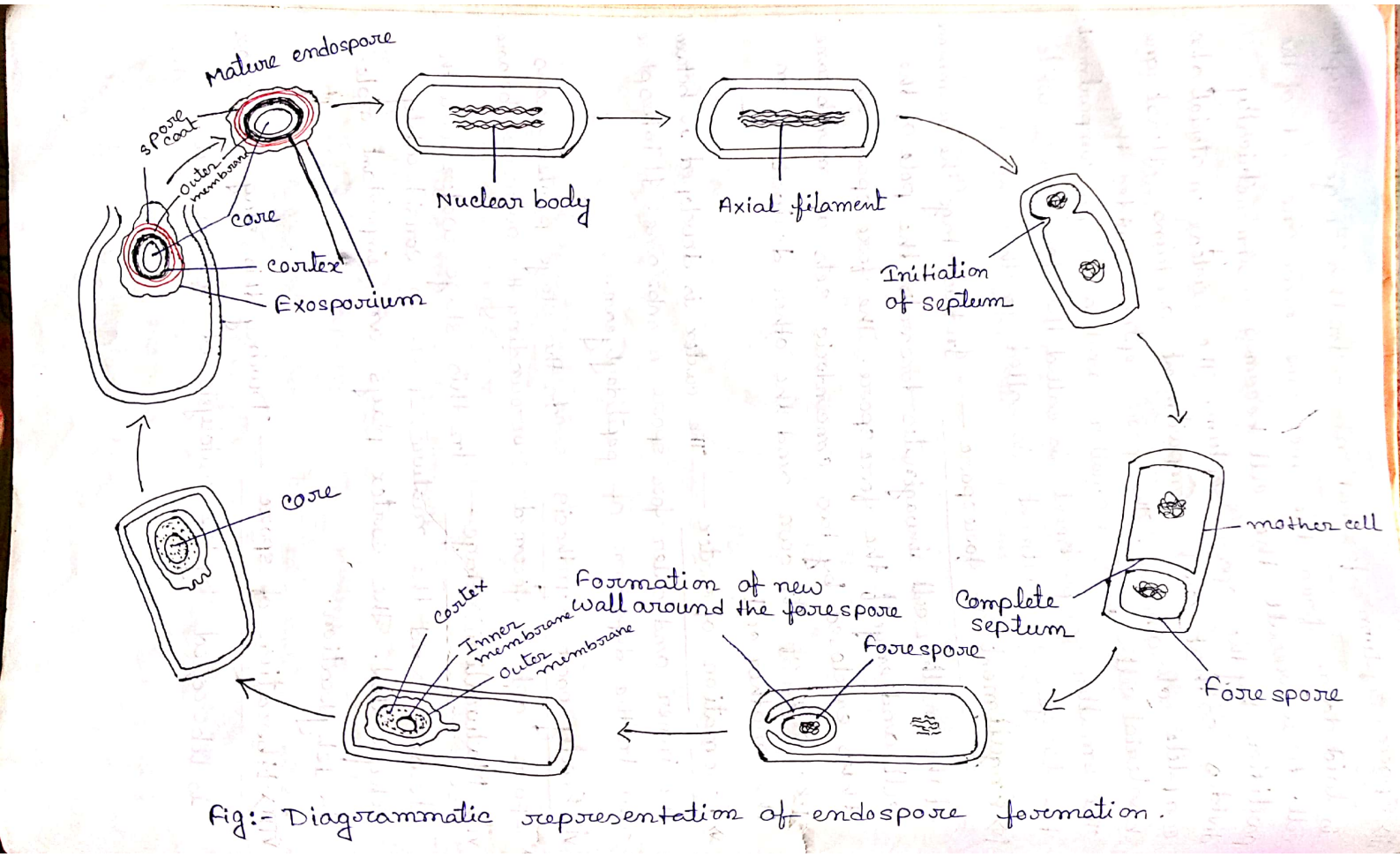

Fig:- Diagrammatic representation of endospore formation.