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\* Ultrastructure of flagella \*

\* Introduction: Except cocci, bacilli and spirillum have long, thread like appendages attached to the cells, called flagella.

⇒ It is thin, about 0.02  $\mu$ m in diameter and 3 to 20  $\mu$ m long.

⇒ Electron microscope studies and show that it is made up of three parts namely filament, hook and basal body.

① Basal body: - It is spindle shaped str. that joins the hook to the cell-membrane.

⇒ In Gram negative bacteria, basal body is complex and made up of three pairs of rings connected by a rod.

⇒ These rings are "m" (membrane) ring, and "s" (super membrane) ring.

⇒ "P" (Peptidoglycan) ring and "L" (Lipopoly-

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Saccharide ring from inner to the outer side.

=> The Outer Ring (L and P) rings are fixed to the cell wall, while the inner Ring (S and M) rings are attached to the plasma membrane.

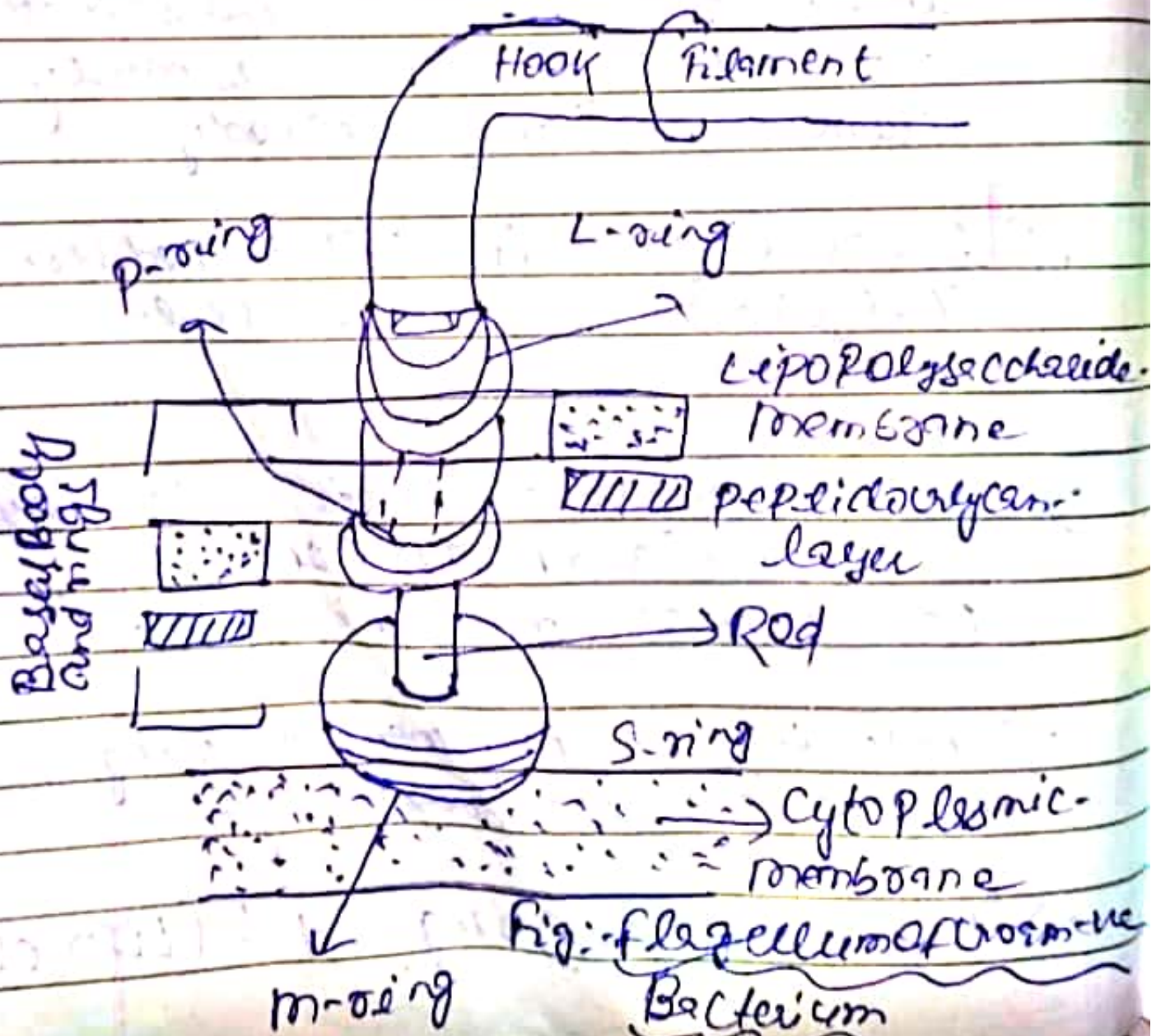
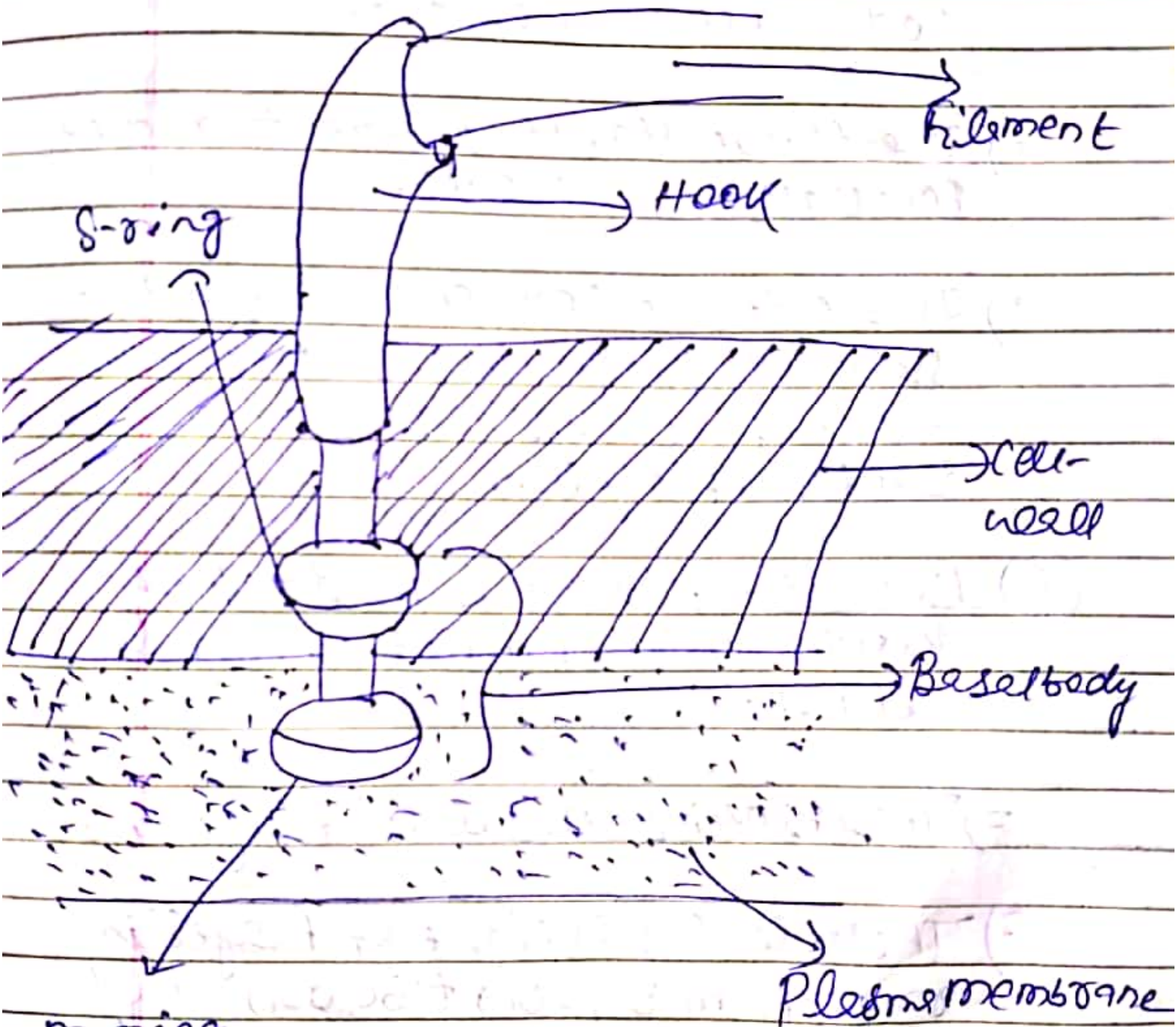


Fig: flagellum of Gram-negative Bacterium



M-ring

Fig: - Flagellum of Gram Positive -

Bacteria

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(1)

no. of Gram and

Amigo.

(2) Hook: - The Hook connects the Basal Body with the filament.

⇒ It is thicker than the filament and it penetrates the cell wall.

⇒ It is bent. The hook of the Gram positive Bacterial flagellum is longer than that of the Gram negative Bacterial flagellum.

(3) Filament: - Filament is made up of protein fibers of about 13-14 μm in diameter.

⇒ These proteins are called flagellin.

⇒ The molecular weight of flagellin ranges from 30,000 to 60,000 and it is made up of 304 amino acid molecules.

⇒ On the basis of number and position of flagella, the bacteria are

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Classified into following types -

(A) Atrichous:- A Bacteria without flagella are called atrichous. e.g. Cocci.

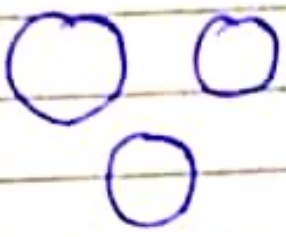


Fig:- Atrichous

(B) monotrichous:- Bacteria with single flagellum present at one end. e.g. vibrio.



Fig:- monotrichous

(C) Lophotrichous:- Bacteria with many flagella present at one pole. e.g. Spirillum undula.