

## INTRODUCTION:

Although we do not know what is the first form of life on the earth whereas we do not know the nature of equipment that started them on road to survival. Life was no more than an experiment of nature. In danger of being snuffed out at anytime to perform two basic functions - reproduce themselves and produce energy. It is clear that all forms of life on our planet have basically the same systems for these two purposes. The power house which produces energy for the continuance of life is "mitochondria", the product of inexorable researches of cytologists have incorporated several main approaches by the turn of this century but could not reach at the peak until the marvels of electron microscope came into light.

## HISTORY:

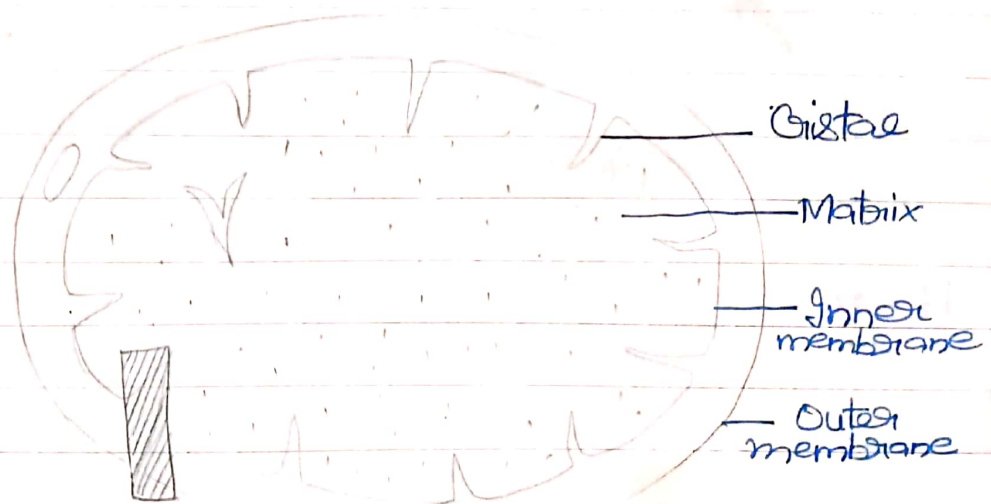
First of all **ALTMAN** (1894) described the presence of these particles in a cell and called them "bioplasts". Prior to him **FLEMMING** and **KOLLIKER** knew about them but their work remain hidden in the darkness until **BENDA** (1897) demonstrated the structures described by **ALTMAN** and **FLEMMING** called them mitochondria (Gr. Mito - filament, chondrios - granule) **BENDA** demonstrated the presence of **MITOCHONDRIA** in a living cell in 1900.

## STRUCTURE:

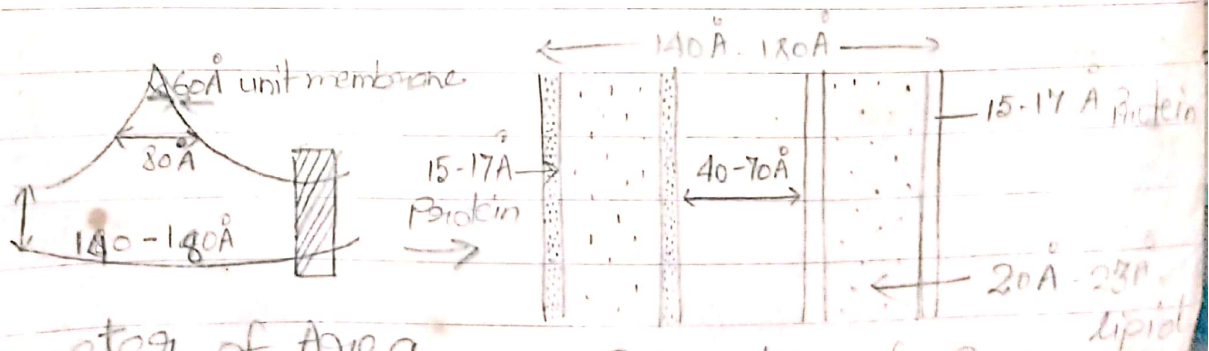
Structure can be studied under following heads:

### OUTER LIMITING MEMBRANE:-

The membrane is double. Outer membrane is about  $60 \text{ \AA}$  in thickness. Inner membrane is of same diameter and shows many foldings. The space between outer and inner membrane is  $40-70 \text{ \AA}$ . These membranes consist of an outer and inner protein sublayers; outer and inner protein sublayers measure  $15-17 \text{ \AA}$  and the middle lipid layer measures  $20-23 \text{ \AA}$ .



(A) Mitochondria in cross-section.



Diameter of Area marked in (A)

Diameter of area marked in (B)

## MATRIX:

It is dense and granular forming many outgrowths as a result of infolding of inner membrane. These infoldings are called cristae.

The arrangement of cristae is as follows:-

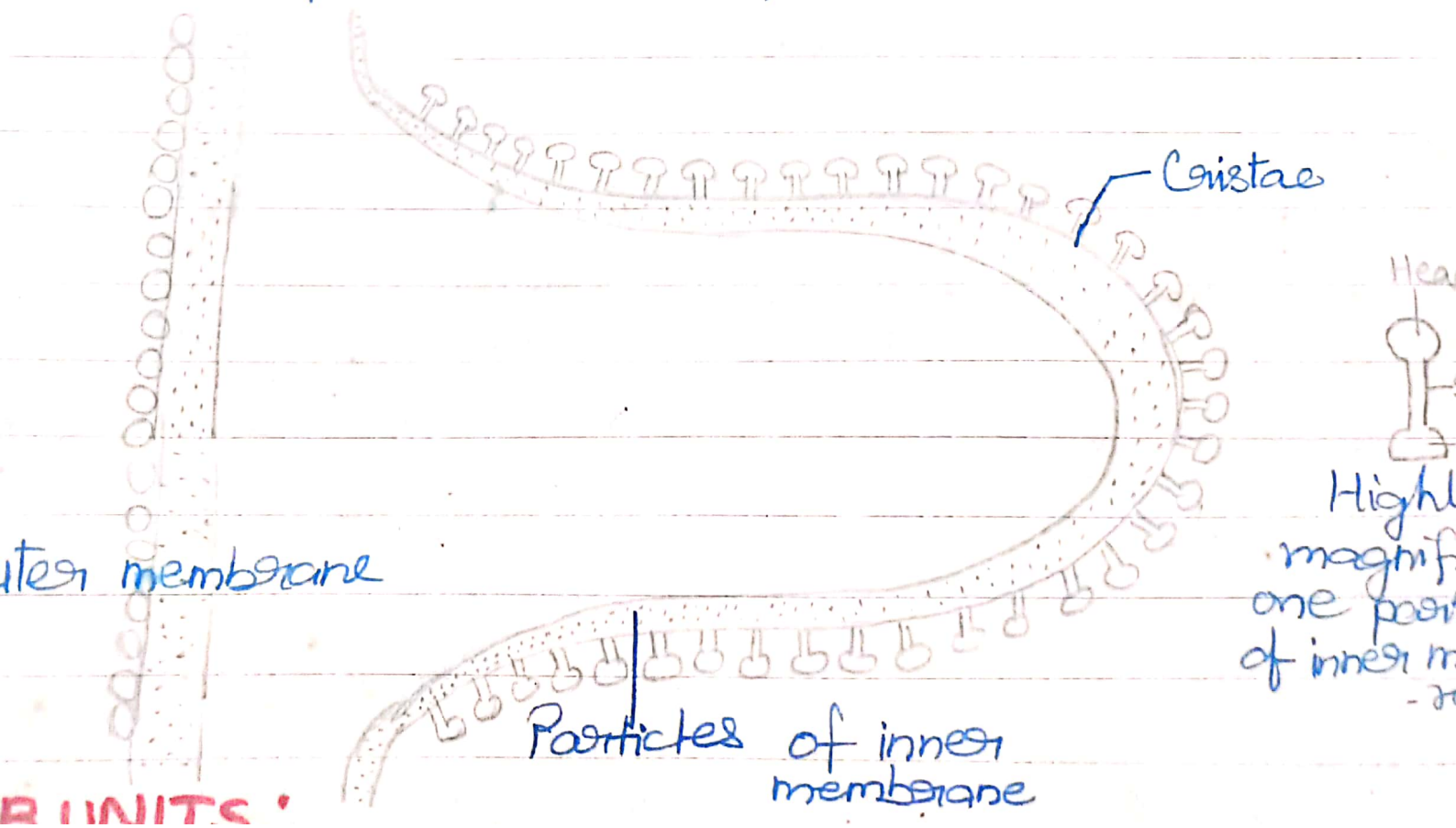
- (i) They may be parallel to the long axis of mitochondria.
- (ii) Commonly they lie perpendicular to the long axis.
- (iii) These may be in the form of vesicles, usually forming a network of connecting chambers as in parathyroid gland cells and human W.B.C
- (iv) In certain spermatics these cristae are arranged concentrically in matrix.
- (v) In Amoeba many cristae become inter-lobed forming villi.

The greater and larger the cristae the stronger its capacity to carry on oxidative reaction.

## ASSOCIATED PARTICLES:

The surface of both the membranes are very much sprinkled with thousands of smaller particles (80-100 Å). These particles are attached to the inner surface of the inner membrane and the outer surface of the outer membrane.

These particles are the elementary units that carry out the chemical activities of the mitochondrion. It has further been suggested that each particle of the inner membrane is made up of a spheric head piece, a base piece and a cylinder stem.



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