(6)

at position 5 and 6 on the β-Pyrrole. which renders heme d as a 20 π-electron chlorin. Heme-d contain two ketone groups in place of the vinyl groups at position 2 and 4; while two acetate groups are added to position 1 and 3 of the tetrapyrrole macrocycle resulting in 18 π electron isobacteriochlorins. The heme f is similar to heme c, with the difference in the ligands that coordinate to the heme iron at the axial position called (axial ligand) make hemes c and f spectroscopically distinct. Thus there are different types of cytochromes.

Function :- Cytochromes c are involved in biological ET Process in both aerobic and anaerobic respiratory chains. In aerobic respiration, they are involved in the mitochondrial respiratory chain to produce the energy currency ATP by transferring electrons from the transmembrane. Its also play a crucial role in programmed cell death (Apoptosis), where they activate the protease involved in cell death.

The other examples where c-type cytochromes are involved in ET include the reduction of sulphate to hydrogen sulphide, conversion of N to ammonia in nitrogen fixation, reduction of Nitrate to dinitrogen in denitrification, in phototrophs that use light energy to carry out various cellular processes and in methylotrophs that use methane or methanol as the carbon source for their growth.

Cytochromes c generally contain ~100-1200 amino acids. Biosynthesis of cyt c involves the formation of two thioether bonds between two cys residue and two vinyl groups of heme b by the the post-translational modification.

Pr. Amino acid seq. alignment shows that residue identity of cyt c in 45-100% among eukaryotes. The electronic spectra of cyt c are dominated by the allowed porphyrin $\pi - \pi^*$ transition that are mixed together with interelectronic repulsion that give rise to an intense band at ~410 nm (called the Soret or γ band) and two weaker signals in the 500-600 nm range (the α and β bands). The reduced form shows a Soret band at 413 nm ($\epsilon = 15.5\ mM^{-1}\ cm^{-1}$) respectively, with a