



NOBEL SYMPOSIA



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Report from the lecture presented by Siv Andersson

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Siv Andersson talked about the classification of life forms and how microbes through endosymbiosis contribute to energy production in eukaryotic cells. In the 1700s Carl von Linné made the distinction between animals and plants. In the 1800s bacteria were discovered but their systematic classification proved very difficult. This enigma was resolved in the 1970s by Carl Woese, who demonstrated that comparison of ribosomal RNA sequences permitted a division of life forms into archaeobacteria, protobacteria and eukaryotic cells.

Alpha-protobacteria are the precursors of mitochondria. The incorporation of alpha-protobacteria into the primitive eukaryotic cell has been accompanied by (1) gene loss, (2) gene transfer from the bacterial genome to the nucleus and (3) development of protein import mechanisms. The yeast mitochondrial proteome contains more than 400 proteins but only a minority of these are encoded by genes homologous to genes present in alpha-protobacteria. However, the mitochondrial proteins involved in energy production are often homologous to alpha-protobacteria genes. The incorporation of alpha-protobacteria into the primitive eukaryotic cell represents a fundamental step in the evolution.