

# The Living Fossil (Horseshoe crab)

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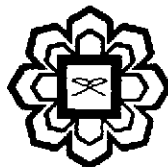
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## CHAPTER – 25

### Revision on the molecular phylogeny of horseshoe crabs – Part 2

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#### Abstract

Close genetic relatedness of horseshoe crabs with insects showed that they might have been evolved from ancient aquatic insects. The efficiency of cytochrome oxidase C subunit 1 gene in species level identification evolutionarily conserved horseshoe crab genome was clear in both the phylogram together with the precise identification of their differential developmental stages to the species level. Nucleotide Substitution pattern study portrayed the higher number of transitional mutations (Ti) over transversional mutation (Tv) in the mitochondrial genome.

**Key words:** Genetic distance, transitional mutations, transversional mutation, mitochondrial genome

#### Introduction

These are known as living fossils, have maintained their morphology almost unchanged for the past 150 million years. The little morphological differentiation among horseshoe crab lineages has resulted in substantial controversy concerning the phylogenetic relationship among the extant species of horseshoe crabs, especially among the three species in the Indo-Pacific region. Earlier studies suggest that the three species constitute a phylogenetically irresolvable trichotomy (Xia, 2000). For elucidating their phylogenetic relationships, two proteins, coagulogen and hemocyanin, have been investigated (Shishikura *et al.*, 1982; Srimal *et al.*, 1985; Sugita, 1988). Miyazaki *et al.* (1989) first investigated tropomyosin which is one of the major structural proteins involved in many types of cells, to elucidate prevailing phylogenetic relationships