

# Divergence between the Anoa of Sulawesi and the Asiatic Water buffaloes, inferred from their complete amino acid sequences of hemoglobin $\beta$ chains

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## Abstract

Four complete amino acid sequences of hemoglobin  $\beta$  chains were determined for the swamp and the river types of the Asiatic water buffalo (*Bubalus bubalis*) and two species of the subgenus *Anoa* in *Bubalus*; *B. (A.) depressicornis* (H. Smith, 1827), the lowland anoa, and *B. (A.) quarlesi* (Ouwens, 1910), the mountain anoa. The two types of the *bubalis* were identical in the 145 amino acid residues of the  $\beta$  chains and, compared to this sequence, the two residues were substituted in the *depressicornis* ( $\beta$ 49Thr  $\rightarrow$  Ser and 134Ala  $\rightarrow$  Thr) and the five were in the *quarlesi* ( $\beta$ 53Val  $\rightarrow$  Ile, 74Met  $\rightarrow$  Ile, 111Val  $\rightarrow$  Ile, 115Arg  $\rightarrow$  His and 134Ala  $\rightarrow$  Thr). While both *Anoa* species diverged from the *bubalis* by the  $\beta$ 134Ala  $\rightarrow$  Thr, they differed from each other by the five substitutions. The *Anoa* species are endemic to Sulawesi of Indonesia. Their speciation and the present coexistence were discussed with reference to probable immigrations of two ancestral *Anoa* species to Sulawesi at so long interval that had caused a reproductive isolation between the two wild animals. The earlier immigrants were postulated to be ancestral to the *quarlesi* and the later ones to the *depressicornis*.

## Keywords

*Anoa depressicornis* • *Anoa quarlesi* • Hemoglobin  $\beta$  chain • Molecular evolution • Sulawesi fauna • Water buffalo

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