ABSTRACT

Disorders of copper metabolism in man: A molecular biology study

Copper is an essential trace element for all organisms because it is required by a variety of enzymes that are involved in metabolism. However, copper is also potentially toxic, when accumulated in excess. Disruption of copper homeostasis in human leads to severe disorders, such as Menkes disease (MD) and Wilson disease (WD). Menkes disease is an X-linked recessive disorder characterised by progressive neurological degeneration, connective tissue abnormalities and kinky hair due to malabsorption of dietary copper, caused by mutations in the ATP7A gene. Wilson disease is an autosomal recessive disorder characterized by dramatic accumulation of intracellular hepatic copper with subsequent hepatic and neurological abnormalities, caused by mutations in the ATP7B gene.

Genomic DNA of 5 unrelated MD patients and of 33 unrelated WD patients were studied for mutations in the ATP7A gene and in the ATP7B gene respectively using direct sequencing of all exons of the gene amplified by polymerase chain reaction (PCR).

Disease alleles were identified in 4 MD patients and in 20 WD patients. This method allows fast and sensitive detection of mutation in patients and identification of carriers in affected families.

Key words: copper; Menkes disease; Wilson disease; ATP7A; ATP7B; metabolism; transport; mutation.

Klíčová slova: měď; Menkesova choroba; Wilsonova choroba; ATP7A; ATP7B; metabolismus; transport; mutace.