Abstract

A hair is many come as an evidence of the forensic laboratory that may be solid probative clues because hair is very stable, single head hair can provide much information of individual and continuously human shedding head hairs. Scalp hair samples of 100 healthy unrelated individuals in the subsequent three generations collected from different southern regions of Iraq. The study aimed to microscopic analysis of hair shaft samples and detection of variations within control region of mtDNA that amenable to the forensic genetic markers and historical patterns of the Arabic Iraqi population. The hair samples were prepared for light microscopy and scanning electron microscopic examinations that associated with the workflow of molecular techniques included genomic hair shaft extraction by Bio trace purification kit, estimation of nuclear DNA to the mitochondrial DNA copy number of genomic hair shaft samples by using real time PCR, amplification of mtDNA control region and direct DNA sequencing. The investigation under compound light microscope observed the differences in microscopic features between male and female which involved shaft diameter range in female scalp hair was range 34.75 - 115 µm (means of 76.05µm and standard deviation ± 17.55), while in male scalp hair was range from 35.67 to 107.65 µm (means of 73.70 µm and standard deviation ±19.77). The medullary index was appeared in range 0.15 - 0.20 of all hair samples. There was significant differences in ovoid bodies between male and female samples, where the results showed 15 males' samples have ovoid body and only eight samples in females. The scanning electron microscope showed the differences inter-individuals in an outer cuticle scale pattern showed all samples were imbricate type, while chipped, lifting, jagged and smooth type were 17%, 8%, 4% and 1% respectively The DNA Sequencing of mtDNA reported 162 polymorphic positions within D-loop region that analyzed to high frequency of polymorphic positions at positions73(0.59), 150(0.13), 146(0.13), 152(0.16), 195(0.8), 263(0.89), 295(0.10), 309(0.38), 315(0.50), 16126(0.21), 16189(0.24), 16311(0.17) and 16519(0.45). The mitochondria haplogroup composition frequency of haplogroup H,HV1, T, U, K, R, N, L, J, B, and A were 26 %, 1%, 10%, 14%, 5%, 8%, 4%, 7%, 10%, 3% and 1% respectively.