

MICROSATELLITES REPEATS: EVOLUTIONARY PATTERNS

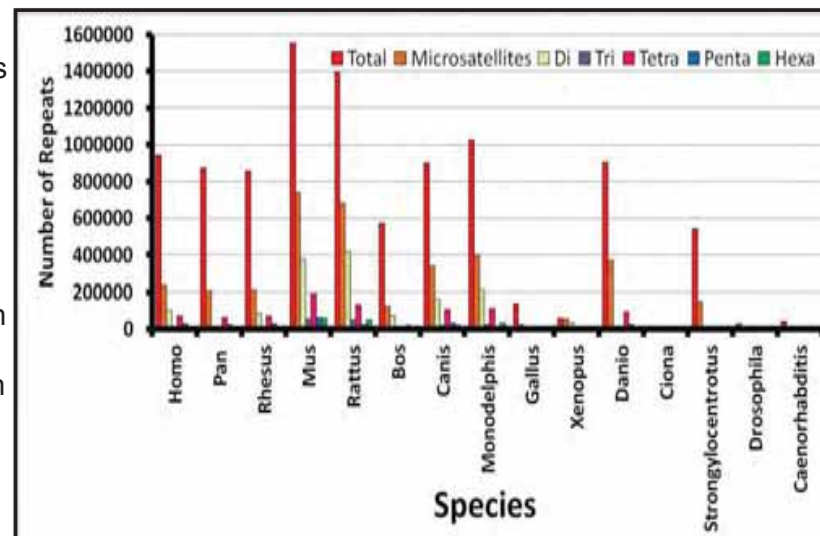
Microsatellites

Microsatellites or simple sequence repeats (**SSRs**) are the 2 to 6 bp tandemly repeating units of DNA sequences. They are distributed across the genomes of eukaryotes. Owing to the **sequential and copy number variations** SSRs are routinely used in the forensic analyses, marker assisted breeding and population genetics studies. Some SSRs patterns are also involved in the onset and progression of **genetic disorders**

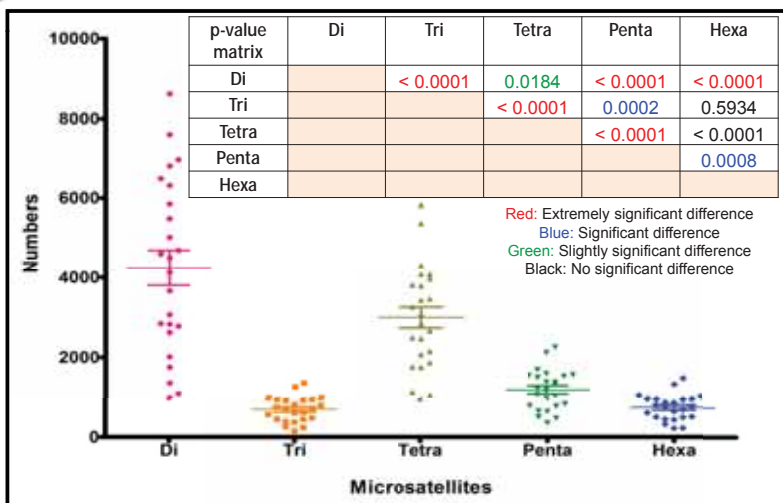
Tri nucleotide
microsatellites

CAATGGA**CGACGACGA**TGATGGT

- The **composition of SSRs** in the genome of different animals varies greatly between different taxonomic groups
- Expansion of total repeats and **SSRs** was observed with the origin of **deuterostomes** and **vertebrates**
- After a decline in numbers in non vertebrate tetrapods, extensive **expansion** of SSRs was noticed in **mammals** where rodentia (mouse and rat) showed signature of **lineage specific expansion**
- Nearly in all the compared genomes **tri nucleotide SSRs** were found to be **least abundant**



Distribution of DNA sequence repeats and microsatellites in different animals



Distribution of SSRs in Human Genome

- The composition of SSRs in the human genome varies significantly in different chromosomes. This suggests the potential **association** of microsatellites numbers with **size(bp) of the chromosome**
- Di and tri nucleotides microsatellites** are respectively the **most abundant** and the **least abundant** microsatellites in the human and most other animal genomes
- Statistically significant difference in the numbers of **tri nucleotide SSRs** compared to other SSRs implicate the presence of some **evolutionary pressure** countering the expansion of tri nucleotide SSRs
- This may be true as onset and progression of **genetic disorders** like Huntington's disease, myotonic dystrophy and fragile X syndrome are well associated with the **expansion of tri nucleotide microsatellite repeats**



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