TELOMERE LENGTH IN WHITE BLOOD CELLS, BUCCAL CELLS AND BRAIN TISSUE AND IT'S VARIATION IN AGEING AND ALZHEIMER'S DISEASE

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Introduction: Eukaryotic chromosomes ends consist of conserved hexanucleotide repeats called telomeres. Telomeres play an essential role in the maintenance of genomic stability, protecting the ends of chromosomes from DNA damage.

Aims:

1) Investigate age-related changes in telomere length in white blood cells (WBCs) and buccal cells and determine whether telomere shortening occurs in WBCs, buccal cells and brain tissue from clinically diagnosed or histopathologically confirmed Alzheimer's disease (AD) patients.

2) Compare telomere length in WBCs and buccal cells because the extent to which telomere length differs in these tissues remains unknown.

Methods: An absolute measure of telomere length (in Kb per diploid genome) was developed and results are reported for the first time with this new method.

Results:

1) Significantly lower telomere length in WBCs (P< 0.0001) and buccal cells (P< 0.01) in Alzheimer's patients relative to healthy age-matched controls.

2) Significantly greater telomere length in hippocampal cells of Alzheimer's brains (P=0.01) compared to control samples.

3) Telomere length in buccal cells was 52.2%-74.2% shorter than that observed in white blood cells (P< 0.0001).

Odd's ratio of being diagnosed with AD was 10.8 if WBC telomere length was less than 115kb with a specificity of 46% and sensitivity of 92.9%. The odds ratio for AD diagnosis was 4.6 if buccal cell telomere length was less than 40kb with a sensitivity of 72.7% and a specificity of 63.1%.

Conclusions: These results suggest important differences in telomere maintenance in AD cases compared to healthy controls and may prove useful as a potential future diagnostic.