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Title †

Parental genetics communicate with intrauterine environment to reprogram newborn telomeres and immunity

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Abstract:

Telomeres, markers for cellular senescence, have been found substantially influenced by parental inheritance. It is well known that genomic stability is preserved by the DNA repair mechanism through telomerase. This study aimed to determine the association between parents-newborn telomere length (TL) and telomerase gene(TERT), highlighting DNA repair combined with TL/TERT polymorphism and immunosenescence of the triad. The mother-father-newborns triad blood samples (n=312) were collected from Ziauddin Hospitals, Pakistan between September 2021-June 2022. The telomere length (T/S ratio) was quantified by qPCR, polymorphism was identified by Sanger sequencing and immunosenescence by flow cytometry. The linear regression was applied for TL and gene association. The newborns had longest TL(2.51+2.87) and strong positive association (R=0.25, p=<0.0001)(transgenerational health effects) with mothers' TL(1.6+2.00). Maternal demographics; Socioeconomic status, education and occupation, showed significant effects on TL of newborn (p<0.015,0.034,0.04, respectively). The TERT risk genotype CC (rs2736100) was predominant in the triad (0.6, 0.5 0.65, respectively) with a strong positive association with newborn TL (β=2.91, <0.0011). Further analysis highlighted the expression of KLRG 1+ in T-cells with longer TL but less frequent among newborns. The study concludes that TERT, parental TL, antenatal maternal health and immunity has a significantly positive effect on the repair of newborn TL.

Keywords: Telomere, Telomerase, TERT, polymorphism, Telomere length (TL), DNA repair, reprogramming, immunity