

# Unravelling the Hydrogen Bonding Patterns

## In Telomeric G-quadruplexes: From Structure to Function

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### Abstract

In this work we investigate the molecular basis of the telomere model of aging. Its key trait is the hydrogen (H-) bonding patterns of G-tetrads that serve a top of G-quadruplexes composing telomeres. We show that these patterns demonstrate a variety of bonding characters – from classic hydrogen bonds to so called ‘over-coordinated oxygen (OCO)’ bifurcated H-bonds that thus result in non-rigidity of G-tetrad structures. This work has implications for the functionality of G-quadruplexes and, in turn, for the quadruplex-based telomere model of aging.