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AFM analysis of G-wire DNA structure and nanoparticle decoration

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Atomic force microscopy was used to characterize extended quadruplex DNA structures (G-wires) constructed from three different oligo building blocks adsorbed on two different substrate preparations. G-wires adsorbed onto freshly cleaved mica through magnesium cation bridge have a preferential orientation at 60° intervals after rinsing and drying, a characteristic of equilibrated adsorption [1]. These present a high degree of auto-orientation even after as little as 10 minutes of incubation, indicating rapid equilibration with the atomic structure of the mica surface. G-wires kinetically trapped onto amino acid treated-mica provide information regarding the flexibility of the G-wires in bulk solution [2]. Persistence length measurements indicate that G-wire flexibility about five time less than that of double stranded DNA. Progress in gold nanoparticle decorating of branched G-wires will be discussed.

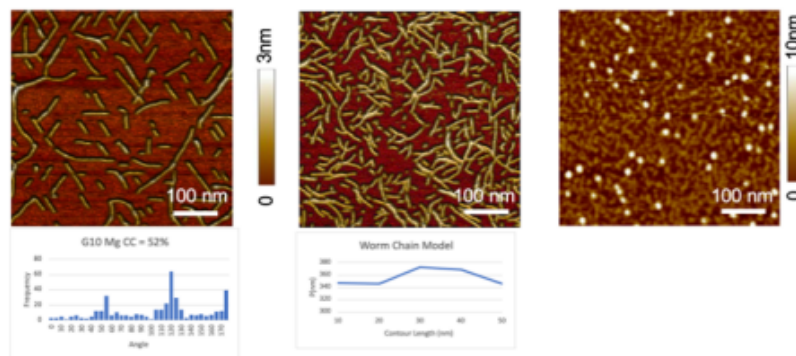


Fig. 1: G-wires equilibration adsorption on mica with autocorrelation function.

Fig. 2: G-wires kinetically adsorbed on amino acid treated mica with persistence length.

Fig. 3: Thiolated-G4T2G4 attached to 5nm gold nanoparticles.

References

- [1] Vesenka et al. (2007). Colloids Surf. Sci. B: Biointerfaces, 58 256-263.
- [2] Abels et al.(2006). Biophys. J, 88, 2737-2744.