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(54) Title: METHODS FOR PREPARING NUCLEIC ACID NANOSTRUCTURES USING COMPACTION OLIGONUCLEOTIDES

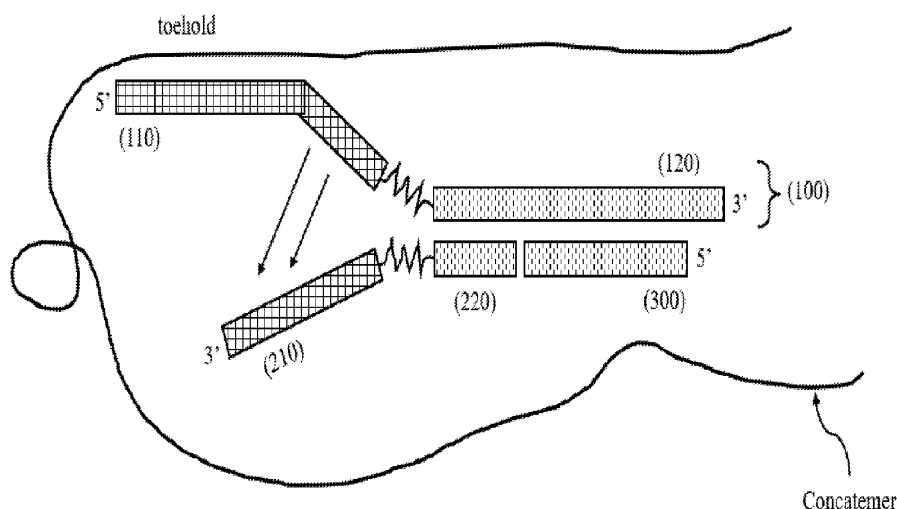


FIG. 13B

(57) Abstract: The present disclosure provides compositions and related methods, *e.g.*, for preparing immobilized nucleic acid nanostructures using compaction oligonucleotides. In some embodiments, rolling circle amplification reaction can be conducted with compaction oligonucleotides on-support or in-solution to generate concatemer molecules having multiple copies of a polynucleotide unit arranged in tandem. Each polynucleotide unit comprises a sequence-of-interest and at least one universal adaptor sequence that binds one end of a compaction oligonucleotide. The 5' and 3' regions of the compaction oligonucleotide can hybridize to the concatemer to pull together distal portions of the concatemer causing compaction of the concatemer to form a nanostructure. Nanostructures having tighter size and shape compared to concatemers generated in the absence of the compaction oligonucleotides. The compact and stable characteristics of the nucleic acid nanostructures improves sequencing accuracy by increasing signal intensity and they retain their

[Continued on next page]

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shape and size during multiple sequencing cycles.