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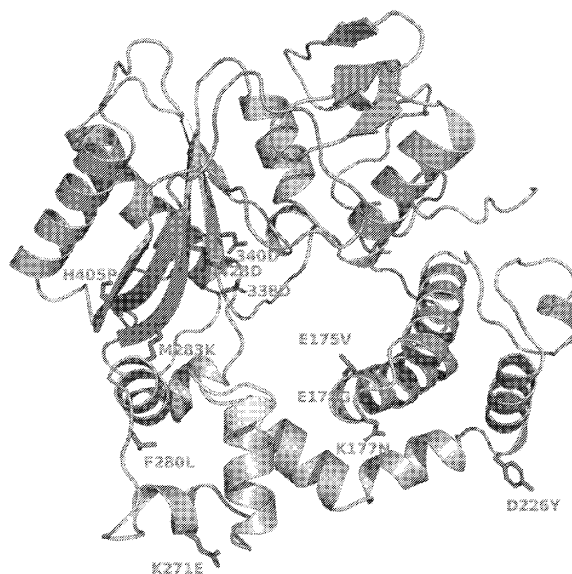


FIG. 14

(57) Abstract: Disclosed herein include recombinant terminal deoxynucleotidyl transferases (TdT). In some embodiments, the recombinant TdT comprises an amino acid sequence that is at least 80% identical to a bovine TdT, wherein the recombinant TdT comprises one or more amino acid substitution mutations at one or more positions functionally equivalent to Glu191, Lys193, Glu194, Asp242, Lys287, Phe296, Met299, Thr342, and His421 in the bovine TdT.

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