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(54) Title: TERMINAL DEOXYNUCLEOTIDYL TRANSFERASE VARIANTS AND USES THEREOF

(57) Abstract: The present invention is directed to terminal deoxynucleotidyltransferase (TdT) variants that (i) comprise an amino acid sequence that is at least a specified percent identical to an indicated SEQ ID NOs and have at least one substitution at Q455 or at least Q455 plus at least one further substitution at G186, S248, T331, Q390, K394 or H466 (where positions are with respect to SEQ ID NO 1 and functionally equivalent positions in indicated SEQ ID NOs), (ii) are capable of template-free extension of a polynucleotide, and (iii) exhibit enhanced stability or enhanced efficiency in incorporating 3'-0-blocked nucleoside triphosphates into a polynucleotide. The invention is also directed to the use of these TdT variants for synthesizing polynucleotides of any predetermined sequence.