CLAIMS:

1. A reverse transcriptase enzyme having an optimum activity at a temperature above 42°C, wherein the reverse transcriptase comprises a Moloney Murine Leukemia Virus (MMLV) reverse transcriptase amino acid sequence with a mutation at one or more of the following amino acid positions:

| | | | | | |
|---|---|---|---|---|---|
| D200, | D653, | L603, | T330, | L139, | Q221, |
| T287, | I49, | N479, | H594, | A502, | |
| E607, | K658, | P130, | Q237, | | |
| A307, | Y344, | Q430, | D449, | A644, | N649, |
| L671, | E673, | M39, | Q91, | M66, | W388, |
| I179 | L333 | R390 | Q374 and | E5 | |

wherein when the mutation is at position D653 the mutation is not D653N, wherein when the mutation is at position L603 the mutant is not L603A, wherein when the mutation is at position H594 the mutation is not H594A.

2. The reverse transcriptase enzyme according to claim 1 having an optimum activity of at least 50°C.

3. The reverse transcriptase enzyme according to claim 2 wherein the optimum activity is in the range from 50°C to 60°C.

4. The reverse transcriptase enzyme according to any one of claims 1 to 3 wherein the activity at 50°C is at least 120% of the activity at 37°C.

5. A reverse transcriptase according to any one of claims 1 to 4, having one or more of the following mutations:

| | | | | | |
|---|---|---|---|---|---|
| D200N,A or, G, | D653G,A,H or, V, | L603W or M, | T330P, | L139P, | Q221R, |
| T287A, | I49V or T, | N479D, | H594R or Q, | | |
| A502V, | E607K, G or A, | K658R or Q | P130S, | Q237R, | |
| A307V, | Y344H, | Q430R, | D449G or A, | A644V or T, | N649S, |

| | | | | | |
|---|---|---|---|---|---|
| L671P, | E673G or K, | M39V or L, | Q91R or L, | M66L, | W388R, |
| I179T or V | L333Q | R390W | Q374R and | E5K | |

6. A reverse transcriptase enzyme according to any one of claims 1 to 4 comprising at least one of the following mutations or mutation combinations:

D200Q;
D200V;
D200W;
D200K;
L603W;
L603F;
D653K;
D653H;
D200N and L603W;
D200N, L603W and T330P;
D200N, L603W, T330P and E607K;
D200N, L603W, T330P, E607K and L139P;
D200N, L603W, N479D and H594R;
D200N, L603W, D653N and D524G; or
D200N, L603W, D653N, D524G and T330P.

7. A polynucleotide encoding a reverse transcriptase according to any one of claims 1 to 6.