CLAIMS

WHAT IS CLAIMED IS:

1. A method for cleaving a polynucleotide, comprising:

(a) synthesizing a plurality of polynucleotides each comprising one or more bases susceptible to enzymatic cleavage;

(b) exposing the plurality of polynucleotides to one or more enzymes; and

(c) treating the plurality of polynucleotides in an aqueous base at a temperature of about 55 degrees Celsius to 75 degrees Celsius.

2. The method of claim 1, wherein exposing the plurality of polynucleotides to the one or more enzymes comprises exposing the plurality of polynucleotides to a first enzyme of the one or more enzymes.

3. The method of claim 2, wherein exposing the plurality of polynucleotides to the one or more enzymes further comprises exposing the plurality of polynucleotides to a second enzyme of the one or more enzymes.

4. The method of claim 3, wherein the first enzyme and the second enzyme are different enzymes.

5. The method of claim 1, wherein synthesizing comprises enzymatic synthesis or chemical synthesis.

6. The method of claim 1, wherein synthesizing comprises synthesizing the plurality of polynucleotides on a solid support.

7. The method of claim 6, wherein the plurality of polynucleotides are attached to a surface of the solid support via a support linker.

8. The method of claim 7, wherein the support linker comprises a stilt.

9. The method of claim 8, wherein the stilt comprises thymidine.

10. The method of claim 1, wherein the one or more bases comprises deoxy uracil.

11. The method of claim 1, wherein the one or more enzymes comprises one or more of uracil DNA glycosylase, apurinic/apyrimidinic (AP) endonuclease, alkylpurine glycosylases C and D, OGG1, NTH1, NEIL1-3, Endonuclease V, or endonuclease VII.

12. The method of claim 1, wherein the plurality of polynucleotides are treated in the aqueous base for about one hour.

13. The method of claim 1, wherein the temperature is about 65 degrees Celsius.

14. The method of claim 1, wherein the aqueous base comprises NH_3/CH_3NH_2.

15. The method of claim 6, wherein the method further comprises cleaving the plurality of polynucleotides from the solid support.

16. The method of claim 7, wherein the support linker comprises one or more of uracil, 3-methyladenine, 8-oxo-guanine, oxo-inosine, 2,6-diamino-4-hydroxy-5-formamidopyrimidine (FapyG), 4,6-diamino-5-formamidopyrimidine (FapyA), 5-hydroxyuracil, 5-hydroxymethyluracil, or 5-formyluracil.

17. The method of claim 7, further comprising:

hybridizing the support linker with a complementary polynucleotide; and

using a restriction endonuclease to cleave one or more polynucleotides of the plurality of polynucleotides from the surface of solid support.

18. The method of claim 7, wherein the support linker comprises one or more ribonucleosides comprising a protecting group at one or both of a 2’ and 3’ OH positions, and wherein the one or more enzymes comprise RNase H.

19. The method of claim 6, wherein the solid support comprises addressable loci, and wherein cleavage of polynucleotides from the solid support is independently addressable.

20. The method of claim 1, wherein synthesizing comprises enzymatic synthesis, and wherein a cleavage site on a synthesized polynucleotide is 1-30 bases from start site of enzymatic synthesis.