WHAT IS CLAIMED IS:

1. A method of chemically producing a protein, comprising ligating at least two ligation-conducive segments of the protein, wherein each of said ligation-conducive segments is chemically-synthesizable, and obtainable by:

i. identifying at least one ligation-conducive sequence in the amino-acid sequence of the protein, parsing said amino-acid sequence of the protein at said ligation-conducive sequence to thereby obtain a plurality of ligation-conducive segments; and

ii. if each of said ligation-conducive segments is chemically-synthesizable, chemically synthesizing each of said ligation-conducive segments;

iii. if any one of said ligation-conducive segments is not chemically-synthesizable, identifying at least one structurally-lose section in said ligation-conducive segment, substituting at least one amino acid in said structurally-lose section with a ligation-conducive amino acid residue so as to introduce a ligation-conducive sequence in said structurally-lose section, parsing the amino-acid sequence of the protein at said ligation-conducive sequence; and chemically synthesizing each of said ligation-conducive segments,

wherein in Step (i), at least one of said ligation-conducive sequences is in a structurally-lose section in the protein.

wherein the method further comprises, prior to Step (i),

a) splitting said amino-acid sequence of the protein into at least two domain-forming segments;

b) if each of said domain-forming segments is chemically-synthesizable, chemically synthesizing each of said domain-forming segments; and

c) co-folding said domain-forming segments to thereby obtain the protein.

2. The method of claim 1, wherein if one of said domain-forming segments is not chemically-synthesizable,

d) identifying at least one ligation-conducive sequence in said domain-forming segment, and parsing the amino-acid sequence of said domain-forming segment at said ligation-conducive sequence to thereby obtain a plurality of chemically-synthesizable ligation-conducive segments;

e) if said domain-forming segment is essentially devoid of a ligation-conducive sequence, or any one of said ligation-conducive segments is not chemically-synthesizable,

identifying at least one structurally-lose section in said domain-forming segment or said ligation-conducive segment;

f) substituting at least one amino acid in said structurally-lose section or said ligation-conducive segment with a ligation-conducive amino acid residue so as to introduce a ligation-conducive sequence in said structurally-lose section or said ligation-conducive segment, and parsing the amino-acid sequence of said domain-forming segment at said ligation-conducive sequence to thereby obtain a plurality of sequences of chemically-synthesizable ligation-conducive segments; and

g) chemically synthesizing each of said chemically-synthesizable ligation-conducive segments.

3. The method of any one of claims 1-2, wherein the protein comprises at least 400 amino-acid residues.

4. The method of any one of claims 1-3, wherein the protein is produced using at least 90 % non-Gly D-amino-acid residues, and having essentially a mirror-imaged 3D structure compared to a 3D structure of a corresponding biologically produced protein.

5. A protein, prepared according to the method of any one of claims 1-4, wherein the protein is at least 400 amino-acid residues long.

6. The protein of claim 5, being an RNA polymerase, capable of synthesizing RNA from ribonucleotides using a DNA template.

7. The protein of claim 6, wherein said RNA polymerase is a T7 RNA polymerase, or a *Pfu* DNA polymerase mutant.

8. The protein of claim 5, being a DNA polymerase, capable of synthesizing DNA from deoxyribonucleotides.

9. The protein of claim 8, wherein said DNA polymerase is a *Pfu* DNA polymerase.

10. A D-amino acids protein, prepared according to the method of claim 4.

11. A process of producing an L-polydeoxyribonucleic acid molecule enzymatically, comprising:

providing a D-amino acids DNA polymerase prepared according to the method of claim 4, and capable of synthesizing L-DNA from L-deoxyribonucleotides; and

reacting said D-amino acids DNA polymerase with a template L-DNA molecule, L-DNA primers and a plurality of L-deoxyribonucleotides,

to thereby enzymatically producing the L-DNA molecule.

12. The process of claim 11, wherein said D-amino acids DNA polymerase is a *Pfu* DNA polymerase.

13. A process of producing an L-polyribonucleic acid (L-RNA) molecule enzymatically, comprising:

providing a D-amino acids RNA polymerase prepared according to the method of claim 4, and capable of synthesizing L-RNA from L-ribonucleotides; and

reacting said D-amino acids RNA polymerase with a template L-DNA molecule, L-DNA/RNA primers and a plurality of L-ribonucleotides,

to thereby enzymatically producing the L-RNA molecule.