

**APPLICATION FOR  
UNITED STATES LETTERS PATENT**

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12/03/84 675298	3 202	165.00 CK
12/03/84 675298	3 203	250.00 CK
12/03/84 675298	3 204	50.00 CK
12/03/84 675298	3 203	50.00 CK

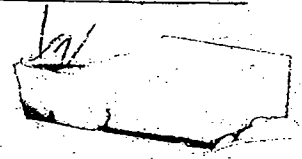
**SPECIFICATION**

S3409 12/26/84 675298 13-2855 1 203 9  
 S3410 12/26/84 675298 13-2855 1 202 15

**MAY CONCERN:**

I, FU-KUEN LIN  
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 of "PRODUCTION OF ERYTHROPOIETIN"

Specification



"PRODUCTION OF ERYTHROPOIETIN"

AT 25  
7/21/87

This is a continuation-in-part of my co-pending U.S. Patent Application Serial Nos. 561,024, filed December 13, 1983, 582,185, filed February 21, 1984, and 655,841, filed September 28, 1984. *(now abandoned)*

UCL

BACKGROUND

10 The present invention relates generally to the manipulation of genetic materials and, more particularly, to recombinant procedures making possible the production of polypeptides possessing part or all of the primary structural conformation and/or one or more of the biological properties of naturally-occurring erythropoietin.  
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A. Manipulation Of Genetic Materials

Genetic materials may be broadly defined as those chemical substances which program for and guide the manufacture of constituents of cells and viruses and direct the responses of cells and viruses. A long chain polymeric substance known as deoxyribonucleic acid (DNA) comprises the genetic material of all living cells and viruses except for certain viruses which are programmed by ribonucleic acids (RNA). The repeating units in DNA polymers are four different nucleotides, each of which consists of either a purine (adenine or guanine) or a pyrimidine (thymine or cytosine) bound to a deoxyribose sugar to which a phosphate group is attached. Attachment of nucleotides in linear polymeric form is by means of fusion of the 5' phosphate of one nucleotide to the 3' hydroxyl group of another. Functional DNA occurs in the form of stable double stranded associations of single strands of nucleotides (known as deoxyoligonucleotides),  
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to claim 14 in a manner ~~allowing~~ the host cell to express said polypeptide product.

16. A polypeptide product of the expression of  
5 a DNA sequence of claim 14 in a procaryotic or eucaryotic host.

17. A purified and isolated DNA sequence coding  
10 for procaryotic or eucaryotic host expression of a polypeptide having part or all of the primary structural conformation and one or more of the biological <sup>activities</sup> ~~properties~~ of erythropoietin.

18. A cDNA sequence according to claim 17.  
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19. A monkey species erythropoietin coding DNA sequence according to claim 18.

20. A DNA sequence according to claim 19 and  
20 including the protein coding region set forth in <sup>Figure 5</sup> ~~Table V~~.

21. A genomic DNA sequence according to claim  
17.

22. A human species erythropoietin coding DNA  
25 sequence according to claim 21.

23. A DNA sequence according to claim 22 and  
30 including the protein coding region set forth in <sup>Figure 6</sup> ~~Table VI~~.

24. A manufactured DNA sequence according to  
claim ~~14~~.

25. A manufactured DNA sequence according to  
35 claim 24 and including one or more codons preferred for expression in E.coli cells.

26. A manufactured DNA sequence according to claim 25, coding for expression of human species erythropoietin.

5 27. A manufactured DNA sequence according to claim 26 including the protein coding region set forth in Table <sup>Figure 7</sup> ~~XXIV~~.

10 28. A manufactured DNA sequence according to claim 24 and including one or more codons preferred for expression in yeast cells.

15 29. A manufactured DNA sequence according to claim 28, coding for expression of human species erythropoietin.

20 30. A manufactured DNA sequence according to claim 29 including the protein coding region set forth in <sup>Figure 8</sup> ~~Table XXI~~.

31. A DNA sequence according to claim 17 covalently associated with a detectable label substance.

25 32. A DNA sequence according to claim 31 wherein the detectable label is a radiolabel.

33. A single-strand DNA sequence according to claim 31.

30 34. A <sup>purified and isolated</sup> DNA sequence coding for a polypeptide fragment or polypeptide analog of naturally-occurring erythropoietin.

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