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What is claimed is:

1. A substantially pure polynucleotide having a sequence encoding human acetylcholinesterase.

2. An expression vector comprising the nucleotide sequence of claim **1**.

3. A host cell transformed with the expression vector of claim **2**.

4. The host cell of claim **3** being a eukaryotic cell.

5. The host cell of claim **4** selected from the group consisting of embryonic or nervous system cells.

6. The host cell of claim **4** being a non-mammalian cell.

7. A host cell containing a non-naturally occurring recombinant nucleotide construct, wherein said construct comprises a sequence (A) encoding human acetylcholinesterase operably linked to a control sequence (B) such that (B) regulates (A) expression to cause the host cell to produce active human acetylcholinesterase.

8. The host cell according to claim **7** in which the nucleotide sequence (A) encoding the human acetylcholinesterase comprises the nucleotide sequence as depicted in FIG. **1***f*, FIG. **1***g*.

9. A substantially pure nucleotide sequence encoding an acetylcholinesterase, whose polypeptide sequence comprises the polypeptide sequence depicted in FIG. **1***k*, FIG. **1***l* from amino acid residue number 1 to amino acid residue number 613.

10. A substantially pure nucleotide sequence encoding an acetylcholinesterase, wherein said sequence comprises the nucleotide sequence depicted in FIG. **1***f*, FIG. **1***g* from nucleotide residue 169 to nucleotide residue 1998.

11. A substantially pure nucleotide sequence encoding a human acetylcholinesterase, wherein said sequence selectively hybridizes to the nucleotide sequence depicted in FIG. **1***f*, FIG. **1***g* from nucleotide residue 169 to nucleotide residue 1998.

12. The nucleotide sequence according to claim **1**, **9**, **10** or **11** wherein said sequence comprises genomic DNA.

13. The nucleotide sequence according to claim **1**, **9**, **10** or **11** wherein said sequence comprises cDNA.

14. The nucleotide sequence according to claim **1**, **9**, **10** or **11** wherein said sequence comprises mRNA.

15. An expression vector comprising the nucleotide sequence of claim **1**, **9**, **10** or **11**.

16. A host cell transformed with the expression vector of claim **15**.

17. The host cell of claim **16** being a eukaryotic cell.

18. The host cell of claim **17** selected from the group consisting of embryonic or nervous system cells.

19. The host cell of claim **17** being a non-mammalian cell.

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