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(54) **HUMAN DESATURASE GENE AND USES THEREOF**

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(57) **ABSTRACT**

The subject invention relates to the identification of a gene involved in the desaturation of polyunsaturated fatty acids at carbon 5 (i.e., "human Δ5-desaturase") and to uses thereof. In particular, human Δ5-desaturase may be utilized, for example, in the conversion of dihomo-γ-linolenic acid (DGLA) to arachidonic acid (AA) and in the conversion of 20:4n−3 to eicosapentaenoic acid (EPA). AA or polyunsaturated fatty acids produced therefrom may be added to pharmaceutical compositions, nutritional compositions, animal feeds, as well as other products such as cosmetics.

ATGGCCCCCGACCCGGTGGCCGCCGAGACCGCGGCTCAGGGACCTACCCCGCGCTACTTCACCTGG
GACGAGGTGGCCCAGCGCTCAGGGTGCGAGGAGCGGTGGCTAGTGATCGACCGTAAGGTGTACAAC
ATCAGCGAGTTCACCCGCCGGCATCCAGGGGGCTCCCGGGTCATCAGCCACTACGCCGGGCAGGAT
GCCACGGATCCCTTTGTGGCCTTCCACATCAACAAGGGCCTTGTGAAGAAGTATATGAACTCTCTC
CTGATTGGAGAACTGTCTCCAGAGCAGCCCAGCTTTGAGCCCACCAAGAATAAAGAGCTGACAGAT
GAGTTCCGGGAGCTGCGGGCCACAGTGGAGCGGATGGGGCTCATGAAGGCCAACCATGTCTTCTTC
CTGCTGTACCTGCTGCACATCTTGCTGCTGGATGGTGCAGCCTGGCTCACCCTTTGGGTCTTTGGG
ACGTCCTTTTTGCCCTTCCTCCTCTGTGCGGTGCTGCTCAGTGCAGTTCAGGCCCAGGCTGGCTGG
CTGCAGCATGACTTTGGGCACCTGTCGGTCTTCAGCACCTCAAAGTGGAACCATCTGCTACATCAT
TTTGTGATTGGCCACCTGAAGGGGGCCCCCGCCAGTTGGTGGAACCACATGCACTTCCAGCACCAT
GCCAAGCCCAACTGCTTCCGCAAAGACCCAGACATCAACATGCATCCCTTCTTCTTTGCCTTGGGG
AAGATCCTCTCTGTGGAGCTTGGGAAACAGAAGAAAAAATATATGCCGTACAACCACCAGCACAAA
TACTTCTTCCTAATTGGGCCCCCAGCCTTGCTGCCTCTCTACTTCCAGTGGTATATTTTCTATTTT
GTTATCCAGCGAAAGAAGTGGGTGGACTTGGCCTGGATGATTACCTTCTACGTCCGCTTCTTCCTC
ACTTATGTGCCACTATTGGGGCTGAAAGCCTTCCTGGGCCTTTTCTTCATAGTCAGGTTCCTGGAA
AGCAACTGGTTTGTGTGGGTGACACAGATGAACCATATTCCCATGCACATTGATCATGACCGGAAC
ATGGACTGGGTTTCCACCCAGCTCCTGGCCACATGCAATGTCCACAAGTCTGCCTTCAATGACTGG
TTCAGTGGACACCTCAACTTCCAGATTGAGCACCATCTTTTTCCCACGATGCCTCGACACAATTAC
CACAAAGTGGCTCCCCTGGTGCAGTCCTTGTGTGCCAAGCGTGGCATAGAGTACCAGTCCAAGCCC
CTGCTGTCAGCCTTCGCCGACATCATCCACTCACTAAAGGAGTCAGGGCAGCTCTGGCTAGATGCC
TATCTTCACCAATAA

Human Power of N Company

SECTIONS OF THE DESATURASES	CLONE ID FROM INCYTE LIFESEQ DATABASE	KEYWORD
151-300 DELTA 5	3808675	FATTY ACID DESATURASE
301-446 DELTA 5	354535	DELTA 6
151-300 DELTA 6	3448789	DELTA 6
151-300 DELTA 6	1362863	DELTA 6
151-300 DELTA 6	2394760	DELTA 6
301-457 DELTA 6	3350263	DELTA 6

FIG.1

GCACGCCGACCGGCGCCGGGAGATCCTGGCAAAGTATCCAGAGATAAAGTCCTTGATGAAACCTGATCCCAATTTGATATGGATTATAATTA
TGATGGTTCTCACCCAGTTGGGTGCATTTTACATAGTAAAAGACTTGGACTGGAAATGGGTCATATTTGGGGCCTATGCGTTTGGCAGTTGC
ATTAACCACTCAATGACTCTGGCTATTCATGAGATTGCCCACAATGCTGCCTTTGGCAACTGCAAAGCAATGTGGAATCGCTGGTTTGGAAT
GTTTGCTAATCTTCCTATTGGGATTCCATATTCAATTTCCTTTAAGAGGTATCACATGGATCATCATCGGTACCTTGGAGCTGATGGCGTCG
ATGTAGATATTCCTACCGATTTTGAGGGCTGGTTCTTCTGTACCGCTTTCAGAAAGTTTATATGGGTTATTCTTCAGCCTCTCTTTTATGCC
TTTCGACCTCTGTTCATCAACCCCAAACCAATTACGTATCTGGAAGTTATCAATACCGTGGCACAGGTCACTTTTGACATTTTAATTTATTA
CTTTTTGGGAATTAAATCCTTAGTCTACATGTTGGCAGCATCTTTACTTGGCCTGGGTTTGCACCCAATTTCTGGACATTTTATAGCTGAGC
ATTACATGTTCTTAAAGGGTCATGAAACTTACTCATATTATGGGCCTCTGAATTTACTTACCTTCAATGTGGGTTATCATAATGAACATCAT
GATTTCCCCAACATTCCTGGAAAAAGTCTTCCACTGGTGAGGAAAATAGCAGCTGAATACTATGACAACCTCCCTCACTACAATTCCTGGAT
AAAAGTACTGTATGATTTTGTGATGGATGATACAATAAGTCCCTACTCAAGAATGAAGAGGCACCAAAAAGGAGAGATGGTGCTGGAGTAAA
TATCATTAGTGCCAAAGGGATTCTTCTCCAAAACTTTAGATGATAAAATGGAATTTTTGCATTATTAAACTTGAGACCAGTGATGCTCAGAA
GCTCCCCTGGCACAATTTCAGAGTAAGAGCTCGGTGATACCAAGAAGTGAATCTGGCTTTTAAACAGTCAGCCTGACTCTGTACTGCTCAGT
TTCACTCACAGGAAACTTGTGACTTGTGTATTATCGTCATTGAGGATGTTTCACTCATGTCTGTCATTTTATAAGCATATCATTTAAAAAGC
TTCTAAAAAGCTATTTCGCCAGG

FIG.2

TTACCTTCTACGTCCGCTTCTTCCTCACTTATGTGCCACTATTGGGGCTGAAAGCTTCCTGGCCTTTTCTTCATAGTCAGGTTCCTGGAAA
GCAACTGGTTTGTGTGGGTGACACAGATGAACCATATTCCCATGCACATTGATCATGACCGGAACATGGACTGGGTTTCCACCCAGCTCCAG
GCCACATGCAATGTCCACAAGTCTGCCTTCAATGACTGGTTCAGTGGACACCTCAACTTCCAGATTGAGCACCATCTTTTTCCCACGATGCC
TCGACACAATTACCACAAAGTGGCTCCCCTGGTGCAGTCCTTGTGTGCCAAGCATGGCATAGAGTACCAGTCCAAGCCCCTGCTGTCAGCCT
TCGCCGACATCATCCACTCACTAAAGGAGTCAGGGCAGCTCTGGCTAGATGCCTATCTTCACCAATAACAACAGCCACCCTGCCCAGTCTGG
AAGAAGAGGAGGAAGACTCTGGAGCCAAGGCAGAGGGGAGCTTGAGGGACAATGCCACTATAGTTTAATACTCAGAGGGGGTTGGGTTTGGG
GACATAAAGCCTCTGACTCAAACTCCTCCCTTTTATCTTCTAGCCACAGTTCTAAGACCCAAAGTGGGGGGTGGACACAGAAGTCCCTAGGA
GGGAAGGAGCT

FIG.3

GTCTTTTACTTTGGCAATGGCTGGATTCCTACCCTCATCACGGCCTTTGTCCTTGCTACCTCTCAGGCCCAAGCTGGATGGCTGCAACATGA
TTATGGCCACCTGTCTGTCTACAGAAAACCCAAGTGGAACCACCTTGTCCACAAATTCGTCATTGGCCACTTAAAGGGTGCCCTCTGCCAACT
GGTGGAATCATCGCCCACTTCCAGCACCACGCCAAGCCTAACATCTTCCACAAGGATCCCGATGTGAACATGCTGCACGGTGTTTGTTCTGGGC
GAATGGCAGCCCATCGAGTACGGCAAGA

FIG.4

CAGGGACCTACCCCGCGCTACTTCACCTGGGACGAGGTGCCCCAGCGCTCAGGGTGCGAGGAGCGGTGGCTAGTGATCGACCGTAAGGTGTA
CAACATCAGCGAGTTCACCCGCCGGCATCCAGGGGGCTCCCGGGTCATCAGCCACTACGCCGGCCAGGATGCCACCGGATCCCTTTGTGGCCT
TCCACATCAACAAGGGCCTTGTGAAGAAGTATATGAACTCTCTCCTGATTGGAGAACTGTCTCCAGAGCAGCCCAGCTTTGAGCCCACCAAG
AATAAAGAGCTGACAGATGAGTTCCGGCAGCTGCGGGCCACAGTGGAGCGGATGGGGCTCATGAAGGCCAACCATGTCTCTTCCTGCTGTA
CCTGCTGCACATCTTGCTGCTGGATGGTGCAGCCTGGCTCACCCTTTGGGTCTTTGGGACGTCCTTTTTGCCCTTCCTCCTCTGTGCGGTGC
TGCTCAGTGCAGTTCAGGCCCAGGCTGGCTGGCTGCAGCATGACTTTGGGCACCTGTCGGTCTTCAGCACCTCAAAGTGGAACCATCTGCTA
CATCATTTTGTGATTGGCCACCTGAAGGGGGCCCCCGCCAGTTGGTGGAACCACATGCACTTCCAGCACCATGCCAAGCCCAACTGCTTCCG
CAAAGACCCAGACATCAACATGCATCCCTTCTTTGCCTTGGGGAAGATCCTCTCTGTGGAGCTTGGGAAACAGAAGAAAAATATATGC
CGTACAACCACCAGCACARATACTTCTTCCTAATTGGGCCCCCAGCCTTGCTGCCTCTCTACTTCCAGTGGTATATTTTCTATTTTTGTTATC
CAGCGAAAGAAGTGGGTGGACTTGGCCTGGATCAGCAAACAGGAATACGATGAAGCCGGGCTTCCATTGTCCACCGCAAATGCTTCTAAA

FIG.5

GCCACTTAAAGGGTGCCTCTGCCAACTGGTGGAATCATCGCCCACTTCCAGCACCACGCCAAGCCTAACATCTTCCACAAGGATCCCGATGTG
AACATGCTGCACGTGTTTGTTCTGGGCGAATGGCAGCCCATCGAGTACGGCAAGAAGCTGAAATACCTGCCCTACAATCACCAGCACGA
ATACTTCTTCCTGATTGGCCCCGCCCGCTGCTCATCCCCATGTATTTCCAGTACCAGATCATCATGACCATGATCGTCCATAAGAACTGGGTGG
ACCTGGCCTGGGCCGTCAGCTACTACATCCGGTTCTTCATCACCTACATCCCTTTCTACGGCATCCTGGGAGCCCTCCTTTTCCTCAACTTC
ATCAGGTTCCTGGAGAGCCACTGGTTTGTGTGGGTCACACAGATGAATCACATCGTCATGGAGATTGACCAGGAGGCCTACCGTGACTGGTT
CAGTAGCCAGCTGACAGCCACCTGCAACGTGGAGCAGTCCTTCTTCAACGACTGGTTCAGTGGACACCTTAACTTCCAGATTGAGCACCACC
TCTTCCCCACCATGCCCCCGGCACAACTTACACAAGATCGCCCCCGCTGGTGAAGTCTCTATGTGCCAAGCATGGCATTGAATACCAGGAGAAG
CCGCTACTGAGGGCCCTGCTGGACATCATCAGGTCCCTGAAGAAGTCTGGGAAGCTGTGGCTGGACGCCCTACCTTCACAAATGAAGCCACAG
CCCCCGGGACACCGTGGGGAAGGGGTGCAGGTGGGGTGATGGCCAGAGGAATGATGGGCTTTTGTTCTGAGGGGTGTCCGAGAGGCTGGTGT
ATGCACTGCTCACGGACCCCATGTTGGATCTTTCTCCCTTTCTCCTCTCCTTTTTCTCTTCACATCTCCCCCATAGCACCCTGCCCTCATGG
GACCTGCCCTCCCTCAGCCGTCAGCCATCAGCCATGGCCCTCCCAGTGCCTCCTAGCCCCTTCTTCCAAGGAGCAGAGAGGTGGCCACCGGG
GGTGGCTCTGTCCTACCTCCACTCTCTGCCCCTAAAGATGGGAGGAGACCAGCGGTCCATGGGTCTGGCCTGTGAGTCTCCCCCTTGCAGCCT
GGTCACTAGGCATCACCCCCGCTTTGGTTCTTCAGATGCTCTTGGGGTTCATAGGGCACCTCCTAGTCGGGCACCCCCCCCTGACCCTCCCG
GCCTGGCTTCACTCTCCCTGACGGCTGCCATTGGTCCACCCTTTCATAGAGAGGCCTGCTTTGTTACAAAGCTCGGGTCTCCCTCCTGCAGC
TCGGTTAAGTACCCGAGGCCTCTCTTAAGATGTCCAGGGCCCCAGGCCCGGGCACAGCCAGCCCAAACCTTGGGCCCTGGAAGAGTCCTC
CACCCCATCACTAGAGTGCTCTGACCCTGGGCTTTCACGGGCCCATTCCACCGCCTCCCCAACTTGAGCCTTGTGACCTTGGGACCAAAGGG
GGAGTCCCTCGTCTCTTGTGACTCAGCAGAGGCAGTGGCCACGTTCAGGGAGGGGCCGGCTGGCCTGGAGGCTCAGCCCACCCTCCAGCTTT
TCCTCAGGGTGTCCTGAGGTCCAAGATTCTGGAGCAATCTGACCCTTCTCCAAAGGCTCTGTTATCAGCTGGGCAGTGCCAGCCCAATCCCTG
GCCATTTGGCCCCCAGGGGACGTGGGCCCTG

FIG.6

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