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LOCUS       SYNPBR322    4361 bp    DNA   circular  SYN       18-SEP-1997
DEFINITION  Cloning vector pBR322, complete genome.
ACCESSION   J01749 K00005 L08654 M10282 M10283 M10286 M10356 M10784 M10785
            M10786 M33694 V01119
NID         g208958
VERSION     J01749.1  GI:208958
KEYWORDS    ampicillin resistance; beta-lactamase; cloning vector; drug
            resistance protein; origin of replication; plasmid; tetracycline
            resistance.
SOURCE      Cloning vector pBR322 (tissue library: ATCC 31344, ATCC 37017) DNA;
            Plasmid pSC101 DNA; Unclassified DNA; and Transposon Tn3 DNA.
  ORGANISM  Cloning vector pBR322
            artificial sequence; cloning vectors.
REFERENCE   1  (bases 1 to 3; 3259 to 4361)
  AUTHORS   Sutcliffe,J.G.
  TITLE     Nucleotide sequence of the ampicillin resistance gene of
            Escherichia coli plasmid pBR322
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 75 (8), 3737-3741 (1978)
  MEDLINE   79012484
REFERENCE   2  (bases 1 to 4361)
  AUTHORS   Sutcliffe,J.G.
  TITLE     Complete nucleotide sequence of the Escherichia coli plasmid pBR322
  JOURNAL   Cold Spring Harb. Symp. Quant. Biol. 43 Pt 1, 77-90 (1979)
  MEDLINE   80002802
REFERENCE   3  (bases 1500 to 2300)
  AUTHORS   Reed,R.R., Young,R.A., Steitz,J.A., Grindley,N.D. and Guyer,M.S.
  TITLE     Transposition of the Escherichia coli insertion element gamma
            generates a five-base-pair repeat
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 76 (10), 4882-4886 (1979)
  MEDLINE   80056597
REFERENCE   4  (bases 2207 to 2265)
  AUTHORS   Covarrubias,L., Cervantes,L., Covarrubias,A., Soberon,X.,
            Vichido,I., Blanco,A., Kupersztoch-Portnoy,Y.M. and Bolivar,F.
  TITLE     Construction and characterization of new cloning vehicles. V.
            Mobilization and coding properties of pBR322 and several deletion
            derivatives including pBR327 and pBR328
  JOURNAL   Gene 13 (1), 25-35 (1981)
  MEDLINE   81213464
REFERENCE   5  (bases 2000 to 2500)
  AUTHORS   Marians,K.J., Soeller,W. and Zipursky,S.L.
  TITLE     Maximal limits of the Escherichia coli replication factor Y
            effector site sequences in pBR322 DNA
  JOURNAL   J. Biol. Chem. 257 (10), 5656-5662 (1982)
  MEDLINE   82167416
REFERENCE   6  (bases 1 to 80; 4151 to 4229; 4349 to 4361)
  AUTHORS   Brosius,J., Cate,R.L. and Perlmutter,A.P.
  TITLE     Precise location of two promoters for the beta-lactamase gene of
            pBR322. S1 mapping of ribonucleic acid isolated from Escherichia
            coli or synthesized in vitro
  JOURNAL   J. Biol. Chem. 257 (15), 9205-9210 (1982)
  MEDLINE   82239419
REFERENCE   7  (bases 4241 to 4343)
  AUTHORS   Van Dyke,M.W., Hertzberg,R.P. and Dervan,P.B.
  TITLE     Map of distamycin, netropsin, and actinomycin binding sites on
            heterogeneous DNA: DNA cleavage-inhibition patterns with
            methidiumpropyl-EDTA.Fe(II)
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 79 (18), 5470-5474 (1982)
  MEDLINE   83039392
REFERENCE   8  (bases 584 to 709)
  AUTHORS   Peden,K.W. and Nathans,D.
  TITLE     Local mutagenesis within deletion loops of DNA heteroduplexes
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 79 (23), 7214-7217 (1982)
  MEDLINE   83117649
REFERENCE   9  (bases 373 to 649)
  AUTHORS   Peden,K.W.
  TITLE     Revised sequence of the tetracycline-resistance gene of pBR322
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  TITLE     Revised sequence of the tetracycline-resistance gene of pBR322
  JOURNAL   Gene 22 (2-3), 277-280 (1983)
  MEDLINE   83263146
REFERENCE   10 (bases 132 to 181)
  AUTHORS   Watabe,H., Iino,T., Kaneko,T., Shibata,T. and Ando,T.
  TITLE     A new class of site-specific endodeoxyribonucleases. Endo.Sce I
            isolated from a eukaryote, Saccharomyces cerevisiae
  JOURNAL   J. Biol. Chem. 258 (8), 4663-4665 (1983)
  MEDLINE   83161053
REFERENCE   11 (bases 368 to 581)
  AUTHORS   Livneh,Z.
  TITLE     Directed mutagenesis method for analysis of mutagen specificity:
            application to ultraviolet-induced mutagenesis
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 80 (1), 237-241 (1983)
  MEDLINE   83117828
REFERENCE   12 (bases 2627 to 2682; 2781 to 2828)
  AUTHORS   Mascharak,P.K., Sugiura,Y., Kuwahara,J., Suzuki,T. and Lippard,S.J.
  TITLE     Alteration and activation of sequence-specific cleavage of DNA by
            bleomycin in the presence of the antitumor drug
            cis-diamminedichloroplatinum(II)
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 80 (22), 6795-6798 (1983)
  MEDLINE   84070716
REFERENCE   13 (bases 4276 to 4336)
  AUTHORS   Schultz,P.G. and Dervan,P.B.
  TITLE     Sequence-specific double-strand cleavage of DNA by
            penta-N-methylpyrrolecarboxamide-EDTA X Fe(II)
  JOURNAL   Proc. Natl. Acad. Sci. U.S.A. 80 (22), 6834-6837 (1983)
  MEDLINE   84070724
REFERENCE   14 (bases 518 to 528)
  AUTHORS   Sutcliffe,J.G.
  JOURNAL   Unpublished (1984)
REFERENCE   15 (bases 2395 to 2495)
  AUTHORS   Fuller,R.S., Funnell,B.E. and Kornberg,A.
  TITLE     The dnaA protein complex with the E. coli chromosomal replication
            origin (oriC) and other DNA sites
  JOURNAL   Cell 38 (3), 889-900 (1984)
  MEDLINE   85024881
REFERENCE   16 (bases 2729 to 2731)
  AUTHORS   Lathe,R., Kieny,M.P., Skory,S. and Lecocq,J.P.
  TITLE     Linker tailing: unphosphorylated linker oligonucleotides for
            joining DNA termini
  JOURNAL   DNA 3 (2), 173-182 (1984)
  MEDLINE   84207440
REFERENCE   17 (bases )
  AUTHORS   Heusterspreute,M. and Davison,J.
  TITLE     Restriction site bank vectors. II. DNA sequence analysis of plasmid
            pJRD158
  JOURNAL   DNA 3 (3), 259-268 (1984)
  MEDLINE   84260952
REFERENCE   18 (bases 2113 to 2186; 2348 to 2415)
  AUTHORS   Abarzua,P., Soeller,W. and Marians,K.J.
  TITLE     Mutational analysis of primosome assembly sites. I. Distinct
            classes of mutants in the pBR322 Escherichia coli factor Y DNA
            effector sequences
  JOURNAL   J. Biol. Chem. 259 (22), 14286-14292 (1984)
  MEDLINE   85054885
REFERENCE   19 (bases 2348 to 2415)
  AUTHORS   Soeller,W., Abarzua,P. and Marians,K.J.
  TITLE     Mutational analysis of primosome assembly sites. II. Role of
            secondary structure in the formation of active sites
  JOURNAL   J. Biol. Chem. 259 (22), 14293-14300 (1984)
  MEDLINE   85054886
REFERENCE   20 (bases 1 to 4361)
  AUTHORS   Van Dyke,M.M. and Dervan,P.B.
  TITLE     Echinomycin binding sites on DNA
  JOURNAL   Science 225 (4667), 1122-1127 (1984)
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  MEDLINE   84300294
REFERENCE   21 (sites)
  AUTHORS   Pouwels,P.H., Enger-Valk,B.E. and Brammar,W.J.
  TITLE     Vector I-A-iv-1
  JOURNAL   (in) Brammar,W.J. (Ed.);
            CLONING VECTORS;
            Elsevier Scientific Publishing, Amsterdam (1985)
REFERENCE   22 (bases 1 to 4361)
  AUTHORS   Watson,N.
  TITLE     A new revision of the sequence of plasmid pBR322
  JOURNAL   Gene 70 (2), 399-403 (1988)
  MEDLINE   89108024
REFERENCE   23 (sites)
  AUTHORS   Gilbert,W.
  TITLE     Obtained from VecBase 3.0
  JOURNAL   Unpublished (1991)
COMMENT     The circular sequence is numbered such that 0 is the middle of the
            unique EcoRI site and the count increases first through the tet
            genes, the pMB1 material, and finally through the Tn3 region.
            Plasmid pBR322 contains ampicillin and tetracycline resistance
            genes.  The ampicillin resistance gene (amp-r) is a penicillin
            beta-lactamase. Promoters P1 and P3 are for the beta-lactamase
            gene. P3 is the natural promoter, and P1 is artificially created by
            the ligation of two different DNA fragments to create pBR322. P2 is
            in the same region as P1, but it is on the opposite strand and
            initiates transcription in the direction of the tetracycline
            resistance gene.
            Mutational studies in the primosome assembly sites indicate four
            types of mutations:  Class I having no effect on the activities
            elicited by the DNA site and the bases involved are probably
            spacers; Class II requiring higher Mg-2+ concentrations than the
            wild-type to be fully activated as factor Y ATPase effectors; Class
            III co-inactivating both the ATPase effector and DNA replication
            template activity of the site, indicating that they probably
            represent essential contact points between factor Y and the DNA;
            Class IV having a replication template activity intermediate that
            of class III and class II mutant DNAs.
            Specific sites within or near the origins of replication are
            recognized by dnaA protein.  Without dnaA binding to the origin of
            replication chromosomal replication is not possible [15]. pBR322
            DNA contains two separate regions on opposite strands and close to
            the origin of replication which, when in single-stranded form, can
            act as effectors for the ATPase activity of E.coli replication
            factor Y [5].  Small fragments of DNA containing these sites when
            cloned in an f1 phage vector act as origins of DNA replication
            allowing the formation of complementary double-stranded DNA in
            rifampicin-resistant, dna[B,G,C]-dependent fashion in vitro [5].
            The biological activity of echinomycin is thought to be related to
            the formation of complexes by intercalating with cellular DNA [20].
            Complete source information:
            Plasmid pBR322 from E.coli [2],[1],[3],[6],[11],[8],[5],[7],[12],
            [13],[10],[9],[14],[18],[19],[15],[20],[16]; pBR322 DNA in pXf3
            [4].
            The following data and their annotation were supplied by Will
            Gilbert under the auspices of the Curator Program.
             CROSSREFERENCE
                          #parent
                            GenBank(50):pSC101C, GenBank(50):Trn3
                          #offspring
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            VecBase(3):pBR328,
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            VecBase(3):pJRD158,
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     1981 ctggagaaac tcaacgagct ggacgcggat gaacaggcag acatctgtga atcgcttcac
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     3001 tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa caaaccaccg
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     3121 aagaagatcc tttgatcttt tctacggggt ctgacgctca gtggaacgaa aactcacgtt
     3181 aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt ttaaattaaa
     3241 aatgaagttt taaatcaatc taaagtatat atgagtaaac ttggtctgac agttaccaat
     3301 gcttaatcag tgaggcacct atctcagcga tctgtctatt tcgttcatcc atagttgcct
     3361 gactccccgt cgtgtagata actacgatac gggagggctt accatctggc cccagtgctg
     3421 caatgatacc gcgagaccca cgctcaccgg ctccagattt atcagcaata aaccagccag
     3481 ccggaaggga cgaggcgcgg agtgatccta cgacttttatc cgcctccatc cagtctatta
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     3541 attgttgccg ggaagctaga gtaagtagtt cgccagttaa tagtttgcgc aacgttgttg
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     3781 tggcagcact gcataattct cttactgtca tgccatccgt aagatgcttt tctgtgactg
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     4261 catttccccg aaaagtgcca cctgacgtct aagaaaccat tattatcatg acattaacct
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//
```