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Nucleotide sequence of rat basic fibroblast growth factor cDNA

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Using human bFGF cDNA (1) as a probe, a 0.8kb cDNA clone, encoding the entire rat bFGF, was isolated from a rat brain cDNA library (2). This clone (pTB784) was sequenced by dideoxy sequencing method (Fig.1). The nucleotide sequences of rat, human, and bovine bFGF show very high levels of conservation, especially in their coding regions (88.7% identity between rat and human, 88.5% between rat and bovine and 94.9% between bovine and human).

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  1  gaattccggg cgcgtggggc gggggcgcgc ggggccgggg tgcaggcggg gacgcgggcc cgggccgctg tagcacacag
 81  gggctcggtc tctcggcttc aggcggagtc cggctgcact aggctgggag cgcggcggga cggaaccggg aggctggcag
161  cccgcgggcg agccgcgctg gggggccagg ccggggtcgg ggccggggag ccccgagact gccgcagcgg ggtcccgggg
241  ccgcggaggg gccATGGCTG CGGGCAGCAT CACTTCGCTT CCCGCACTGC CGGAGGACGG CGGCGGCGCC TTCCCACCCG
321  GCCACTTCAA GGATCCCAAG CGGCTCTACT GCAAGAACGG CGGCTTCTTC CTGCGCATCC ATCCAGACGG CCGCGTGGAC
401  GGCGTCCGGG AGAAGAGCGA CCCACACGTC AAACTACAGC TCCAAGCAGA AGAGAGAGGA GTTGTGTCCA TCAAGGGAGT
481  GTGTGCGAAC CGGTACCTGG CTATGAAGGA AGATGGACGG CTGCTGGCTT CTAAGTGTGT TACAGAAGAG TGTTTCTTCT
561  TTGAACGCCT GGAGTCCAAT AACTACAACA CTTACCGGTC ACGGAAATAC TCCAGTTGGT ATGTGGCACT GAAACGAACT
641  GGGCAGTATA AACTCGGATC CAAAACGGGG CCTGGACAGA AGGCCATACT GTTTCTTCCA ATGTCTGCTA AGAGCTGAct
721  ctctttagac actgtcactg agagaaaaga aaagaatgta tacagctaag tttggatgcc ttttatgtaa caataagaca
801  cttagccatt acccgaattc
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Figure 1. Nucleotide sequence of cDNA encoding the rat bFGF. Translated region is shown in upper case.

The rat bFGF seems to consist of 154 amino acid residues including signal-like sequence, while both of human and bovine bFGF consist of 155 (1,3). These amino acid sequences are almost identical to one another (Fig.2)

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                +       +                                       +
human   maagsittlPALPEDGGSGAFPPGHFKDPKRLYCKNGGFFLRIHPDGRVDGVREKSDPHIKLQLQAEERGVVSIKGVC
rat     maagsitslPALPEDGG GAFPPGHFKDPKRLYCKNGGFFLRIHPDGRVDGVREKSDPHVKLQLQAEERGVVSIKGVC
bovine  maagsittlPALPEDGGSGAFPPGHFKDPKRLYCKNGGFFLRIHPDGRVDGVREKSDPHIKLQLQAEERGVVSIKGVC
                +       +                                       +
                                +                       +
human   ANRYLAMKEDGRLLASKCVTDECFFFERLESNNYNTYRSRKYTSWYVALKRTGQYKLGSKTGPGQKAILFLPMSAKS
rat     ANRYLAMKEDGRLLASKCVTEECFFFERLESNNYNTYRSRKYSSWYVALKRTGQYKLGSKTGPGQKAILFLPMSAKS
bovine  ANRYLAMKEDGRLLASKCVTDECFFFERLESNNYNTYRSRKYSSWYVALKRTGQYKLGPKTGPGQKAILFLPMSAKS
                                +                               +
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Figure 2. Amino acid sequence of human, rat, and bovine bFGF depicted in single letter code. Predicted atypical signal sequences are shown in lower case. Amino acid in difference between human and rat are indicated by a '+' above the sequence, and between rat and bovine by a '+' below the sequence.

References: (1) Kurokawa,T., Sasada,R., Iwane,M. and Igarashi,K. (1987) FEBS lett. 213, 189-194. (2) Ono,Y., Kurokawa,T., Nishimura,K., Marumoto,R., Igarashi,K., Kikkawa,U., Ogita,K. and Nishizuka,Y. (1986) FEBS lett. 203, 111-115. (3) Esch,F., Baird,A., Ling,N., Ueno,N., Hill,F., Denoroy,L., Klepper,R, Gospodarowicz,D., Bohlen,P. and Guillemin,R. (1985) Proc.Natl.Acad.Sci.USA 82, 6507-6511.