

# Isolation of human cDNA clones of *jun*-related genes, *jun-B* and *jun-D*

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cDNA clones of the *jun*-related genes *jun-B* and *jun-D* were obtained by screening human cDNA libraries with a 0.95 kb fragment of the *v-jun* clone (1). The predicted open reading frame

of *jun-B* could encode a protein of 347 amino acid residues (Fig. 1). Although the N-terminal end has not been cloned yet, an almost entire coding region of *jun-D*, which is 303 amino acids

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1
34 CCAGGAAAGC TATCGGCCA GAGAGGGCGA CGGGGGCTCG GGAAGCCTGA CAGGGCTTTT GCGCACAGCT GCCGGCTGGC TGCTACCCCG CCGCGCCAGC CCCCAGAAAC
144 GCGCGACCAG GCACCCAGTC CGGTCACCGC AGCGGAGAGC TCGCCGCTCG CTGCAGCGAG GCCCGGAGCG GCCCCGACAG GACCCCTCCC AGACCGCCTG GGCCGCCCCG

254 ATG TGC ACT AAA ATG GAA CAG CCC TTC TAC CAC GAC GAC TCA TAC ACA GCT ACG GGA TAC GGC CGG GCC CCT GGT GGC CTC TCT CTA CAC
1 Met Cys Thr Lys Met Glu Gln Pro Phe Tyr His Asp Asp Ser Tyr Thr Ala Thr Gly Tyr Gly Arg Ala Pro Gly Gly Leu Ser Leu His

344 GAC TAC AAA CTC CTG AAA CCG AGC CTG GCG GTC AAC CTG GCC GAC CCC TAC CGG AGT CTC AAA GCG CCT GGG GCT CGC GGA CCC GGC CCA
31 Asp Tyr Lys Leu Leu Lys Pro Ser Leu Ala Val Asn Leu Ala Asp Pro Tyr Arg Ser Leu Lys Ala Pro Gly Ala Arg Gly Pro Gly Pro

434 GAG GGC GGC GGT GGC GGC AGC TAC TTT TCT GGT CAG GGC TCG GAC ACC GGC GCG TCT CTC AAG CTC GCC TCT TCG GAG CTG GAA CGC CTG
61 Glu Gly Gly Gly Gly Gly Ser Tyr Phe Ser Gly Gln Gly Ser Asp Thr Gly Ala Ser Leu Lys Leu Ala Ser Ser Glu Leu Glu Arg Leu

524 ATT GTC CCC AAC AGC AAC GGC GTG ATC ACG ACG ACG CCT ACA CCC CCG GGA CAG TAC TTT TAC CCC CGC GGG GGT GGC AGC GGT GGA GGT
91 Ile Val Pro Asn Ser Asn Gly Val Ile Thr Thr Thr Pro Thr Pro Pro Gly Gln Tyr Phe Tyr Pro Arg Gly Gly Gly Ser Gly Gly Gly

614 GCA GGG GGC GCA GGG GGC GGC GTC ACC GAG GAG CAG GAG GGC TTC GCC GAC GGC TTT GTC AAA GCC CTG GAC GAT CTG CAC AAG ATG AAC
121 Ala Gly Gly Ala Gly Gly Gly Val Thr Glu Glu Glu Glu Gly Phe Ala Asp Gly Phe Val Lys Ala Leu Asp Asp Leu His Lys Met Asn

704 CAC GTG ACA CCC CCC AAC GTG TCC CTG GGC GCT ACC GGG GGG CCC CCG GCT GGG CCC GGG GGC GTC TAC GCC GGC CCG GAG CCA CCT CCC
151 His Val Thr Pro Pro Asn Val Ser Leu Gly Ala Thr Gly Gly Pro Ala Gly Pro Gly Val Tyr Ala Gly Pro Glu Pro Pro Pro

794 GTT TAC ACC AAC CTC AGC AGC TAC TCC CCA GCC TCT GCG TCC TCG GGA GGC GCC GGG GCT GCC GTC GGG ACC GGG AGC TCG TAC CCG ACG
181 Val Tyr Thr Asn Leu Ser Ser Tyr Ser Pro Ala Ser Ala Ser Ser Gly Gly Ala Gly Ala Ala Val Gly Thr Gly Ser Ser Tyr Pro Thr

884 ACC ACC ATC AGC TAC CTC CCA CAC GCG CCG CCC TTC GCC GGT GGC CAC CCG GCG CAG CTG GGC TTG GGC CGC GGC GCC TCC ACC TTC AAG
211 Thr Thr Ile Ser Tyr Leu Pro His Ala Pro Pro Phe Ala Gly Gly His Pro Ala Gln Leu Gly Leu Gly Arg Gly Ala Ser Thr Phe Lys

974 GAG GAA CCG CAG ACC GTG CCG GAG GCG CGC AGC CGG GAC GCC ACG CCG CCG GTG TCC CCC ATC AAC ATG GAA GAC CAA GAG CGC ATC AAA
241 Glu Glu Pro Gln Thr Val Pro Glu Ala Arg Ser Arg Asp Ala Thr Pro Pro Val Ser Pro Ile Asn Met Glu Asp Gln Glu Arg Ile Lys

1064 GTG GAG CGC AAG CGG CTG CGG AAC CGG CTG GCG GCC ACC AAG TGC CGG AAG CGG AAG CTG GAG CGC ATC GCG CGC CTG GAG GAC AAG GTG
271 Val Glu Arg Lys Arg Leu Arg Asn Arg Leu Ala Ala Thr Lys Cys Arg Lys Arg Lys Leu Glu Arg Ile Ala Arg Leu Glu Asp Lys Val

1154 AAG ACG CTC AAG GCC GAG AAC GCG GGG CTG TCG AGT ACC GCC GGC CTC CTC CGG GAG CAG GTG GCC CAG CTC AAA CAG AAG GTC ATG ACC
301 Lys Thr Leu Lys Ala Glu Asn Ala Gly Leu Ser Ser Thr Ala Gly Leu Leu Arg Glu Gln Val Ala Gln Leu Lys Gln Lys Val Met Thr

1244 CAC GTC AGC AAC GGC TGT CAG CTG CTG CTT GGG GTC AAG GGA CAC GCC TTC TGA ACGTCCCCTG CCCCTTACG GACACCCCTT CGCTTGGACG
331 His Val Ser Asn Gly Cys Gln Leu Leu Leu Gly Val Lys Gly His Ala Phe End

1338 GCTGGGCACA CGCTCCCAC TGGGGTCCAG GGAGCAGGCG GTGGGCACCC ACCCTGGGAC CTAGGGGGCG CGCAAACCAC ACTGGACTCC GGCCCCCTA CCCTGCGCC
1448 AGTCCTTCCA CCTCGACGTT TACAAGCCCC CCCTTCCACT TTTTITTTGTA TGTTTTTTTT CTGCTGGAAA CAGACTCGAT TCATATTGAA TATAATATAT TTGTGTATT
1558 AACAGGGGAG GGAAGAGGGG GCGATCGCG CGGAGCTGGC CCCCGCCCTT GGTACTCAAG CCCCGGGGA CATTGGGAAG GGGACCCCG CCCCTGCCC TCCCCTCTC
1668 GCACCGTACT GTGAAAAGA AACACGCACT TAGTCTCTAA AGAGTTTATT TTAAGACGTG TTTGTGTTTG TGTTGTTTG TTCTTTTAT TGAATCTATT TAAGTAAAA
1778 AAAAATGGT TCTTTATTA 1797

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Figure 1. Human *jun-B* cDNA nucleotide sequence and the deduced amino acid sequence.

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1 ATG AAG AAG GAC GCG CTG ACG CTG AGC CTG AGT GAG CAG GTG GCG GCA GCG CTC AAG CCT GCG GCC GCG CCG CCT CCT ACC CCC CTG CGC
1 Met Lys Lys Asp Ala Leu Thr Leu Ser Leu Ser Glu Gln Val Ala Ala Ala Leu Lys Pro Ala Ala Ala Pro Pro Pro Thr Pro Leu Arg

91 GCC GAC GGC GCC CCC AGC GCG GCA CCC CCC GAC GGC CTG CTC GCC TCT CCG GAC CTG GGG CTG CTG AAG CTG GCC TCC CCC GAG CTC GAG
31 Ala Asp Gly Ala Pro Ser Ala Ala Pro Pro Asp Gly Leu Leu Ala Ser Pro Asp Leu Gly Leu Leu Lys Leu Ala Ser Pro Glu Leu Glu

181 CGC CTC ATC ATC CAG TCC AAC GGG CTG GTC ACC ACC ACG CCG ACG AGC TCA CAG TTC CTC TAC CCC AAG GTG GCG GCC AGC GAG GAG CAG
61 Arg Leu Ile Ile Gln Ser Asn Gly Leu Val Thr Thr Thr Pro Thr Ser Ser Gln Phe Leu Tyr Pro Lys Val Ala Ala Ser Glu Glu Gln

271 GAG TTC GCC GAG GGC TTC GTC AAG GCC CTG GAG GAT TTA CAC AAG CAG AAC CAG CTC GGC GCG GGC GCG GCC GCT GCC GCC GCC GCC
91 Glu Phe Ala Glu Gly Phe Val Lys Ala Leu Glu Asp Leu His Lys Leu Glu Asp Leu Gly Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala

361 GCC GCC GGG GGG CCC TCG GGC ACG GCC ACG GGC TCC GCG CCC GCC GGC GAG CTG GCC CCG GCG GCC GCG GCC GCG CCC GAA GCG CCT GTC TAC
121 Ala Ala Gly Gly Pro Ser Gly Thr Ala Thr Gly Thr Ala Pro Pro Gly Glu Leu Ala Pro Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala

451 GCG AAC CTG AGC AGC TAC GCG GGC GGC GCC GGG GGC GCG GGG GGC GCC GCG ACG GTC GCC TTC GCT GCC GAA CCT GTG CCC TTC CCG CCG
151 Ala Asn Leu Ser Ser Tyr Ala Gly Gly Ala Gly Gly Ala Gly Gly Ala Ala Thr Val Ala Phe Ala Ala Ala Glu Pro Val Pro Phe Pro Pro

541 CCG CCA CCC CCA GGC GCG TTG GGG CCG CCG CGC CTG GCT GCG CTC AAG GAC GAG CCA CAG ACG GTG CCC GAC GTG CCG AGC TTC GGC GAG
181 Pro Pro Pro Pro Gly Ala Leu Gly Pro Pro Arg Leu Ala Ala Leu Lys Asp Glu Pro Gln Thr Val Pro Asp Val Pro Ser Phe Gly Glu

631 AGC CCG CCG TTG TCG CCC ATC GAC ATG GAC ACG CAG GAG CGC ATC AAG GCG GAG CGC AAG CCG CTG CGC AAC CGC ATC GCC GCC TCC AAG
211 Ser Pro Pro Leu Ser Pro Ile Asp Met Asp Thr Gln Glu Arg Ile Lys Ala Glu Arg Lys Arg Leu Arg Asn Arg Ile Ala Ala Ser Lys

721 TGC CGC AAG CGC AAG CTG GAG CGC ATC TCG CGC CTG GAA GAG AAA GTG AAG ACC CTC AAG AGT CAG AAC ACG GAG CTG GCG TCC ACG GCG
241 Cys Arg Lys Arg Lys Leu Glu Arg Ile Ser Arg Leu Glu Glu Lys Val Lys Thr Leu Lys Ser Gln Asn Thr Glu Leu Ala Ser Thr Ala

811 AGC CTG CTG CGC GAG CAG GTG GCG CAG CTC AAG CAG AAA GTC CTC AGC CAC GTC AAC AGC GGC TGC CAG CTG CTG CCC CAG CAC CAG GTG
271 Ser Leu Leu Arg Glu Gln Val Ala Gln Leu Lys Gln Lys Val Leu Ser His Val Asn Ser Gly Cys Gln Leu Leu Pro Gln His Gln Val

901 CCC GCG TAC TGA GTCCGCGCG GGGGCGCATG CGCGGCCACC CTCCCAAGG GCGGGGCTCG CGGGGGGTG TCGTGGGCGC CCCGACTTG GAGAGGGTGC
301 Pro Ala Tyr End

1003 GGCCCTGGGG ACCCCCCCT CCCCGAGTGT GCCCAGGAAC TCAGAGAGGG CGCGGCCCCG GGGGATTCCC CCCCGAGGGT GCCCAGGACT CGGAAGGGGC GCCCCGGACT
1113 CGACAAGCTG GACCCCTGTC TCCCGGGGGG GCGAGCGCAT GACCCCCCGG CCCTCGCGCT GCCTCTTTCC CCCGCGCGGC CGCCCGGTGT TGCACAAACC CGCGCGTCTC
1223 GGCTGCCCTT TTGTACACCG CGCCGCGGAA GGGGGCTCCG AGGGGGCGCA GCCTCAAACC CTGCCTTCC TTTACTTTTA CTTTTTTTTT TTTTCTTTT GGAAGAGAGA
1333 AGAACAGAGT GTTCGATTCT GCCCTATTTA TGTTTCTACT CGGGAACAAA CGTTGGTTGT GTGTGTGTGT GTTTTCTTGT GTTGGTTTTT TAAAGAAATG GGAAGAAGAA
1443 AAAAAAATC TCCGCCCTT TCCTCGATCT CGCTCCCCT TCGGTTCTTT CGACCGGTCC CCCCTCCCT TTTTGTCTG TTTTGTCTG TTTTGTCTG AGTCCACATT
1553 CCTGTTTGT ATCCTTGTTT CGCCCGGTTT TCTGTTTCA GTAAGTCTC GTTACGCCAA AAAAAAAAAA A 1623

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Figure 2. Human *jun-D* cDNA nucleotide sequence and the deduced amino acid sequence

long, was determined (Fig. 2). The mRNAs of *jun-B* and *jun-D* were both 1.9 kb (data not shown). Enhanced expression of *jun-B* and *jun-D* was detected in neuroblastoma (NB-39nu, NB-1), Burkitt lymphoma (JBL-2, JBL-5), thyroid tumor (TC78), vulva tumor (A431) and prostate tumor (PC3) cell lines (data not shown). U937 human monocyte cells differentiate into macrophages when treated with TPA (2), and expression of the *jun* gene family, *c-jun*, *jun-B* and *jun-D* was determined. Expression of all the three genes increased in 60 min and reached a peak about 9–120 min after addition of TPA (data not shown).

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