Human BCL2:

>gi|72198189|ref|NP\_000624.2| B-cell lymphoma protein 2 alpha isoform [Homo sapiens]

MAHAGRTGYDNREIVMKYIHYKLSQRGYEWDAGDVGAAPPGAAPAPGIFSSQPGHTPHPAASRDPVARTS

PLQTPAAPGAAAGPALSPVPPVVHLTLRQAGDDFSRRYRRDFAEMSSQLHLTPFTARGRFATVVEELFRD

GVNWGRIVAFFEFGGVMCVESVNREMSPLVDNIALWMTEYLNRHLHTWIQDNGGWDAFVELYGPSMRPLF

DFSWLSLKTLLSLALVGACITLGAYLGHK

**Sequence A:**

MAGAASPCANGCGPGAPSDAEVLHLCRSLEVGTVMTLFYSKKSQRPERKTFQVKLETRQITWSRGADKIE

GAIDIREIKEIRPGKTSRDFDRYQEDPAFRPDQSHCFVILYGMEFRLKTLSLQATSEDEVNMWIKGLTWL

MEDTLQAPTPLQIERWLRKQFYSVDRNREDRISAKDLKNMLSQVNYRVPNMRFLRERLTDLEQRSGDITY

GQFAQLYRSLMYSAQKTMDLPFLEASTLRAGERPELCRVSLPEFQQFLLDYQGELWAVDRLQVQEFMLSF

LRDPLREIEEPYFFLDEFVTFLFSKENSVWNSQLDAVCPDTMNNPLSHYWISSSHNTYLTGDQFSSESSL

EAYARCLRMGCRCIELDCWDGPDGMPVIYHGHTLTTKIKFSDVLHTIKEHAFVASEYPVILSIEDHCSIA

QQRNMAQYFKKVLGDTLLTKPVEISADGLPSPNQLKRKILIKHKKLAEGSAYEEVPTSMMYSENDISNSI

KNGILYLEDPVNHEWYPHYFVLTSSKIYYSEETSSDQGNEDEEEPKEVSSSTELHSNEKWFHGKLGAGRD

GRHIAERLLTEYCIETGAPDGSFLVRESETFVGDYTLSFWRNGKVQHCRIHSRQDAGTPKFFLTDNLVFD

SLYDLITHYQQVPLRCNEFEMRLSEPVPQTNAHESKEWYHASLTRAQAEHMLMRVPRDGAFLVRKRNEPN

SYAISFRAEGKIKHCRVQQEGQTVMLGNSEFDSLVDLISYYEKHPLYRKMKLRYPINEEALEKIGTAEPD

YGALYEGRNPGFYVEANPMPTFKCAVKALFDYKAQREDELTFIKSAIIQNVEKQEGGWWRGDYGGKKQLW

FPSNYVEEMVNPVALEPEREHLDENSPLGDLLRGVLDVPACQIAIRPEGKNNRLFVFSISMASVAHWSLD

VAADSQEELQDWVKKIREVAQTADARLTEGKIMERRKKIALELSELVVYCRPVPFDEEKIGTERACYRDM

SSFPETKAEKYVNKAKGKKFLQYNRLQLSRIYPKGQRLDSSNYDPLPMWICGSQLVALNFQTPDKPMQMN

QALFMTGRHCGYVLQPSTMRDEAFDPFDKSSLRGLEPCAISIEVLGARHLPKNGRGIVCPFVEIEVAGAE

YDSTKQKTEFVVDNGLNPVWPAKPFHFQISNPEFAFLRFVVYEEDMFSDQNFLAQATFPVKGLKTGYRAV

PLKNNYSEDLELASLLIKIDIFPAKQENGDLSPFSGTSLRERGSDASGQLFHGRAREGSFESRYQQPFED

FRISQEHLADHFDSRERRAPRRTRVNGDNRL

**Seq for Multiple Sequence Alignment:**

>Human gi|29725609|ref|NP\_005219.2| epidermal growth factor receptor isoform a [Homo sapiens]

MRPSGTAGAALLALLAALCPASRALEEKKVCQGTSNKLTQLGTFEDHFLSLQRMFNNCEVVLGNLEITYV

QRNYDLSFLKTIQEVAGYVLIALNTVERIPLENLQIIRGNMYYENSYALAVLSNYDANKTGLKELPMRNL

QEILHGAVRFSNNPALCNVESIQWRDIVSSDFLSNMSMDFQNHLGSCQKCDPSCPNGSCWGAGEENCQKL

TKIICAQQCSGRCRGKSPSDCCHNQCAAGCTGPRESDCLVCRKFRDEATCKDTCPPLMLYNPTTYQMDVN

PEGKYSFGATCVKKCPRNYVVTDHGSCVRACGADSYEMEEDGVRKCKKCEGPCRKVCNGIGIGEFKDSLS

INATNIKHFKNCTSISGDLHILPVAFRGDSFTHTPPLDPQELDILKTVKEITGFLLIQAWPENRTDLHAF

ENLEIIRGRTKQHGQFSLAVVSLNITSLGLRSLKEISDGDVIISGNKNLCYANTINWKKLFGTSGQKTKI

ISNRGENSCKATGQVCHALCSPEGCWGPEPRDCVSCRNVSRGRECVDKCNLLEGEPREFVENSECIQCHP

ECLPQAMNITCTGRGPDNCIQCAHYIDGPHCVKTCPAGVMGENNTLVWKYADAGHVCHLCHPNCTYGCTG

PGLEGCPTNGPKIPSIATGMVGALLLLLVVALGIGLFMRRRHIVRKRTLRRLLQERELVEPLTPSGEAPN

QALLRILKETEFKKIKVLGSGAFGTVYKGLWIPEGEKVKIPVAIKELREATSPKANKEILDEAYVMASVD

NPHVCRLLGICLTSTVQLITQLMPFGCLLDYVREHKDNIGSQYLLNWCVQIAKGMNYLEDRRLVHRDLAA

RNVLVKTPQHVKITDFGLAKLLGAEEKEYHAEGGKVPIKWMALESILHRIYTHQSDVWSYGVTVWELMTF

GSKPYDGIPASEISSILEKGERLPQPPICTIDVYMIMVKCWMIDADSRPKFRELIIEFSKMARDPQRYLV

IQGDERMHLPSPTDSNFYRALMDEEDMDDVVDADEYLIPQQGFFSSPSTSRTPLLSSLSATSNNSTVACI

DRNGLQSCPIKEDSFLQRYSSDPTGALTEDSIDDTFLPVPEYINQSVPKRPAGSVQNPVYHNQPLNPAPS

RDPHYQDPHSTAVGNPEYLNTVQPTCVNSTFDSPAHWAQKGSHQISLDNPDYQQDFFPKEAKPNGIFKGS

TAENAEYLRVAPQSSEFIGA

>Mouse gi|46560582|ref|NP\_997538.1| epidermal growth factor receptor isoform 1 [Mus musculus]

MRPSGTARTTLLVLLTALCAAGGALEEKKVCQGTSNRLTQLGTFEDHFLSLQRMYNNCEVVLGNLEITYV

QRNYDLSFLKTIQEVAGYVLIALNTVERIPLENLQIIRGNALYENTYALAILSNYGTNRTGLRELPMRNL

QEILIGAVRFSNNPILCNMDTIQWRDIVQNVFMSNMSMDLQSHPSSCPKCDPSCPNGSCWGGGEENCQKL

TKIICAQQCSHRCRGRSPSDCCHNQCAAGCTGPRESDCLVCQKFQDEATCKDTCPPLMLYNPTTYQMDVN

PEGKYSFGATCVKKCPRNYVVTDHGSCVRACGPDYYEVEEDGIRKCKKCDGPCRKVCNGIGIGEFKDTLS

INATNIKHFKYCTAISGDLHILPVAFKGDSFTRTPPLDPRELEILKTVKEITGFLLIQAWPDNWTDLHAF

ENLEIIRGRTKQHGQFSLAVVGLNITSLGLRSLKEISDGDVIISGNRNLCYANTINWKKLFGTPNQKTKI

MNNRAEKDCKAVNHVCNPLCSSEGCWGPEPRDCVSCQNVSRGRECVEKCNILEGEPREFVENSECIQCHP

ECLPQAMNITCTGRGPDNCIQCAHYIDGPHCVKTCPAGIMGENNTLVWKYADANNVCHLCHANCTYGCAG

PGLQGCEVWPSGPKIPSIATGIVGGLLFIVVVALGIGLFMRRRHIVRKRTLRRLLQERELVEPLTPSGEA

PNQAHLRILKETEFKKIKVLGSGAFGTVYKGLWIPEGEKVKIPVAIKELREATSPKANKEILDEAYVMAS

VDNPHVCRLLGICLTSTVQLITQLMPYGCLLDYVREHKDNIGSQYLLNWCVQIAKGMNYLEDRRLVHRDL

AARNVLVKTPQHVKITDFGLAKLLGAEEKEYHAEGGKVPIKWMALESILHRIYTHQSDVWSYGVTVWELM

TFGSKPYDGIPASDISSILEKGERLPQPPICTIDVYMIMVKCWMIDADSRPKFRELILEFSKMARDPQRY

LVIQGDERMHLPSPTDSNFYRALMDEEDMEDVVDADEYLIPQQGFFNSPSTSRTPLLSSLSATSNNSTVA

CINRNGSCRVKEDAFLQRYSSDPTGAVTEDNIDDAFLPVPEYVNQSVPKRPAGSVQNPVYHNQPLHPAPG

RDLHYQNPHSNAVGNPEYLNTAQPTCLSSGFNSPALWIQKGSHQMSLDNPDYQQDFFPKETKPNGIFKGP

TAENAEYLRVAPPSSEFIGA

>Chimp gi|114613403|ref|XP\_001156495.1| PREDICTED: epidermal growth factor receptor isoform 5 [Pan troglodytes]

MRPSGTAGAALLALLAALCPASRALEEKKVCQGTSNKLTQLGTFEDHFLSLQRMFNNCEVVLGNLEITYV

QRNYDLSFLKTIQEVAGYVLIALNTVERIPLENLQIIRGNMYYENSYALAVLSNYDANKTGLKELPMRNL

QEILHGAVRFSNNPALCNVESIQWRDIVSSDFLSNMSMDFQNHLGSCQKCDPSCPNGSCWGAGEENCQKL

TKIICAQQCSGRCRGKSPSDCCHNQCAAGCTGPRESDCLVCRKFRDEATCKDTCPPLMLYNPTTYQMDVN

PEGKYSFGATCVKKCPRNYVVTDHGSCVRACGADSYEMEEDGVRKCKKCEGPCRKVCNGIGIGEFKDTLS

INATNIKHFKNCTSISGDLHILPVAFRGDSFTHTPPLDPQELDILKTVKEITGFLLIQAWPENRTDLHAF

ENLEIIRGRTKQHGQFSLAVVSLNITSLGLRSLKEISDGDVIISGNKNLCYANTINWKKLFGTSGQKTKI

ISNRGENSCKATGQVCHALCSPEGCWGPEPRDCVSCRNVSRGRECVDKCNILEGEPREFVENSECIQCHP

ECLPQAMNITCTGRGPDNCIQCAHYIDGPHCVKTCPAGVMGENNTLVWKYADAGHVCHLCHPNCTYGCFG

PHSHASMPRPWNLSATSPFLVPPLHSRPKIPSIATGMVGALLLLLVVALGIGLFMRRRHIVRKRTLRRLL

QERELVEPLTPSGEAPNQALLRILKETEFKKIKVLGSGAFGTVYKGLWIPEGEKVKIPVAIKELREATSP

KANKEILDEAYVMASVDNPHVCRLLGICLTSTVQLITQLMPFGCLLDYVREHKDNIGSQYLLNWCVQIAK

GMNYLEDRRLVHRDLAARNVLVKTPQHVKITDFGLAKLLGAEEKEYHAEGGKVPIKWITLESILHRIYTH

QKKVWSYGVTVWELMTFGSKPYDGIPASEISSILEKGERLPQPPICTIDVYMIMVKCWMIDADSRPKFRE

LIIEFSKMARDPQRYLVIQGDERMHLPSPTDSNFYRALMDEEDMDDVVDADEYLIPQQGFFSSPSTSRTP

LLSSLSATSNNSTMACIDRNGLQSCPIKEDSFLQRYSSDPTGALTEDSIDDTFLPVPEYINQSVPKRPAG

SVQNPVYHNQPLNPTPSRDPHYQDPHSTAVGNPEYLNTVQPTCVNSTFDSPAHWAQKGSHQISLDNPDYQ

QDFFPKEAKPNGIFKGSTAENAEYLRVAPQSSEFIGA

>Rat gi|25742617|ref|NP\_113695.1| epidermal growth factor receptor [Rattus norvegicus]

MRPSGTARTKLLLLLAALCAAGGALEEKKVCQGTSNRLTQLGTFEDHFLSLQRMFNNCEVVLGNLEITYV

QRNYDLSFLKTIQEVAGYVLIALNTVERIPLENLQIIRGNALYENTYALAVLSNYGTNKTGLRELPMRNL

QEILIGAVRFSNNPILCNMETIQWRDIVQDVFLSNMSMDVQRHLTGCPKCDPSCPNGSCWGRGEENCQKL

TKIICAQQCSRRCRGRSPSDCCHNQCAAGCTGPRESDCLVCHRFRDEATCKDTCPPLMLYNPTTYQMDVN

PEGKYSFGATCVKKCPRNYVVTDHGSCVRACGPDYYEVEEDGVSKCKKCDGPCRKVCNGIGIGEFKDTLS

INATNIKHFKYCTAISGDLHILPVAFKGDSFTRTPPLDPRELEILKTVKEITGFLLIQAWPENWTDLHAF

ENLEIIRGRTKQHGQFSLAVVGLNITSLGLRSLKEISDGDVIISGNRNLCYANTINWKKLFGTPNQKTKI

MNNRAEKDCKATNHVCNPLCSSEGCWGPEPTDCVSCQNVSRGRECVDKCNILEGEPREFVENSECIQCHP

ECLPQTMNITCTGRGPDNCIKCAHYVDGPHCVKTCPSGIMGENNTLVWKFADANNVCHLCHANCTYGCAG

PGLKGCQQPEGPKIPSIATGIVGGLLFIVVVALGIGLFMRRRQLVRKRTLRRLLQERELVEPLTPSGEAP

NQAHLRILKETEFKKIKVLGSGAFGTVYKGLWIPEGEKVKIPVAIKELREATSPKANKEILDEAYVMASV

DNPHVCRLLGICLTSTVQLITQLMPYGCLLDYVREHKDNIGSQYLLNWCVQIAKGMNYLEDRRLVHRDLA

ARNVLVKTPQHVKITDFGLAKLLGAEEKEYHAEGGKVPIKWMALESILHRIYTHQSDVWSYGVTVWELMT

FGSKPYDGIPASEISSILEKGERLPQPPICTIDVYMIMVKCWMIDADSRPKFRELILEFSKMARDPQRYL

VIQGDERMHLPSPTDSNFYRALMEEEDMEDVVDADEYLIPQQGFFNSPSTSRTPLLSSLSANSNSSTVAC

INRNGSCRVKEDAFLQRYSSDPTSVLTEDNIDDTFLPVPEYINQSVPKRPAGSVQNPVYHNQPLHPAPGR

DLHYQNPHSNAVSNPEYLNTAQPTCLSSGFDSSALWIQKGSHQMSLDNPDYQQDFFPKEAKPNGIFKGPT

AENAEYLRVAPPSSEFSGA

>Chicken gi|45382797|ref|NP\_990828.1| epidermal growth factor receptor [Gallus gallus]

MGVRSPLSASGPRGAAVLVLLLLLLGRVALCSAVEEKKVCQGTNNKLTQLGHVEDHFTSLQRMYNNCEVV

LSNLEITYVEHNRDLTFLKTIQEVAGYVLIALNMVDVIPLENLQIIRGNVLYDNSFALAVLSNYHMNKTQ

GLRELPMKRLSEILNGGVKISNNPKLCNMDTVLWNDIIDTSRKPLTVLDFASNLSSCPKCHPNCTEDHCW

GAGEQNCQTLTKVICAQQCSGRCRGKVPSDCCHNQCAAGCTGPRESDCLACRKFRDDATCKDTCPPLVLY

NPTTYQMDVNPEGKYSFGATCVRECPHNYVVTDHGSCVRSCNTDTYEVEENGVRKCKKCDGLCSKVCNGI

GIGELKGILSINATNIDSFKNCTKINGDVSILPVAFLGDAFTKTLPLDPKKLDVFRTVKEISGFLLIQAW

PDNATDLYAFENLEIIRGRTKQHGQYSLAVVNLKIQSLGLRSLKEISDGDIAIMKNKNLCYADTMNWRSL

FATQSQKTKIIQNRNKNDCSKSVCFPAFAKAHNEMEE

>C elegans gi|25146697|ref|NP\_495962.2| LEThal family member (let-23) [Caenorhabditis elegans]

MRYPPSIGSILLIIPIFLTFFGNSNAQLWKRCVSPQDCLCSGTTNGISRYGTGNILEDLETMYRGCRRVY

GNLEITWIEANEIKKWRESTNSTVDPKNEDSPLKSINFFDNLEEIRGSLIIYRANIQKISFPRLRVIYGD

EVFHDNALYIHKNDKVHEVVMRELRVIRNGSVTIQDNPKMCYIGDKIDWKELLYDPDVQKVETTNSHQHC

YQNGKSMAKCHESCNDKCWGSGDNDCQRVYRSVCPKSCSQCFYSNSTSSYECCDSACLGGCTGHGPKNCI

ACSKYELDGICIETCPSRKIFNHKTGRLVFNPDGRYQNGNHCVKECPPELLIENDVCVRHCSDGHHYDAT

KDVRECEKCRSSSCPKICTVDGHLTNETLKNLEGCEQIDGHLIIEHAFTYEQLKVLETVKIVSEYITIVQ

QNFYDLKFLKNLQIIEGRKLHNVRWALAIYQCDDLEELSLNSLKLIKTGAVLIMKNHRLCYVSKIDWSSI

ITSKGKDNKPSLAIAENRDSKLCETEQRVCDKNCNKRGCWGKEPEDCLECKTWKSVGTCVEKCDTKGFLR

NQTSMKCERCSPECETCNGLGELDCLTCRHKTLYNSDFGNRMECVHDCPVSHFPTQKNVCEKCHPTCYDN

GCTGPDSNLGYGGCKQCKYAVKYENDTIFCLQSSGMNNVCVENDLPNYYISTYDTEGVIETHCEKCSISC

KTCSSAGRNVVQNKCVCKHVEYQPNPSERICMDQCPVNSFMVPDTNNTVCKKCHHECDQNYHCANGQSTG

CQKCKNFTVFKGDIAQCVSECPKNLPFSNPANGECLDYDIASRQRKTRMVIIGSVLFGFAVMFLFILLVY

WRCQRIGKKLKIAEMVDMPELTPIDASVRPNMSRICLIPSSELQTKLDKKLGAGAFGTVFAGIYYPKRAK

NVKIPVAIKVFQTDQSQTDEMLEEATNMFRLRHDNLLKIIGFCMHDDGLKIVTIYRPLGNLQNFLKLHKE

NLGAREQVLYCYQIASGMQYLEKQRVVHRDLATRNVLVKKFNHVEITDFGLSKILKHDADSITIKSGKVA

IKWLAIEIFSKHCYTHASDVWAFGVTCWEIITFGQSPYQGMSTDSIHNFLKDGNRLSQPPNCSQDLYQEL

LRCWMADPKSRPGFEILYERFKEFCKVPQLFLENSNKISESDLSAEERFQTERIREMFDGNIDPQMYFDQ

GSLPSMPSSPTSMATFTIPHGDLMNRMQSVNSSRYKTEPFDYGSTAQEDNSYLIPKTKEVQQSAVLYTAV

TNEDGQTELSPSNGDYYNQPNTPSSSSGYYNEPHLKTKKPETSEEAEAVQYENEEVSQKETCL

**GDE formatted MSA**

%Human

---------mrpsgtagaallallaalcpasr---------aleekkvcqgtsnkltqlg

tfedhflslqrmfnncevvlgnleityvqr----------------------nydlsflk

tiqevagyvlialntveriplenlqiirgnmyyensyalavlsnydanktg-lkelpmrn

lqeilhgavrfsnnpalcnv-esiqwrdivss-----dflsnmsmdfqnhlgscqkcdps

cpngscwgageencqkltkiicaqqcsgrcrgksps--dcchnqcaagctgpresdclvc

rkfrdeatckdtcpplmlynpttyqmdvnpegkysfgatcvkkcprnyvvtdhgscvrac

gadsyemeedgvrkckkceg-pcrkvcngigigefkdslsinatnikhfknctsisgdlh

ilpvafrgdsfthtppldpqeldilktvkeitgflliqawpenrtdlhafenleiirgrt

kqhgqfslavvsln-itslglrslkeisdgdviisgnknlcyantinwkklfgtsgqktk

----iisnrgensckatgqvchalcspegcwgpeprdcvscrnvsrgrecvdkcnllege

prefvense---------------------------------------------------

ciqchpeclpqamnitctgrgpdnciqcahyidgp-------------------------

-------------------hcvktcpagvmgenntlvwkyadag----------------

--------hvchlchpnctygctgpg----------------------------------

--legcpt--ngpkipsiatgmvgalll--llvvalgiglfmrrrhivrkrtlrrllqer

elvepltpsgeapnqallrilketefkkikvlgsgafgtvykglwipegek-vkipvaik

elreatspkankeildeayvmasvdnphvcrllgicltst-vqlitqlmpfgclldyvre

hkdnigsqyllnwcvqiakgmnyledrrlvhrdlaarnvlvktpqhvkitdfglakllga

eekeyhaeggkvpikwmalesilhriythqsdvwsygvtvwelmtfgskpydgipaseis

silekgerlpqppictidvymimvkcwmidadsrpkfreliiefskmardpqrylviqgd

ermhlpsptdsnfyralmdeedmddvvdadeylipqqgffsspstsrtpllsslsatsnn

stvacidrnglqscpikedsflqryssdptgaltedsiddtflpvpeyinqsvpkrpags

vqnpvyhnqplnpapsrdphyqdphstavgnpeylntvqptcvnstfdspahwaqkgshq

isldnpdyqqdffpkeakpngifkgstaenaeylrvapqssefiga

%Chimp

---------mrpsgtagaallallaalcpasr---------aleekkvcqgtsnkltqlg

tfedhflslqrmfnncevvlgnleityvqr----------------------nydlsflk

tiqevagyvlialntveriplenlqiirgnmyyensyalavlsnydanktg-lkelpmrn

lqeilhgavrfsnnpalcnv-esiqwrdivss-----dflsnmsmdfqnhlgscqkcdps

cpngscwgageencqkltkiicaqqcsgrcrgksps--dcchnqcaagctgpresdclvc

rkfrdeatckdtcpplmlynpttyqmdvnpegkysfgatcvkkcprnyvvtdhgscvrac

gadsyemeedgvrkckkceg-pcrkvcngigigefkdtlsinatnikhfknctsisgdlh

ilpvafrgdsfthtppldpqeldilktvkeitgflliqawpenrtdlhafenleiirgrt

kqhgqfslavvsln-itslglrslkeisdgdviisgnknlcyantinwkklfgtsgqktk

----iisnrgensckatgqvchalcspegcwgpeprdcvscrnvsrgrecvdkcnilege

prefvense---------------------------------------------------

ciqchpeclpqamnitctgrgpdnciqcahyidgp-------------------------

-------------------hcvktcpagvmgenntlvwkyadag----------------

--------hvchlchpnctygcfgphshas-------------------mprpwnlsats

pflvpplh--srpkipsiatgmvgalll--llvvalgiglfmrrrhivrkrtlrrllqer

elvepltpsgeapnqallrilketefkkikvlgsgafgtvykglwipegek-vkipvaik

elreatspkankeildeayvmasvdnphvcrllgicltst-vqlitqlmpfgclldyvre

hkdnigsqyllnwcvqiakgmnyledrrlvhrdlaarnvlvktpqhvkitdfglakllga

eekeyhaeggkvpikwitlesilhriythqkkvwsygvtvwelmtfgskpydgipaseis

silekgerlpqppictidvymimvkcwmidadsrpkfreliiefskmardpqrylviqgd

ermhlpsptdsnfyralmdeedmddvvdadeylipqqgffsspstsrtpllsslsatsnn

stmacidrnglqscpikedsflqryssdptgaltedsiddtflpvpeyinqsvpkrpags

vqnpvyhnqplnptpsrdphyqdphstavgnpeylntvqptcvnstfdspahwaqkgshq

isldnpdyqqdffpkeakpngifkgstaenaeylrvapqssefiga

%Mouse

---------mrpsgtarttllvlltalcaagg---------aleekkvcqgtsnrltqlg

tfedhflslqrmynncevvlgnleityvqr----------------------nydlsflk

tiqevagyvlialntveriplenlqiirgnalyentyalailsnygtnrtg-lrelpmrn

lqeiligavrfsnnpilcnm-dtiqwrdivqn-----vfmsnmsmdlqshpsscpkcdps

cpngscwgggeencqkltkiicaqqcshrcrgrsps--dcchnqcaagctgpresdclvc

qkfqdeatckdtcpplmlynpttyqmdvnpegkysfgatcvkkcprnyvvtdhgscvrac

gpdyyeveedgirkckkcdg-pcrkvcngigigefkdtlsinatnikhfkyctaisgdlh

ilpvafkgdsftrtppldpreleilktvkeitgflliqawpdnwtdlhafenleiirgrt

kqhgqfslavvgln-itslglrslkeisdgdviisgnrnlcyantinwkklfgtpnqktk

----imnnraekdckavnhvcnplcssegcwgpeprdcvscqnvsrgrecvekcnilege

prefvense---------------------------------------------------

ciqchpeclpqamnitctgrgpdnciqcahyidgp-------------------------

-------------------hcvktcpagimgenntlvwkyadan----------------

--------nvchlchanctygcagpg----------------------------------

--lqgcevwpsgpkipsiatgivggllf--ivvvalgiglfmrrrhivrkrtlrrllqer

elvepltpsgeapnqahlrilketefkkikvlgsgafgtvykglwipegek-vkipvaik

elreatspkankeildeayvmasvdnphvcrllgicltst-vqlitqlmpygclldyvre

hkdnigsqyllnwcvqiakgmnyledrrlvhrdlaarnvlvktpqhvkitdfglakllga

eekeyhaeggkvpikwmalesilhriythqsdvwsygvtvwelmtfgskpydgipasdis

silekgerlpqppictidvymimvkcwmidadsrpkfrelilefskmardpqrylviqgd

ermhlpsptdsnfyralmdeedmedvvdadeylipqqgffnspstsrtpllsslsatsnn

stvacinrng--scrvkedaflqryssdptgavtedniddaflpvpeyvnqsvpkrpags

vqnpvyhnqplhpapgrdlhyqnphsnavgnpeylntaqptclssgfnspalwiqkgshq

msldnpdyqqdffpketkpngifkgptaenaeylrvappssefiga

%Rat

---------mrpsgtartklllllaalcaagg---------aleekkvcqgtsnrltqlg

tfedhflslqrmfnncevvlgnleityvqr----------------------nydlsflk

tiqevagyvlialntveriplenlqiirgnalyentyalavlsnygtnktg-lrelpmrn

lqeiligavrfsnnpilcnm-etiqwrdivqd-----vflsnmsmdvqrhltgcpkcdps

cpngscwgrgeencqkltkiicaqqcsrrcrgrsps--dcchnqcaagctgpresdclvc

hrfrdeatckdtcpplmlynpttyqmdvnpegkysfgatcvkkcprnyvvtdhgscvrac

gpdyyeveedgvskckkcdg-pcrkvcngigigefkdtlsinatnikhfkyctaisgdlh

ilpvafkgdsftrtppldpreleilktvkeitgflliqawpenwtdlhafenleiirgrt

kqhgqfslavvgln-itslglrslkeisdgdviisgnrnlcyantinwkklfgtpnqktk

----imnnraekdckatnhvcnplcssegcwgpeptdcvscqnvsrgrecvdkcnilege

prefvense---------------------------------------------------

ciqchpeclpqtmnitctgrgpdncikcahyvdgp-------------------------

-------------------hcvktcpsgimgenntlvwkfadan----------------

--------nvchlchanctygcagpg----------------------------------

--lkgcqq-pegpkipsiatgivggllf--ivvvalgiglfmrrrqlvrkrtlrrllqer

elvepltpsgeapnqahlrilketefkkikvlgsgafgtvykglwipegek-vkipvaik

elreatspkankeildeayvmasvdnphvcrllgicltst-vqlitqlmpygclldyvre

hkdnigsqyllnwcvqiakgmnyledrrlvhrdlaarnvlvktpqhvkitdfglakllga

eekeyhaeggkvpikwmalesilhriythqsdvwsygvtvwelmtfgskpydgipaseis

silekgerlpqppictidvymimvkcwmidadsrpkfrelilefskmardpqrylviqgd

ermhlpsptdsnfyralmeeedmedvvdadeylipqqgffnspstsrtpllsslsansns

stvacinrng--scrvkedaflqryssdptsvltedniddtflpvpeyinqsvpkrpags

vqnpvyhnqplhpapgrdlhyqnphsnavsnpeylntaqptclssgfdssalwiqkgshq

msldnpdyqqdffpkeakpngifkgptaenaeylrvappssefsga

%Chicken

mgvrsplsasgprgaavlvllllllgrvalcs---------aveekkvcqgtnnkltqlg

hvedhftslqrmynncevvlsnleityveh----------------------nrdltflk

tiqevagyvlialnmvdviplenlqiirgnvlydnsfalavlsnyhmnktqglrelpmkr

lseilnggvkisnnpklcnm-dtvlwndiidt-----srkpltvldfasnlsscpkchpn

ctedhcwgageqncqtltkvicaqqcsgrcrgkvps--dcchnqcaagctgpresdclac

rkfrddatckdtcpplvlynpttyqmdvnpegkysfgatcvrecphnyvvtdhgscvrsc

ntdtyeveengvrkckkcdg-lcskvcngigigelkgilsinatnidsfknctkingdvs

ilpvaflgdaftktlpldpkkldvfrtvkeisgflliqawpdnatdlyafenleiirgrt

kqhgqyslavvnlk-iqslglrslkeisdgdiaimknknlcyadtmnwrslfatqsqktk

----iiqnrnkndcsks--vcfpafakahnemee--------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

----------------------------------------------

%C

---------mryppsigsilliipifltffgnsnaqlwkrcvspqdclcsgttngisryg

-tgniledletmyrgcrrvygnleitwieaneikkwrestnstvdpknedsplksinffd

nleeirgsliiyraniqkisfprlrviygdevfhdn-------alyihkndkvhevvmre

lrvirngsvtiqdnpkmcyigdkidwkellydpdvqkvettnshqhcyqngksmakches

cn-dkcwgsgdndcqrvyrsvcpkscsqcfysnstssyeccdsaclggctghgpknciac

skyeldgicietcpsrkifnhktgrlvfnpdgryqngnhcvkecpp-elliendvcvrhc

sdghhydatkdvrecekcrssscpkictvdgh--------ltnetlknlegceqidghli

iehaft------------yeqlkvletvkivs--eyitivqqnfydlkflknlqiiegrk

lhnvrwalaiyqcddleelslnslkliktgavlimknhrlcyvskidwssiitskgkdnk

pslaiaenrdsklceteqrvcdkncnkrgcwgkepedclecktwksvgtcvekcdtkgfl

rnqtsmkcercspecetcnglgeldcltcrhktlynsdfgnrmecvhdcpvshfptqknv

cekchptcydngctgpdsnlgyggckqckyavkyendtifclqssgmnnvcvendlpnyy

istydtegviethcekcsiscktcssagrnvvqnkcvckhveyqpnpsericmdqcpvns

fmvpdtnntvckkchhecdqnyhcangqstgcqkcknftvfkgdiaqcvsecpknlpfsn

pangecldydiasrqrktrmviigsvlfgfavmflfillvywrcqrigkklkiaemvdmp

eltpidasvrpnmsriclipsselqtkldkklgagafgtvfagiyypkraknvkipvaik

vfqtdqs--qtdemleeatnmfrlrhdnllkiigfcmhddglkivtiyrplgnlqnflkl

hkenlgareqvlycyqiasgmqylekqrvvhrdlatrnvlvkkfnhveitdfglskilkh

dadsitiksgkvaikwlaieifskhcythasdvwafgvtcweiitfgqspyqgmstdsih

nflkdgnrlsqppncsqdlyqellrcwmadpksrpgfeilyerfkefckvpqlflen--s

nkisesdlsaeerfqteriremfdgnidpqmyfdqg---------------slpsmpssp

tsmatftiphgdlmnrmqsvnssryktepfdygstaqednsylip-----ktkevqqsav

lytavtnedgqtelspsngdyynqpntpssssgyynephlktkkpetseeaeavqyenee

vsqketcl--------------------------------------

**Seq for MSA Hands-on**

PLCg1

>human gi|33598948|ref|NP\_002651.2| phospholipase C gamma 1 isoform a [Homo sapiens]

MAGAASPCANGCGPGAPSDAEVLHLCRSLEVGTVMTLFYSKKSQRPERKTFQVKLETRQITWSRGADKIE

GAIDIREIKEIRPGKTSRDFDRYQEDPAFRPDQSHCFVILYGMEFRLKTLSLQATSEDEVNMWIKGLTWL

MEDTLQAPTPLQIERWLRKQFYSVDRNREDRISAKDLKNMLSQVNYRVPNMRFLRERLTDLEQRSGDITY

GQFAQLYRSLMYSAQKTMDLPFLEASTLRAGERPELCRVSLPEFQQFLLDYQGELWAVDRLQVQEFMLSF

LRDPLREIEEPYFFLDEFVTFLFSKENSVWNSQLDAVCPDTMNNPLSHYWISSSHNTYLTGDQFSSESSL

EAYARCLRMGCRCIELDCWDGPDGMPVIYHGHTLTTKIKFSDVLHTIKEHAFVASEYPVILSIEDHCSIA

QQRNMAQYFKKVLGDTLLTKPVEISADGLPSPNQLKRKILIKHKKLAEGSAYEEVPTSMMYSENDISNSI

KNGILYLEDPVNHEWYPHYFVLTSSKIYYSEETSSDQGNEDEEEPKEVSSSTELHSNEKWFHGKLGAGRD

GRHIAERLLTEYCIETGAPDGSFLVRESETFVGDYTLSFWRNGKVQHCRIHSRQDAGTPKFFLTDNLVFD

SLYDLITHYQQVPLRCNEFEMRLSEPVPQTNAHESKEWYHASLTRAQAEHMLMRVPRDGAFLVRKRNEPN

SYAISFRAEGKIKHCRVQQEGQTVMLGNSEFDSLVDLISYYEKHPLYRKMKLRYPINEEALEKIGTAEPD

YGALYEGRNPGFYVEANPMPTFKCAVKALFDYKAQREDELTFIKSAIIQNVEKQEGGWWRGDYGGKKQLW

FPSNYVEEMVNPVALEPEREHLDENSPLGDLLRGVLDVPACQIAIRPEGKNNRLFVFSISMASVAHWSLD

VAADSQEELQDWVKKIREVAQTADARLTEGKIMERRKKIALELSELVVYCRPVPFDEEKIGTERACYRDM

SSFPETKAEKYVNKAKGKKFLQYNRLQLSRIYPKGQRLDSSNYDPLPMWICGSQLVALNFQTPDKPMQMN

QALFMTGRHCGYVLQPSTMRDEAFDPFDKSSLRGLEPCAISIEVLGARHLPKNGRGIVCPFVEIEVAGAE

YDSTKQKTEFVVDNGLNPVWPAKPFHFQISNPEFAFLRFVVYEEDMFSDQNFLAQATFPVKGLKTGYRAV

PLKNNYSEDLELASLLIKIDIFPAKQENGDLSPFSGTSLRERGSDASGQLFHGRAREGSFESRYQQPFED

FRISQEHLADHFDSRERRAPRRTRVNGDNRL

>Cow gi|27806069|ref|NP\_776850.1| phospholipase C gamma 1 [Bos taurus]

MAGAASPCANGCGPSAPSDAEVVHLCRSLEVGTVMTLFYSKKSQRPERKTFQVKLETRQITWSRGADKIE

GAIDIREIKEIRPGKTSRDFDRYQEDPAFRPDQSHCFVILYGMEFRLKTLSLQATSEDEVNMWIRGLTWL

MEDTLQAATPLQIERWLRKQFYSVDRNREDRISAKDLKNMLSQVNYRVPNMRFLRERLTDLEQRTSDITY

GQFAQLYRSLMYSAQKTMDLPFLEASALRAGERPELCRVSLPEFQQFLLEYQGELWAVDRLQVQEFMLSF

LRDPLREIEEPYFFLDEFVTFLFSKENSIWNSQLDEVCPDTMNNPLSHYWISSSHNTYLTGDQFSSESSL

EAYARCLRMGCRCIELDCWDGPDGMPVIYHGHTLTTKIKFSDVLHTIKEHAFVASEYPVILSIEDHCSIA

QQRNMAQYFKKVLGDTLLTKPVDIAADGLPSPNQLKRKILIKHKKLAEGSAYEEVPTSVMYSENDISNSI

KNGILYLEDPVNHEWYPHYFVLTSSKIYYSEETSSDQGNEDEEEPKEASGSTELHSNEKWFHGKLGAGRD

GRHIAERLLTEYCIETGAPDGSFLVRESETFVGDYTLSFWRNGKVQHCRIHSRQDAGTPKFFLTDNLVFD

SLYDLITHYQQVPLRCNEFEMRLSEPVPQTNAHESKEWYHASLTRAQAEHMLMRVPRDGAFLVRKRNEPN

SYAISFRAEGKIKHCRVQQEGQTVMLGNSEFDSLVDLISYYEKHPLYRKMKLRYPINEEALEKIGTAEPD

YGALYEGRNPGFYVEANPMPTFKCAVKALFDYKAQREDELTFTKSAIIQNVEKQEGGWWRGDYGGKKQLW

FPSNYVEEMVSPAALEPEREHLDENSPLGDLLRGVLDVPACQIAVRPEGKNNRLFVFSISMASVAHWSLD

VAADSQEELQDWVKKIREVAQTADARLTEGKMMERRKKIALELSELVVYCRPVPFDEEKIGTERACYRDM

SSFPETKAEKYVNKAKGKKFLQYNRLQLSRIYPKGQRLDSSNYDPLPMWICGSQLVALNFQTPDKPMQMN

QALFLAGGHCGYVLQPSVMRDEAFDPFDKSSLRGLEPCAICIEVLGARHLPKNGRGIVCPFVEIEVAGAE

YDSIKQKTEFVVDNGLNPVWPAKPFHFQISNPEFAFLRFVVYEEDMFSDQNFLAQATFPVKGLKTGYRAV

PLKNNYSEGLELASLLVKIDVFPAKQENGDLSPFGGASLRERSCDASGPLFHGRAREGSFEARYQQPFED

FRISQEHLADHFDGRDRRTPRRTRVNGDNRL

>Zebra fish gi|35903054|ref|NP\_919388.1| phospholipase C, gamma 1 [Danio rerio]

MAASAGFSSNGPVPWALSDTEVNNLYRDLELGTVLTLYYSKKSQRPERRTFQVKLETRQIIWTRGTDKIE

GEIDIREIKEIRTGQKSRDFERYVEDVTTRPDQAHCFVILYGTEFRLKSLSLAATSDEEMVMWVKGLTWL

MSDTLSSSTPLQIERWLRKQFYAVDRNREDRISCKDLKCMLCQVNYRVPNMKFLREKLPDGELRNGDVSY

SHFAQLYRSLMFDAQKSMEIPLLQRFIDRPEQKISLEDFQNFLIEQQKELWAADSNKVQEYMFRYLKDPL

REIEQPYFHQDEFLTYLFSKENTIWDAQLDQVRPEDMNNPLSHYWISSSHNTYLTGDQFSSESSLEAYAR

CLRMGCRCIELDCWDGPDGMPVIYHGHTLTTKIKFSDVLNTIKEHAFVTSDYPIILSIEDHCSIVQQRNM

ATFFKKVFGEMLLTKAVDISADGLPSPHQLKRKILIKHKKLAEGSAYEEVSSSTPYSENDISNSIKNGIL

YLEDPINHEWYPHFFVLTSNKIYYSEETSSNQGNEDEEEHREICNGMDQHVTEKWFHGKLGAGRDGRQIA

ERLLSEYCVETGAPDGSFLVRESETFVGDYTLSFWRSGRVQHCRIHSRQEAGSPKFYLTDNLVFDTLFAL

ITHYQQVPLRCNEFEMKLTEPVPQTNAHESKEWYHACLSRSQAENMLMRVPRDGAFLVRKRTEFNSFAIS

FRAEGKIKHCRVQQEGQTVVLGTSEFDSLVDLISYYEKHPLYRKMKLRYPINEETLEKIGTAEPDYGSLY

EGRNPGFYVEANQMPTFKCTVKAMYEYKAQRDDELSFIKNAIISNVDKQEGGWWKGDCGGKKQLWFPANY

VEEISPTAVEPDRSASENSPLGDLLRGSVDVSSCQIVVRPEGKGSRQFVFSLVPVASPRTGPVLDIAASS

QEELKDWVVKIREVTMTSEAKLEEGKMMERRKKIALELSDLVIYCRPVPFDEDKIGTERACFRDMSSFPE

TKAEKYVNRVKGKKFLQYNRLQLSRIYPRGQRLDSSNYDPLPMWLCGSQLVALNFQTADKPMQMNQAIFM

LNGRSGYVLQPPIMRDDNFDPFDRHSLRGVEPITLSIEVLGARHLPKHGRGIVCPLIEIEVCGAEYDNAK

QRTDSEADNGLNPTWTRKLFRFTVCNPSFAFLRFVVYEIDMFSDQNFLAQATFPINCLKTGYRSVPLKNS

YSEDLELACLLVHMDVIRGRVGYEMIHENGDMLSPFSPAGAMAMAMQTGRERMNDSGSVSSTSSMSPLPS

SPAQALGYRGREGSFEARYQTPLEDFRVSQEALLDHENRRLRRARVSADNRA

> Dog gi|73992438|ref|XP\_542998.2| PREDICTED: similar to 1-phosphatidylinositol-4,5-bisphosphate phosphodiesterase gamma 1 (Phosphoinositide phospholipase C) (PLC-gamma-1) (Phospholipase C-gamma-1) (PLC-II) (PLC-148) [Canis familiaris]

MGRELRGGAQAVEHSDPGLDAFVFVRLCACVRVDIREIKEIRPGKTSRDFDRYQEDPAFRPDQSHCFVIL

YGMEFRLKTLSLQATSEDEVNMWIKGLTWLMEDTLQAATPLQIERWLRKQFYSVDRNREDRISAKDLKNM

LSQVNYRVPNMRFLRERLTDLEQRSSDITYGQFAQLYRSLMYSAQKTMDLPFLEASALRAGERPELCRVS

LPEFQQFLLEYQGELWAVDRLQVQEFMLSFLRDPLREIEEPYFFLDEFVTFLFSKENSVWNSQLDAVCPD

TMNNPLSHYWISSSHNTYLTGDQFSSESSLEAYARCLRMGCRCIELDCWDGPDGMPVIYHGHTLTTKIKF

SDVLHTIKEHAFVASEYPVILSIEDHCSIAQQRNMAQYFKKVLGDTLLTKPVDIAADGLPSPNQLKRKIL

IKHKKLAEGSAYEEVPTSVMYSENDISNSIKNGILYLEDPVNHEWYPHYFVLTSSKIYYSEETSSDQGNE

DEEEPKEASGSTELHSSEKWFHGKLGAGRDGRHIAERLLTEYCIETGAPDGSFLVRESETFVGDYTLSFW

RNGKVQHCRIHSRQDAGAPKFFLTDNLVFDSLYDLITHYQQVPLRCNEFEMRLSEPVPQTNAHESKEWYH

ASLTRAQAEHMLMRVPRDGAFLVRKRNEPNSYAISFRAEGKIKHCRVQQEGQTVMLGNSEFDSLVDLISY

YEKHPLYRKMKLRYPINEEALEKIGTAEPDYGALYEGRNPGFYVEANPMPTFKCAVKALFDYKAQRDDEL

TFTKSAIIQNVEKQEGGWWRGDYGGKKQLWFPSNYVEEMVSPAALEPEREHLDENSPLGDLLRGVLDVPA

CQIAIRPEGKNNRLFVFSISMASVAHWSLDVAADSQEELQDWVKKIREVAQTADARLTEGKMMERRKKIA

LELSELVVYCRPVPFDEDKIGTERACYRDMSSFPETKAEKYVNKAKGKKFLQYNRLQLSRIYPKGQRLDS

SNYDPLPMWICGSQLVALNFQTPDKPMQMNQALFMAGGHCGYVLQPSTMRDEAFDPFDKSSLRGLEPYAI

CIEVLGARHLPKNGRGIVCPFVEIEVAGAEYDSIKQKTEFVVDNGLNPVWPAKPFHFQISNPEFAFLRFV

VYEEDMFSDQNFLAQATFPVKGLKTGYRAVPLKNNYSEDLELASLLVKIDVFPAKENGDLSPFGMSLRER

GSDASGQLFHGRAREGSFEARYQQPFEDFRISQEHLADHFDSRERRAPRRTRVNGDNRL

**Sequence Pattern:**

F-[GSTV]-P-R-L-[G>]

X(3)[RK]X(3)[RK](2)X(2)[RK]X