

Figure S1

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num          ----.10.....20.....30.....40.....50.....60.....70.....80.....90.....100.....110.....120.....130.....
features     .....G.G.G.....

Consensus    .....R.....MS.EV.D.NPYSRLMAL.M.V.Y.IR.....VG.GGVGSV.A.MLTRCGI.L.L.DYD.VELANMNRFL.P.P.G.K.AA..TL..
worm_170587840 MSKNLSEQLDALHAKLLAI GTDLICVKRSNVL-DTNASVKRPKIDVMSAEVDSNPYSRLMALKRMGIVKNIYDEIRKKTVLIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQSGMSKVAADNRNTLRE
corn_226529804 -----MRERLIVAMMN-----PAAGAAASRSKIKDMSAEVDSNPYSRLMALQRMVGVENYERIRDYSAIVIGGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
fly_194889595 ----MPYAI DELQEI IGNLRTLVEPIDSGG--VNNTRLGRDRVERMSAEVDSNPYSRLMALKRMGIVKNIYDEIRKKTVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
tick_241622411 ----MALAHSLEDRVRELEAEIARLKW-----AEGSNPRGKI SQMSAEVDSNPYSRLMALKRMGIVKNIYDEIRKKTVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
frog_148225200 ----MEGLIEELRSRVRELEELDRVRN-----GQHEGHRTKIEKMSAEVDSNPYSRLMALKRMGIVKNIYDEIRKKTVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
chicken_48976121 ----MAERVELLERRVRELELELRLAR-----GGRASARARIE TMSAEVDSNPYSRLMALKRMGIVKNIYDEIRKKTVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
mouse_227499242 ----MADSVRELQRVVEELEQELARERTRS--GGDGHGCRTRIQEMSDEVDSNPYSRLMALKRMGIVSDYEKIRTFVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
rat_57527209 ----MAESVERLQRVVEELEQELARERTRS--AGDGHGCRTRIQEMSDEVDSNPYSRLMALKRMGIVSDYEKIRTFVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
cow_155371865 ----MAESVERLQRVVEELEQELARERTRS--AGDGHGCRTRIQEMSDEVDSNPYSRLMALKRMGIVSDYEKIRTFVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
chimp_197102922 ----MAESVERLQRVVEELEQELARERTRS--AGDGHGCRTRIQEMSDEVDSNPYSRLMALKRMGIVSDYEKIRTFVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG
man_13376212 ----MAESVERLQRVVEELEQELARERTRS--AGDGHGCRTRIQEMSDEVDSNPYSRLMALKRMGIVSDYEKIRTFVAIVGGVGSVVAEMLTRCGI GKLLIFDYDKVELANMNRFLFYQPHQAGLTKVAAAGVQLSG

num          ..140.....150.....160.....170.....180.....190.....200.....210.....220.....230.....240.....250.....260.....270.....
features     .....Z.Z.....*.....

Consensus    INPDV.E...NITT...F.....V.LVLSVDN.EARM.N.ACNE...W.ESGVSE.AVSHG.Q...PG..ACFAC.PPLVVA...E.TLK.EGVCAASLPTTM...AG.LVQN.LK.LL.FG
worm_170587840 INPDVDFETYNNTNITVENYSLFVDIR-KGNL-TGEKVELVLSVDNFEARMTINTACNEENQIWMESGVSENAVSHGQCMRPGYSACFACVPLVVAASNI SERTLKREGVCAASLPTTMVAVIAGPLVQNALKFLNLF
corn_226529804 INPDVLESYSLNITTVKGFETFLASLKAQSSHERSTGVDLVLSCVDNFEARMVVAQACNELGQVWMSGVSENAVSHGIIQLLIPGETACFACAPPLVVASGV DERTLKREGVCAASLPTTMGVVGLLVQNALKYL NLF
fly_194889595 INPDVEIEMFNFNITVDNDFRLNLAIS-QGGRIAGQVLDLVLSCVDNFEARMAINTACNEERLNWFSGVSENAVSHGIIQIIRPGDTACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGITAGPLVQNLKYL NLF
tick_241622411 INPDVTFETYNNTNITVENYSLFVDIR-TGNL-QGGPVDLVLSCVDNFEARMAINTACNELGQVWMSGVSENAVSHGIIQLIIPGETACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGITAGPLVQNLKYL NLF
frog_148225200 INPDVQFEVHNNTITVDNDFEHFMDRIS-KGALLEEGPVDLVLSCVDNFEARMAINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
chicken_48976121 INPDVQFEVHNNTITVDNDFEHFMDRIS-KGALLEEGPVDLVLSCVDNFEARMAINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
mouse_227499242 INPDVLEFVHNNTITVEHFHFPMNRIS-NGGLEEGPVDLVLSCVDNFEARMAINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
rat_57527209 INPDVLEFVHNNTITVEHFHFPMNRIS-NGGLEEGPVDLVLSCVDNFEARMAINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
cow_155371865 INPDVLEFVHNNTITVENFHFMDRIS-NGGLEEGPVDLVLSCVDNFEARMTINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
chimp_197102922 INPDVLEFVHNNTITVENFHFMDRIS-NGGLEEGPVDLVLSCVDNFEARMTINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF
man_13376212 INPDVLEFVHNNTITVENFHFMDRIS-NGGLEEGPVDLVLSCVDNFEARMTINTACNELGQVWMSGVSENAVSHGIIQLIIPGESACFACAPPLVVAASNI DEKTLKREGVCAASLPTTMGVVAGILVQNLKYL NLF

num          ..280.....290.....300.....310.....320.....330.....340.....350.....360.....370.....380.....390.....400.....410
features     .....Z.Z.....

Consensus    ..S..LGYN...D.FP....PN..C...C..Q.E.....H..N.W.I.....G.....L..L.....
worm_170587840 EISYCLGYNALCDFPRHQMLPNPSCEDRFPQQRQEECKQPVNENET-----KGNKTED-EITHEDNNGWIELVDESILIGPTN----GCCSPGEGIQFAYEAPIKEDTESKEQ----ISEMKNLSALMAELKSL--
corn_226529804 QVSYLGYNALSDYFPAMEMRPNPQCLNPAFCVHRQKEYMESKPARDAAAKTKMEAEASTENECPVHATNEWNI SVLDD---EETETSSIRNTPDILPEGLVRELDPADSYAGPAAVSSSAIDDDDDLEELQRLDALNAS
fly_194889595 EVSDYLYNALSDYFPKMTLKNPQCDDNSCLVRQMEFQAK--PKPV-----VVEEKADNEEPLHATNEWGIELVAENAPEINPTST---ETPVVGEGLKLAYEAPKSSSETSEETVTPAPDDASLEDLMAQMKSM--
tick_241622411 TVSHYLYNALQDFPPTMQMKNPQCDSDFCRRRQKQEPQREAAKPK-----QEAKKEEKEEIIHEDNEWGIELVSETPEEDGKDRTPATVPGLVSGVRLAYTVPAQQIEDEEP--TT-GTEQSELEDLMAQMKSL--
frog_148225200 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QETVVEEVEEVVHEDNEWGIELVSEVEEELKQAS--GPVPLPVGITVAYTIPITKP--TSGF--TVDESQSELEDLMAQMKNL--
chicken_48976121 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QEEIHQEE-EIVHEDNEWGIELVSETPEEELKQAS--GPVPLPVGITVAYTIPNKENLTAE--TVDESSELEDLMAQMKNL--
mouse_227499242 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QEAEPQEEAEVHEDNEWGIELVSEVEEELKNSS--GPVPLPEGITVAYTVPKKEEDSASEV--TVDESSELEDLMAQMKNM--
rat_57527209 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QETAPQEEVEVHEDNEWGIELVSEVEEELKNSS--GPVPLPEGITVAYTVPKKEEDSASEV--TVDESSELEDLMAQMKNM--
cow_155371865 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QEVVVEEVEEVHEDNEWGIELVSEVEEELKNSS--GPIPLPEGITVAYTVPKQEDSVPVEV--TVDESSELEDLMAQMKNI--
chimp_197102922 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QEVVVEEVEEVHEDNEWGIELVSEVEEELKNSS--GPIPLPEGITVAYTVPKQEDSVPVEV--TVDESSELEDLMAQMKNI--
man_13376212 TVSYLYGNAMQDFPPTMAMKPNPQCDDKCYCRKQEEFKLKEAAKPK-----QEVVVEEVEEVHEDNEWGIELVSEVEEELKNSS--GPIPLPEGITVAYTVPKQEDSVPVEV--TVDESSELEDLMAQMKNI--
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Supplementary Figure 1. Sequence alignment of UBA5. The number row corresponds to the human sequence. The NCBI number is included with species name. Strictly-conserved residues are shown in the Consensus line. Features include the glycine-rich motif (G), catalytic cysteine (*), the Zinc-binding cystines (Z), and the crossover loop (Λ).