```
Cattle    MSLLFSRCNSIVTVKKDKRHMAEVNASPLKHFVTAKKKINGIFEQLGAYIQESASFLEDTHRNTELDPVTTEEQVLDVKGYLSKVRGISEVLARRHMKVA 100
Human     MSLLFSRCNSIVTVKKDKRHMAEVNASPLKHFVTAKKKINGIFEQLGAYIQESAGFLEDTHRNTELDPVTTEEQVLDVKGYLSKVRGISEVLARRHMKVA 100
Dog       MSLLFSRCNSIVTVKKNKRHMAEVNASPLKHFVTAKKKINGIFEQLGAYIQESATFLEDTYRNAELDPVTTEEQVLDVKGYLSKVRGISEVLARRHMKVA 100
Mouse     MSLLFPRCNSIVTVKKDKRHMAEVNASPLKHFVTAKKKINGIFEQLGAYIQESATFLEDTYRNAELDPVTTEEQVLDVKGYLSKVRGISEVLARRHMKVA 100
Rat       MSLLFSRCNSIVTVKKDKRHMAEVNASPLKHFVTAKKKINGIFEQLGAYIQESATFLEETYRNAELDPVTTEEQVLDVKGYLSKVRGISEVLARRHMKVA 100
Xenopus   MSVLFSRPAIKVTTKKDKRFMAEVTASPLKHFVTAKKKINGIFDQLGAYTQESYNFLEETYKNAELDPVASEEQVLEVKCYLTNVAGISEVLARRHMKVA 100
Zebrafish MSLVFPRPNTSVIGKKDKRLMAEVNASPLKHFVTAKKKINGIFEQLGAYIKESSAFLEETYSNEELDPVTTEEQVAEVRGYLSKVAGIGEVLSRRHMKVV 100
          **::*.*    *  **:** ****.******************:***** :**  ***:*: * *****::**** :*: **::* **.***:******.

            tripartite GTP-binding motif of the GTPase domain
Cattle    FFGRTSNGKSTVINAMLWDKVLPSGIGHTTNCFLRVGGTDGHEAFLLTEGSEEKKSVKTVNQLAHALHQDEQLHAGSMVSVMWPNSKCPLLKDDLVLMDS 200
Human     FFGRTSNGKSTVINAMLWDKVLPSGIGHTTNCFLRVGGTDGHEAFLLTEGSEEKKSVKTVNQLAHALHQDEQLHAGSLVSVMWPNSKCPLLKDDLVLMDS 200
Dog       FFGRTSNGKSTVINAMLWDKVLPSGIGHTTNCFLRVEGTDGHEAFLLTEGSEEKRSAKTVNQLAHALHQDKQLHAGSLVSVMWPNSKCPLLKDDLVLMDS 200
Mouse     FFGRTSNGKSTVINAMLWDKVLPSGIGHTTNCFLRVEGTDGHEAFLLTEGSEEKRSVKTVNQLAHALHQDEQLHAGSLVSVMWPNSKCPLLKDDLVLMDS 200
Rat       FFGRTSNGKSTVINAMLWDKVLLSGIGHTTNCFLRVEGTDGHEAFLLTEGSEEKRSVKTVNQLAHALHQDEQLHAGSLVSVMWPNSKCPLLKDDLVLMDS 200
Xenopus   FFGRTSNGKSSVINAMLWDKVLPSGIGHTTNCFLRVEGTDGNDAYLLTDGSEEKRSVKTVNQLAHALHQDDLLDSGCMVSVMWPNSKCPLLKDDLVLMDS 200
Zebrafish FFGRTSNGKSSVINAMLWDKVLPSGIGHTTNCFLRVEGTDGNESFLLTEGSDERKSVKTVNQLAHALHQDEDLDAGSLVCVMWPKAKCALLRDDLVLVDS 200
          **********:*********** ************* ****::::***:**:*::*.*************. *.:*.:*.****::**.**:*****:**

Cattle    PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKQFFHKVSERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVVDRAQAGDR 300
Human     PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKQFFHKVSERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVVDRAQAGDR 300
Dog       PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKHFFHKVSERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVVDRSQAGDR 300
Mouse     PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKQFFHKVSERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVVDRGQAGDR 300
Rat       PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKQFFHKVSERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVVDRGQAGDR 300
Xenopus   PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKQFFHKVNERLSRPNIFILNNRWDASASEPEYMEEVRRQHMERCTSFLVDELGVLDRTQAGDR 300
Zebrafish PGIDVTTELDSWIDKFCLDADVFVLVANSESTLMQTEKSFFHKVNERLSSPNIFILNNRWDASANEPEYMEEVRRQHMDRCTSFLVDELRVVDRSHAGDR 300
          ************************************** *****.**** **************.**************:********** *:** :****

Cattle    IFFVSAKEVLSARVQKAQGMPEGGGALAEGFQVRMFEFQNFERQFEECISQSAVKTKFEQHTVRAKQIAEAVRLIMDSLHIAAQEQRVYCLEMREERQDR 400
Human     IFFVSAKEVLSARVQKAQGMPEGGGALAEGFQVRMFEFQNFERRFEECISQSAVKTKFEQHTVRAKQIAEAVRLIMDSLHIAAQEQRVYCLEMREERQDR 400
Dog       IFFVSAKEVLNARIQKAQGMPEGGGALAEGFQVRMFEFQNFERRFEECISQSAVKTKFEQHTVRAKQIAEAVRLIMDSLHMAAREQQVYCEEMREERQDR 400
Mouse     IFFVSAKEVLNARIQKAQGMPEGGGALAEGFQVRMFEFQNFERRFEECISQSAVKTKFEQHTVRAKQIAEAVRLIMDSLHIAAQEQRVYCLEMREERQER 400
Rat       IFFVSAKEVLNARIQKAQGMPEGGGALAEGFQVRMFEFQNFERRFEECISQSAVKTKFEQHTVRAKQIAEAVRLIMDSLHIAAQEQRVYCLETREERQER 400
Xenopus   IFFVSAKEVLNARIQKAQGMPEGGGALAEGFQARMFEFQNFERRFEECISQSAVKTKFEQHTKRAKHIAEVLRQIMESVHVAAQEQRCLCLEKCEEFKDR 400
Zebrafish IFFVSAKEVLQARVQKAQGMPEAGGALAEGFQARMFEFQNFERRFEECISQSAVKTKFEQHTTRAKQISEALRLIMDSVHIAAQEQRIHCLEMKEEREDR 400
          **********.**:********.*********.**********:****************** ***:*:*.:* **:*:*:**:**:  * *  ** ::*

              coiled coil domain
Cattle    LRFIDKQLELLAQDYKLRIKQITEEVERQVSTAMAEEIRRLSVLVDEYQMDFHPSPVVLKVYKNELHRHIEEGLGRNLSDRCSTAIASSLQTMQQDMIDG 500
Human     LRFIDKQLELLAQDYKLRIKQMTEEVERQVSTAMAEEIRRLSVLVDEYQMDFHPSPVVLKVYKNELHRHIEEGLGRNMSDRCSTAIASSLQTMQQDMIDG 500
Dog       LKFIDKQLELLAQDYKLRIKQITEEVERQVSTAMAEEIRRLSVLVDDYQMDFHPSPVVLKVYKNELHRHIEEGLGRNMSDRCSTAITNSLQTMQQDMIDG 500
Mouse     LRFIDKQLELLAQDYKLRIKQITEEVERQVSTAMAEEIRRLSVLVDDYQMDFHPSPVVLKVYKNELHRHIEEGLGRNMSDRCSTAISSSLQAMQQDMIDG 500
Rat       LRFIDKQLELLAQDYKLRIKQITEEVERQVSTAMAEEIRRLSVLVDEYQMDFHPSPVVLKVYKNELHRHIEEGLGRNMSDRCSTAITSSLQTMQQEMIDG 500
Xenopus   LEFIEKQLELLTEDYRFKIKLITDEVERQVSNAMAEEIRRLSVLVDEFQLDFHPSPVVLKVYKNELHRHIEEGLGRNLSDRCSSVISVSLQTTQQEMIEG 500
Zebrafish LEFIDKQLDLLTLDCKSKIKKITEEVEKQVSNAMAEEIRRLAVLVDDFHMDFHPSPVVLKVYKNELHRHIEEGLGRNMSERCSSAITVALQTTQTDMIDG 500
          *.**:***:**: * : :** :*:***:***.*********:****:::*****************************:*:***:.*: :**: * :**:*

Cattle    LKPLLPVSMRNQIDMLVPRQCFSLSYDLNCDKLCADFQEDIEFHFSLGWTMLVNRFLGPKNSRRALLGYSDQVQRPLPLTPANPSMPPLPQSSLTQEELM 600
Human     LKPLLPVSVRNQIDMLVPRQCFSLSYDLNCDKLCADFQEDIEFHFSLGWTMLVNRFLGPKNSRRALLGYNDQVQRPLPLTPANPSMPPLPQGSLTQEELM 600
Dog       LKPLLPVSVRSQIDMLVPRQCFSLNYDLNCDKLCADFQEDIEFHFSLGWTMLVNRFLGPKNSRRALMGYNDQVQRPIPLTPANPSMPPLPQGSLTQEEFM 600
Mouse     LKPLLPASVRSQIDMLVPRQCFSLSYDLNCDKLCADFQEDIEFHFSLGWTMLVNRFLGPKNSRRALMGYNDQVQRPIPLTPANPSMPPLPQGSLTQEELM 600
Rat       LKPLLPVSVRSQMDMLVPRQCFSLSYDLNCDKLCADFQEDIEFHFSLGWTMLVNRFLGPKNSRRALMGYSDQVQRPMPLTPANPSMPPLPQGSLTQEELM 600
Xenopus   MMPLLPPTARTQMDLLVPRQCFNLSYDLSCDKLCADFQEDVEFHFSLGWTMLVNRFLGPKNGRRALMAYNDQVPRVMPLTPVNPSMPPMPQGSMTQEELM 600
Zebrafish LKPLLPITIREQVDKMVPRQCFALSYDLNCDKLCSDFQEDIGFHFSLGWTMLVNRFLGPKNTRRALMGYNDQVPRSLAITPVSTSMPPFPQGSMTQEELM 600
          : **** : * *:* :****** *.***.*****:*****: ******************* ****:.*.*** * :.:**...****:**.*:****:*

              transmembrane domain   transmembrane domain
Cattle    VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSFGLYGLLYVYERLTWTTKAKERAFKRQFVEYASEKLQLIISYTGSNCSHQVQQELSGTFAHLC 700
Human     VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSFGLYGLLYVYERLTWTTRAKERAFKRQFVEYASEKLQLIISYTGSNCSHQVQQELSGTFAHLC 700
Dog       VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSFGLYGLLYVYERLTWTTKAKERAFKRQFVEHASEKLQLVISYTGSNCSHQVQQELSGTFAHLC 700
Mouse     VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSFGLYGLLYVYERLTWTTKAKERAFKRQFVEYASEKLQLIISYTGSNCSHQVQQELSGTFAHLC 700
Rat       VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSLGLYGLLYVYERLTWTTKAKERAFKRQFVEYASEKLQLIISYTGSNCSHQVQQELSGTFAHLC 700
Xenopus   VSMVTGLASLTSRTSMGILVVGGVVWKAVGWRLIALSFGLYGLLYVYERLTWTNKAKERAFKRQFVDYAAEKLQLIVSYTGSNCSHQVQQELSSTFAHLC 700
Zebrafish VSMVTGLASLTSRTSMGIIVVGGVIWKAVGWRLIALSVGLYGLLYVYERLTWTTRAKERTFKRQFVDYASEKLQLIVSYTGSNCSHQVQQELASTFSQLC 700
          ******************:*****:************.***************.:****:******::*:*****::***************:.**::**

        coiled coil domain in bright green   22 amino acids lacking
        HR2 domain in pale green             in aberrant cattle MFN2
Cattle    QQVDITRDNLEQEIAAMNKKVEALDSLQSRAKLLRNKAGWLDSELNMFTHQYLQPSR 757
Human     QQVDITRDNLEQEIAAMNKKVEALDSLQSKAKLLRNKAGWLDSELNMFIHQYLQPSR 757
Dog       QQVDVTRENLEQEIAAMNKKIEVLDSLQSKAKLLRNKAGWLDSELNMFTHQYLQPSR 757
Mouse     QQVDVTRENLEQEIAAMNKKIEVLDSLQSKAKLLRNKAGWLDSELNMFTHQYLQPSR 757
Rat       QQVDVTRENLEQEIAAMNKKIEVLDSLQSKAKLLRNKAGWLDSELNMFTHQYLQPSR 757
Xenopus   QQVDVTRENLEQDIDVLNKKIEILDSLQSKAKLLRNKAGWLDSELNMFTHQYLQQS- 756
Zebrafish QQVDVTRQQLEDEIGDLNSKIEQLDTLQSKAKLLRNKAGWLDSELNMFIQQYLQQGR 757
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