```
                  10         20         30         40         50         60         70         80         90        100        110        120
dog UGT1A6        CTCAGGACGG AAGCCACTGG CTCAGTATGG AGAACATAGT TGAGCTCCTC AGTGAGAAGG GGCATGACAT TGTGGTGCTG GTGCCAGAAG TCAATT--TG CTTCTGAAGG AATCCAAACA
SSL UGT1A6P       CTCAGGTTGG AAGCCACTGG CTCAGTATGA AGGACATAGT TGAGCTCCTC AGTGAAAAGG GGCATGACAT TGTGGTGCTG GTACCAGAAG TCAATTTATG CTTCTGAAGG AATCCAAGCA
NFS UGT1A6P       CTCAGGTTGG AAGCCACTGG CTCAGTATGA AGAACATAGT TGGGCTCCTC AGTGAAAAGG GGCATGACAT TGTGGTGCTG GTACCAGAAG TCAATTTATG CTTCTGAAGG AATCCAAGCA
CS UGT1A6         CTCAGGATGG AAGCCACTGG CTCAGTATGA AGGACATAGT TGAGCTCCTC AGTCAGAAGG GGCACGACAT TGTGGTGCTG GTACCAGAAG TCAATT--TG CTGCTGAAGG AATCCAAGCA

                 130        140        150        160        170        180        190        200        210        220        230        240
dog UGT1A6        CTACACGAGA CAAATCTACT CAGTGCCATT TGGCCAGGAA GGGTTGGAGA ACCGCTACCG CTCTTTTGGA AAGAATCACT TTGCTGAGAG ATGGCTCCTG AACGCTGCTC AGATGGAGTA
SSL UGT1A6P       CCACACAAGA AAAATCTACC CAGTGCCATT CGACCAGAAA GAGCTGGAGA ATCGTTACCA CTCTTTTGGA AACAATCACT TTGCTGAGAG ATGGCTCCTG AACGCTGCTC AGATGGAGCA
NFS UGT1A6P       CTACACAAGA AAAATCTACC CAGTGCCATT CGACCAGAAA GAGCTGGGGA ATCGTTACCA CTCTTTTGGA AACAATCACT TTGCTGAGAG ATGGCTCCTG AACGCTGCTC AGATGGAGTA
CS UGT1A6         CTACACAAGA AAAACCTACC CAGTGCCATT CGATCAGAAA GAGCTGGAGA ATCGTTACCA CTCTTTTGGA AACAATCACT TTGCTGAGAG ATGGCTCCTG AACACTGCTC AGATGGAGTA

                 250        260        270        280        290        300        310        320        330        340        350        360
dog UGT1A6        CAGAAATAGC ATGATTGTTA TTGACATGTA CTTCACCAAC TGCCAGAGCC TTCTGGAGGA CTCGGCCACG CTCAGTGTCC TCAGGCAGAG CAAGTTCGAT GCCCTTTTCA CAGACCCAGC
SSL UGT1A6P       CGGGAATAGC GTAATCGTTA TTGACATGTA CTTCACCAAC TGCCAGAGCC TCCTGGAGGA CTCGGCCACC CTGAGTGTCC TCAGGGAGAG CAAGTTCGAT GCCCTTTACA CAGACCCAGC
NFS UGT1A6P       CGGGAATAGC GTAATTGTTA TTGACATGTA CTTCACCAAC TGCCAGAGCC TCCTGGAGGA CTCGGCCACC CTGAGTGTCC TCAGGGAGAG CAAGTTCGAT GCCCTTTACA CAGACCCAGC
CS UGT1A6         CAGGAATAGC ATGATGGTTA TTGACATGTA CTTCACCAAC TGCCAGAGCC TGCTGGAGGA CTCAGCCACC CTGAGTGTCC TCAGGGAGAG CAAGTTCGAT GCCCTTTTCA CAGACCCAGC

                 370        380        390        400        410        420        430        440        450        460        470        480
dog UGT1A6        TCTGCCCTGT GGGGTGATCC TGGCCGAGTA CCTGGGCCTG CCCTCCGTGT ACCTCTTCA- GGGGCTTCCC ATGCTCCCTG GAGCATACTA TCAGCAGGAG CCCAAACCCT GTGTCCTACA
SSL UGT1A6P       CCTATCCTGC GGGGTCATCC TGGCCGAGTA CCTGGGCCTG CCCTCTATGT ACCTCTTCAG GGGGCTTCCC ATGCTCCCTG GAGCATACAG TGAGCAGGAG CCCAAACCCT GTGTCCCACA
NFS UGT1A6P       CCTATCCTGC GGGGTCATCC TGGCCGAGTA CCTGGGCCTG CCCTCTATGT ACCTCTTCAG GGGGCTTCCC ATGCTCCCTG GAGCATACAA TGAGCAGGAG CCCAAACCCT GTGTCCCACA
CS UGT1A6         CCTACCCTGC GGGGTCATCC TGGCCGAGTA CCTGGGCCTG CCCTCCGTGT ACCTCTTCA- GGGGCTTCCC ATGCTCCCTG GAGCATATGA TGAGCAGGAG CCCAAACCCT GTGTCCCACA

                 490        500        510        520        530        540        550        560        570        580        590        600
dog UGT1A6        TTCCCAGGTG CTATACTCAG TTCTCAGACA AGATGACATT TCCCCAACGG GTGGGCAGCT ACCTCGTTAA TTACCTGGAG ACCTACCTGT TCTACTGTCT GTATTCAAAG TACGAAGACC
SSL UGT1A6P       TTCCCAGATG CTACACTCAG TTCTCAGACC CGATGACGTT CCCCCAACGG GTGGCCAACT ACCTCATTAA TTACTTGGAG ACCTATCTGT TCTACTGCCT GTAGTCAAAG TATGAAGACC
NFS UGT1A6P       TTCCCAGATG CTACACTCAG TGCTCAGACC CGATGACGTT CCCCCAACGG GTGGCCAACT ACCTCATTAA TTACTTGGAG ACCTATCTGT TCTACTGCCT GTAGTCAAAG TATGAAGACC
CS UGT1A6         TTCCCAGCTG CTACACTCAG TTCTCAGACC AGATGACGTT CCCCCAACGG GTGGCCAACT ACCTCGTTAA TTCCTTGGAG ACCTATCTGT TCTGCTGCCT GTATTCAAAG TATGAAGACC

                 610        620        630        640        650        660
dog UGT1A6        TTGCATCCAA TATCCTCATG AGAGATGTGC ACTTACCCAC CTTGTATCGG AACGGCTCCA TT
SSL UGT1A6P       TCACCTCCAA TATCCTCAAG GGAGCTGTGC ACTTACCCAC CTTGTATCGG AGGGGCTCCA TT
NFS UGT1A6P       TCACCTCCAA TATCCTCAAG AGAGCTGTGC ACTTACCCAC CTTGTATCAG AGGGGCTCCA TT
CS UGT1A6         TCACCTCCAA TATCCTCAAG AGAGATGTGC ACTTACCCAC CTTGTATCGG AAGGGCTCCA TT
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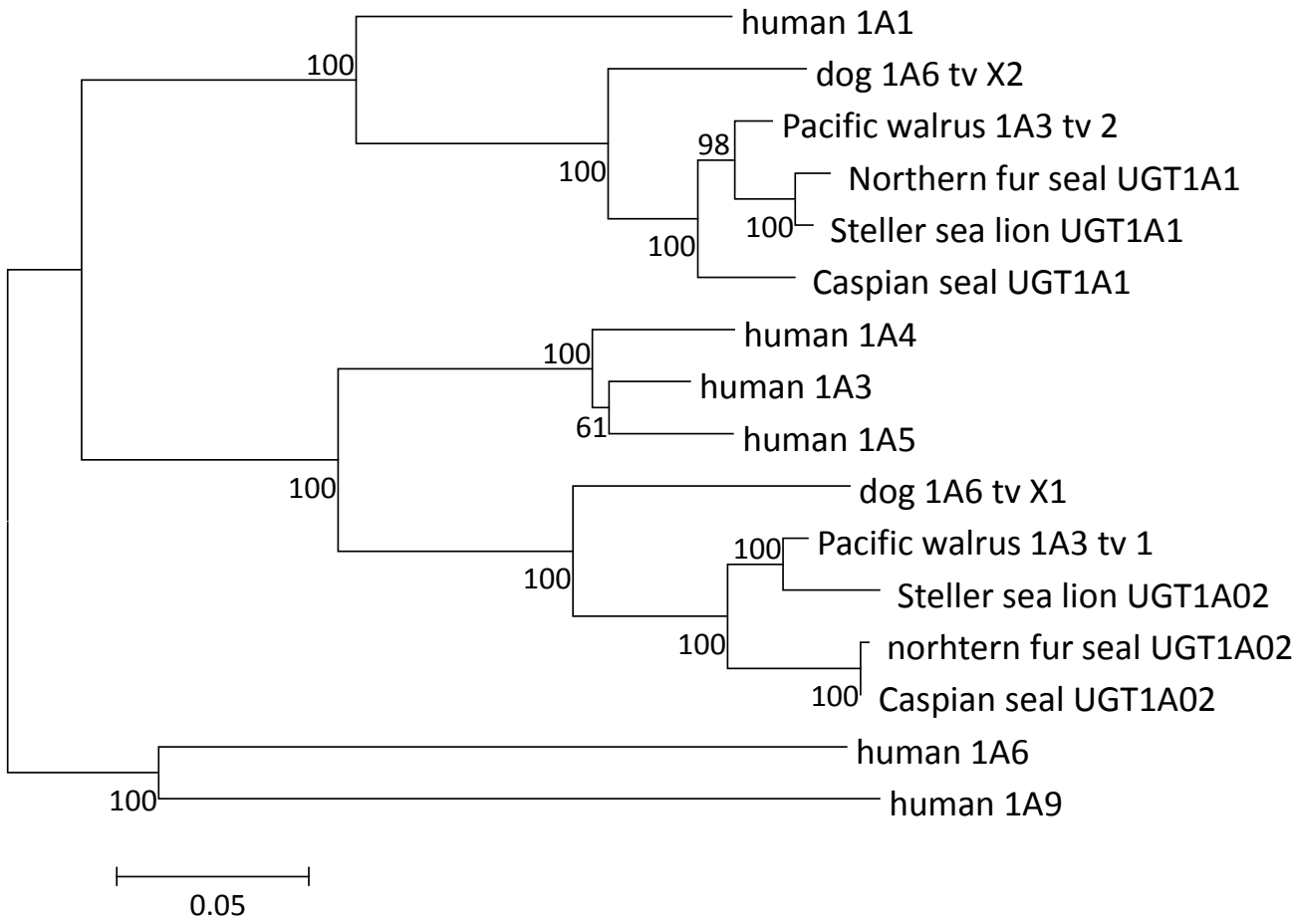
Supplementary figure 1. Alignments of UGT1A6 nucleotide sequences.
SSL: Steller sea lion, NFS: Northern fur seal, CS: Caspian seal



Supplementary figure 2. Phylogenetic tree of UGT1A genes to identify Pinnipedia UGT1A gene sequences

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                  10         20         30         40         50         60         70         80         90         100        110        120
dog UGT1A1    MAAEAPGPRP LVLGLLLCAL SAPVSQGGKL LLIPVDGSHW LSMLGVVKQL HQRGHEVVVI ASEASVYIKG AAFYTLKRYP VPFRREDVEA TFTSLGRGVF ENVPLLRRVI KTYKKVKEDS
SSL UGT1A1    --AGSQGPRP LVLGLLLCAL SPTVSQGGKL LLVPVDGSHW LSMLGIVQQL HQRGHDIVVL AHEASVHIKE GALYTLKRYP VPFRREDVEA AFIRLGHGVF ENESLLQRVV KMYKKVKEDS
NFS UGT1A1    --AGSQGLRP LVLGLLLCAL NPTVSQGGKL LLVPVDGSHW LSMLGIVQQL HQRGHDIVVL AHEASVHIKE GALYTLKRYP VPFRREDVEA AFIRLGHGVF ENEPLLQRVV KMYKKVKEDS
CS UGT1A1     --AGARGPRP LVLGLLLCAL NPTVSQGGKL LLVPVDGSHW LSMLGVVRQL HQRGHDIVVL AHEASVHIKE GALYTLKRYP VPFRREDVEA AFTRLGHGVF EKEPLLQRVV KTYKKVKEDS

                  130        140        150        160        170        180        190        200        210        220        230        240
dog UGT1A1    ALLLSACSHL LHNKELMASL AESSFDAVLT DPFLPCGPIV ALYLALPAVF FLHALPCSLD FQGTQCPNPP SYVPRALSLN SDHMTFLQRV KNMLIFLSES FLCNVVYSPY EPLASEVLQK
SSL UGT1A1    ALLLSACSHL LHNKELMASL VESSFDAVLT DPFLPCGPIV ALYLGLPAVF FLNALPCGLD FQGTLCPNPP SYVPRALSLN SDHMTFLPRV KNMLIFLSES FLCNVFYSPY GPLASEVLQK
NFS UGT1A1    ALLLSACSHL LHNKELMASL VESNFDAVLT DPFLPCGPIV ALYLGLPAVF FLNALPCGLD FQGTLCPNPP SYVPRALSLN SDHMTFLPRV KNMLIFLSES FLCNVVYSPY GPLASEVLQK
CS UGT1A1     ALLLSACSHL LHNKELMASL VESNFDAVLT DPFLPCGPIV ALYLALPAVF FLNALPCGLD FQGTQCPSPP SYVPRALSLN SDHMTFLPRV KNMLIFLSES FLCNVVYSPY GPLASEVLQK

                  250        260        270        280        290        300        310        320        330        340        350        360
dog UGT1A1    DVTVQELMGS ASIWLLKGDF VKDYSRPIMP SMVFVGGINC ASKNPLSKEF EAYVNASGEH GIVVFSLGSM VSDIPEKKAM EIADALGKIP QTVLWRYTGT PPPNLSKNTI LVKWLPQNDL
SSL UGT1A1    DMTVQDLMGS ASLWLLRSDF VKDYSRPIMP NMVFVGGINC ASKSPLSKEF ETYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIS QTVLWRYTGT PPPNLAKNTI LVKWLPQNDL
NFS UGT1A1    DMTVQDLMGS ASLWLLRSDF VKDYSRPIMP NMVFVGGINC ASKSPLSKEF ETYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIS QTVLWRYTGT PPPNLAKNTI LVKWLPQNDL
CS UGT1A1     DVTVQDLMGS ASLWLLRSDF VKDYSRPIMP NMVFVGGINC ASKNPLSKEF EAYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIP QTVLWRYTST PPPNLAKNTI LVKWLPQNDL

                  370        380        390        400        410        420        430        440        450        460        470        480
dog UGT1A1    LGHPKARAFI THSGSHGIYE GICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNVLEMTS ADLANALKAV INDKSYKENI MHLSRLHKDR PIEPLDLAVF WVEFVMRHKG APHLRPAAHD
SSL UGT1A1    LGHPKTRAFI THSGSHGIYE AICNGVPMVM LPLFGDQMDN AKRMETRGTG VTLNILEMTS EDLANAIKTV INDKSYKENI MHLSGLHKDR PIEPLDLAVF WVEFVMRHKG APHLRAVAHD
NFS UGT1A1    LGHPKTRAFI THSGSHGIYE AICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNILEMTS EDLANAIKTV INDKSYKENI MHLSGLHKDR PIEPLDLAVF WVEFVMRHKG APHLRAVAHD
CS UGT1A1     LGHPKTRAFI THSGSHGVYE GICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNVLEMTS EDLANAIKTV INDKSYKENI MHLSRLHKDR PIEPLDLAVF WVEFVMRHKG APHLRSAAHD

                  490        500        510        520        530
dog UGT1A1    LTWYQYHSLD VIGFLLAVVL GVVFITYKCC AFGCRKCFGK KGRVKKPHKS KAH*QVGGK
SSL UGT1A1    LTWYQYHSLD VIGFLLAIVL GVVFITYKCC ALGCRKCFGK KGRVKKPHKS KAH*EVGGK
NFS UGT1A1    LTWYQYHSLD VIGFLLAIVL GVVFITYECC ALGCRKCFGK KGRVKKSHKS KAH*EVGGK
CS UGT1A1     LTWYQYHSLD VIGFLLAIVL GVVFITYKCG TLAYRRCFGK KGRV------ ---------
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Supplementary figure 3. Alignments of UGT1A1 protein sequences.
SSL: Steller sea lion, NFS: Northern fur seal, CS: Caspian seal

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                  10         20         30         40         50         60         70         80         90        100        110        120
dog UGT XM    MAAGFLAPLP VLTGLLLILC DGRWVEGGRV LVVPMDGSHW LSMKKAVQKL HARGHQMVVV SPESNMHIKE EDFFTLTTYA TPYTQEEFDN FMLGQSYLVF QRMSFLKTFL KTMEGLKTAT
SSL UGT1A02   MAARFLVPLP TLMGLLIFLC VGPGAEGGKV LVVPMDGSHW LSMKEAVQEL HARGHQMVVV SPELNMHIKE EDFFTLTTYA SPYTQDEFNH LLLGQTYLIF ERMHFLKMFL KSMESLKSAA
NFS UGT1A02   MAARFLVPLP ALVGLLLFLC VGPGAEGGKV LVVPMDGSHW LSMKEAMQEL HARGHQMVVV SPELNMHIKE EDFFTLTTYA IPYTQDEFNH LLLGQTYLVF ERMHFLKMFL KSMESLKSVA
CS UGT1A02    MAARFLVPLP ALVGLLLFLC VGPGAEGGKV LVVPMDGSHW LSMKEAMQEL HARGHQMVVV SPELNMHIKE EDFFTLTTYA IPYTQDEFNH LLLGQTYLVF ERMHFLKMFL KSMESLKSVA

                 130        140        150        160        170        180        190        200        210        220        230        240
dog UGT XM    LIFQRSCESL MHNKNLIRHL NASSFDVLLT DPVYPCGAIL ARYLSLPSVF FLRNIPCDLE SESTQCPNPS SYIPRLLTRN SDHMTFLQRV KNMLYPLALK YFCHFSFTPY ASLASELLQR
SSL UGT1A02   LVFQRSCEEL LHNKELIRHL NASSFEVVLT DPVYPCGAVL AKYLSLPAVF FLRSIPCDLD VQGTQCPNPS SYIPRLFTMN SDHMTFLQRV KNMLYPLALK YICHISFTPY ASLASELLQR
NFS UGT1A02   LVFQRSCEEL LRNKELVRDL NASSFDVVLT DPVYPCGAVL AKYLSLPAVF FLRSIPCDLD FQGTRCPNPP SYIPRLLTMN SDHMTFLQRV KNMLYPLALK YICHISFTPY ASLASELLQR
CS UGT1A02    LVFQRSCEEL LRNKELVRDL NASSFDVVLT DPVYPCGAVL AKYLSLPAVF FLRSIPCDLD FQGTRCPNPP SYIPRLLTMN SDHMTFLQRV KNMLYPLALK YICHISFTPY ASLASELLQR

                 250        260        270        280        290        300        310        320        330        340        350        360
dog UGT XM    EVSLEDILSS GSVWLFRGDF VLDYPRPIMP NMFFIGGINC ANRKPLSQEF EAYVNASGEH GIVVFSLGSM VSDIPEKKAM EIADALGKIP QTVLWRYTGT PPPNLSKNTI LVKWLPQNDL
SSL UGT1A02   EVSMVDVFSF ASVWLFRGEF VLDYPRPIMP NMVFSGGRNC GQRKPLSQEF ETYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIS QTVLWRYTGT PPPNLAKNTI LVKWLPQNDL
NFS UGT1A02   EVSVVDVFSF ASIWLFRGDF VLDYPRPIMP NMVFIGGINC GHRKPLSQEF EAYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIP QTVLWRYTST PPPNLAKNTI LVKWLPQNDL
CS UGT1A02    EVSVVDVFSF ASIWLFRGDF VLDYPRPIMP NMVFIGGINC GHRKPLSQEF EAYVNASGEH GIVVFSLGSM VSEIPEKKAM EIADALGKIP QTVLWRYTST PPPNLAKNTI LVKWLPQNDL

                 370        380        390        400        410        420        430        440        450        460        470        480
dog UGT XM    LGHPKARAFI THSGSHGIYE GICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNVLEMTS ADLANALKAV INDKSYKENI MHLSRLHKDR PIEPLDLAVF WVEFVMRHKG APHLRPAAHD
SSL UGT1A02   LGHPKTRAFI THSGSHGIYE AICNGVPMVM LPLFGDQMDN AKRMETRGTG VTLNILEMTS EDLANAIKTV INDKSYKENI MHLSGLHKDR PIEPLDLAVF WVEFVMRHKG APHLRAVAHD
NFS UGT1A02   LGHPKTRAFI THSGSHGVYE GICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNVLEMTS EDLANAIKTI INDKSYKENI MHLSRLHKDR PIEPLDLAVF WVEFVMRHKG APHLRSAAHD
CS UGT1A02    LGHPKTRAFI THSGSHGVYE GICNGVPMVM LPLFGDQMDN AKRMETRGAG VTLNVLEMTS EDLANAIKTV INDKSYKENI MHLSRLHKDR PIEPLDLAVF WVEFVMRHKG APHLRSAAHD

                 490        500        510        520        530
dog UGT XM    LTWYQYHSLD VIGFLLAVVL GVVFITYKCC AFGCRKCFGK KGRVKKPHKS KAH*QVGGK
SSL UGT1A02   LTWYQYHSLD VIGFLLAIVL GVVFITYKCC ALGCRKCFGK KGRV------ ---------
NFS UGT1A02   LTWYQYHSLD VIGFLLAIVL GVVFITYKCG TLAYRRCFGK KGRV------ ---------
CS UGT1A02    LTWYQYHSLD VIGFLLAIVL GVVFITYKCG TLAYRRCFGK KGRVKKSHKS KAH*EVGGK
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Supplementary figure 4. Alignments of UGT1A02 protein sequences.
dog UGT XM: dog XM_005635599.1 SSL: Steller sea lion, NFS: Northern fur seal, CS: Caspian seal