A. Summary table of the similarity between *Asterias rubens* and *Octopus vulgaris* SREB receptor sequences compared against human SREB receptors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Human Receptor | Species sequences | Alignment Length | Identity (%) | Similarity (%) |
| Hsap27 (SREB1) | ArubSREB | 470 | 32.55 | 47.66 |
| Hsap85 (SREB2) | ArubSREB | 467 | 33.62 | 51.39 |
| Hsap173 (SREB3) | ArubSREB | 461 | 36.88 | 54.23 |
| Hsap27 (SREB1) | OvulSREB | 421 | 32.78 | 47.98 |
| Hsap85 (SREB2) | OvulSREB | 401 | 36.91 | 53.87 |
| Hsap173 (SREB3) | OvulSREB | 403 | 35.98 | 54.84 |

B. Alignment of the SREB receptors from human, *Asterias rubens*, and *Octopus vulgaris* that were cloned and tested in receptor assays in this study. Conserved residues are highlighted, with similar amino acids in gray and 100% conserved residues in black.

SREBHsap85 ---------------------------------------------------------------MANYSHAADNILQNLSP 17

SREBHsap173 ---------------------------------------------------------------MANTTGEPEEVSGALSP 17

SREBHsap27 -------------------------------------------------------------------MANASEPGGSGGG 13

SREBArub MSHIITTRIRPPPARLSFAPTGMSELSTAMSTLLDLGFTNGSTGLNSSAGDSISVTARTVLHAGVRPGEEGGGDADLLAD 80

SREBOvul ----------------------------------------------------------------MHTEVYTHASYSYYSE 16

SREBHsap85 --LTAFLKLTSLGFIIGVSVVGNLLISILLVKDKTLHRAPYYFLLDLCCSDILRSAICFPFVFNSVKNGSTWT---YGTL 92

SREBHsap173 PSASAYVKLVLLGLIMCVSLAGNAILSLLVLKERALHKAPYYFLLDLCLADGIRSAVCFPFVLASVRHGSSWT---FSAL 94

SREBHsap27 EAAALGLKLATLSLLLCVSLAGNVLFALLIVRERSLHRAPYYLLLDLCLADGLRALACLPAVMLAARRAAAAAGAPPGAL 93

SREBArub DHGPRVLWCASLIVVIILSVVGNGILALVVFGNSRLRRPSYFFLFNCALADFVRSLLCFPFVVSAVVSRDWIY----SNS 156

SREBOvul PQYVLALKIISLALIIFTGILGNSMVVYTIIRDKRLHRPPFYYLVSLAMSDLARSVFCLPFVLTTVIQGYVWVY---GEN 93

SREBHsap85 TCKVIAFLGVLSCFHTAFMLFCISVTRYLAIAHHRFYTKRLTFWTCLA-VICMVWTLSVAMAFPPVLDVGTYSFIREEDQ 171

SREBHsap173 SCKIVAFMAVLFCFHAAFMLFCISVTRYMAIAHHRFYAKRMTLWTCAA-VICMAWTLSVAMAFPPVFDVGTYKFIREEDQ 173

SREBHsap27 GCKLLAFLAALFCFHAAFLLLGVGVTRYLAIAHHRFYAERLAGWPCAAMLVCAAWALALAAAFPPVLDGGGD---DEDAP 170

SREBArub LCEILAFFNVYLTYGVLYTLFLISIERYVVLRFHRFHRQKLKGPACLL-LVLASWALAVSMAFPPVFNTRTYSFIEIENQ 235

SREBOvul ACILVGFTNTFFIYSSAVTFLLISGDRYVGVVQTRFYRRKCGGLLSLA-FIVFGWGVAFLVSFPPIFGLGSYTFVPSEAQ 172

SREBHsap85 CTFQHRSFRANDSLGFMLLLALILLATQLVYLKLIFFVHDRRKMKPVQFVAAVSQNWTFHGPGASGQAAANWLAGFGRGP 251

SREBHsap173 CIFEHRYFKANDTLGFMLMLAVLMAATHAVYGKLLLFEYRHRKMKPVQMVPAISQNWTFHGPGATGQAAANWIAGFGRGP 253

SREBHsap CALEQRPDGAPGALGFLLLLAVVVGATHLVYLRLLFFIHDRRKMRPARLVPAVSHDWTFHGPGATGQAAANWTAGFGRGP 250

SREBArub CTFKHQEYKSNETLCFLLFFVAVIAFTHFAYFRVFLFMRAHRKMRPMQFVPAVSNNWTFYGPGSTGQAAANWFLGYRQGP 315

SREBOvul CTYSHTHYRSNDTLVFLLVFTFIMSLSLLLYYRILMFLRNHRKMYPFFHQPARSNNWTFLGPGANGQALVNWLNGFTGFR 252

SREBHsap85 TPPTLLGIRQNANTTGRRRLLVLDEFKME-KRISRMFYIMTFLFLTLWGPYLVACYWRVFARGPVVPGGFLTAAVWMSFA 330

SREBHsap173 MPPTLLGIRQNGHAASRR-LLGMDEVKGE-KQLGRMFYAITLLFLLLWSPYIVACYWRVFVKACAVPHRYLATAVWMSFA 331

SREBHsap27 TPPALVGIRPAGPGRGARRLLVLEEFKTE-KRLCKMFYAVTLLFLLLWGPYVVASYLRVLVRPGAVPQAYLTASVWLTFA 329

SREBArub TPPPLIGLAP--PANGNSTSLSKSDFERE-EKFSKLSLTITISFSVLWLPYTVYCFWQVFQHNNPLPYTYVSIATWLTFF 392

SREBOvul QNPWLNPIAAGFQMPPRQLGRTVNLKVVKGEHLSRLFFTVTLVFDILWVPYLVLSYWQVFEVSHQLSSTFIGVAAWCSYL 332

SREBHsap85 QAGINPFVCIFSNRELRRCFSTTLLYCRK--SRLPREPYCVI---- 370

SREBHsap173 QAAVNPIVCFLLNKDLKKCLRTHAPCWGTGGAPAPREPYCVM---- 373

SREBHsap27 QAGINPVVCFLFNRELRDCFRAQFPCCQSPRTTQATHPCDLKGIGL 375

SREBArub QACINPILCFVVSKEFRQIALQHVFGASAFQQEGHNVQL------- 431

SREBOvul AVAVNPLVYLCCSGTLRRAFRPEIESYSKRGTLRE----------- 367

C. Summary table of the similarity between *Asterias rubens* and *Octopus vulgaris* CCK receptor sequences compared against human CCK receptors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Human Receptor | Species sequences | Alignment Length | Identity (%) | Similarity (%) |
| HsapCCKRA | ArubCCKR | 485 | 37.32 | 55.05 |
| HsapCCKRb | ArubCCKR | 502 | 36.45 | 53.19 |
| HsapCCKRa | OvulCCKR | 486 | 38.89 | 55.97 |
| HsapCCKRb | OvulCCKR | 511 | 36.40 | 53.62 |

D. Alignment of the CCK receptors from human, *Asterias rubens,* and *Octopus vulgaris* that were cloned and tested in receptor assays in this study. Conserved residues are highlighted, with similar amino acids in gray and 100% conserved residues in black.

HsapCCKRA -------MDVVDSLLVNGSNITPPCELGLENETLFCLDQ---------PRP------SKEWQPAVQILLY 48

HsapCCKRB MELLKLNRSVQGTGPGPGASLCRPGAPLLNSSSVGNLSC---------EPPRIRGAGTRELELAIRITLY 61

ArubCCKR ---MATATTAYPYSLIDSSLPPVNSTFLVTSIVDVNSTNSSLITEDFDDDRNRGVRIGFGLNIYLTATLY 67

OvulCCKR -------MNLTGHGILDDNEAEFIDRDLGSNIVYNKTSN---------YTVKRMHHASFQKEILIPP--Y 52

HsapCCKRA SLIFLLSVLGNTLVITVLIRNKRMRTVTNIFLLSLAVSDLMLCLFCMPFNLIPNLLKDFIFGSAVCKTTT 118

HsapCCKRB AVIFLMSVGGNMLIIVVLGLSRRLRTVTNAFLLSLAVSDLLLAVACMPFTLLPNLMGTFIFGTVICKAVS 131

ArubCCKR GIVFVLAIVGNILVLVTLAQDKRMRTVTNMFLLSLAFSDLLFGIFCMPFTVVGNMLGRFVFGAVICKIVP 137

OvulCCKR IAIFLLAVVGNLLVILTLVQNKRMRTVTNVFLLNLSISDLLLAVFCMPFTLIPVLLRNFIFGATMCVLIR 122

HsapCCKRA YFMGTSVSVSTFNLVAISLERYGAICKPLQSRVWQTKSHALKVIAATWCLSFTIMTPYPIYSNLVPFTKN 188

HsapCCKRB YLMGVSVSVSTLSLVAIALERYSAICRPLQARVWQTRSHAARVIVATWLLSGLLMVPYPVYTVVQPVG-- 199

ArubCCKR YIQGISVTVSVWTMVVISLERYHAICNPLSSRVWQTKAHAYKAIVGVWMVALFLNLPAVIFSKLFSFNS- 206

OvulCCKR YLQGVSVAVSCFTLVAMSLERYFGICQPLHSRRWQTLSRAYKIITGCWFLAAMVVIPIAIVTRMKSFDK- 191

HsapCCKRA NNQTANMCRFLLPNDVMQQSWHTFLLLILFLIPGIVMMVAYGLISLELYQGIKFEASQKKSAKERKPS-- 256

HsapCCKRB --PRVLQCVHRWPSARVRQTWSVLLLLLLFFIPGVVMAVAYGLISRELYLGLRFDGDSDSDSQSRVRNQG 267

ArubCCKR --GTVFRCDEIWPATLYRTIYRMCLFVILMVAPLFTMLTAYGLIIRELRRGMKLEQCGADNEKREN---- 270

OvulCCKR --GKTHVCREFWTSKIAEKCYTVFLDMAFLLIPVIIMSGSYGSIMWTLWMGIKMDKKMQDGENQRNQP-- 257

HsapCCKRA -------------TTSSGKYEDSDGCYLQKTRPPRKLELRQLSTGSSSRANRIRSNSSAANLMAKKRVIR 313

HsapCCKRB GLPGAVHQNGRCRPETGAVGEDSDGCYVQLPRSRPALELTALTAPGPGSGSRP----TQAKLLAKKRVVR 333

ArubCCKR -----------------GIAMKNMGDEASCSLNEKK----TKKSDKKPAQATMRSTSTSG---AKKRVVK 316

OvulCCKR -----------------GNSMRMCVFEGSPSRNSENRPIVTPKRRRYDLQSGVRQSNLDRNVAAKKRVIK 310

HsapCCKRA MLIVIVVLFFLCWMPIFSANAWRAYDTASAERRLSGTPISFILLLSYTSSCVNPIIYCFMNKRFRLGFMA 383

HsapCCKRB MLLVIVVLFFLCWLPVYSANTWRAFDGPGAHRALSGAPISFIHLLSYASACVNPLVYCFMHRRFRQACLE 403

ArubCCKR MLIVIVALFFVCWTPSWVGNIWIMISEKSASEHFGRAEVTIFKLMTYASACVNPIVYCFMNKRFRQGFLN 386

OvulCCKR MLAVVVLEFFVCWTPLFFAQTWLAFDARTAHSHISPVGLAFIHLLSYVSSCCNPITYCFMNRKFRESFLG 380

HsapCCKRA TFPCCPNPGPPGARGEVGEEEEGGTTGASLSRFS-----------------------YSHMSASVPPQ 428

HsapCCKRB TCARCCPRPPRARPRALPDEDPPTPSIASLSRLS-----------------------YTTISTLGPG- 447

ArubCCKR AFSCGRR-GRAGDRATASGDVSRFQSTRRTNVPR------------------PSPTNYTNVSSDSSV- 434

OvulCCKR AFCCRRRRSQAPDIAQSTSQIRQGESIATVNASLNSIRIQFEPPLKHLQEMKPNFSNITESDDTSDS- 447