Amino acid sequences of enzymes involved in carbohydrate uptake and metabolism, and BC biogenesis

*Enzymes involved in carbohydrate uptake and metabolism*

>Carbohydrate-selective porin 1, OprB family (encoding gene at position 1261539:1263020 bp)

MCVVVSFYCNLSWARKPVPDHAARTQSGLLVSQPHAEVRETPAAPHASVSTRLNSIFRTEGLSILLTNREDALRVRDLSAGYYASSEAPGHILPQIGALRSRLQNRGVTFAFTYKGEAMADVGGGISRGMDYVHELTLQTQFDLGRLFGFTGWTVHTLLMERVGREVSHDRVGDYNISLMEVYSLSGHSVAHLTDMYAQKSFLHNTVDLAFGRMALTHVFATSPLLCSFMMTCSAPVAIKLDAGFSVYPKATWGGRVRLRPTRDTLVQIGAYSVSPLNEDISGWAWAGEKSTGLMIPVEFAWQPFFGPRKLPGHYVLGFAHDTTRYADNIGDVPAGSAIRPHGGEARDTFYLEADQMLYRKGGASQMAGGYVLAGYIHNTPDVSVISDEFYVGSSLLGIIPHRPHDRFGVMYSYYRMSPRTELGQQLRMDAGMALGVHVNGPQTHAAVLEAYYGVPVYPGILVQPEFQYMMRPGETAHIPNAEVVGLKVIGTL

>Carbohydrate-selective porin 2, OprB family (encoding gene at position 1287655:1289154 bp)

MCVIKTCANNENKSAIKWNFIPVRIRLLAVAVGMLFIGCTLTSEVLAQTETAKTAFTTHYDPAAFPMTEMGQVAIGPLVPMLTASPHLFGDWGGIQPWLTNRGIFLNVTVNEEYMGNVTGGRQRANVAAGQVAGALDIDWQRLAGVPSFWTHMLVVNGHGSSLSNAIGDSITNPEEIYGARGNVVAHLVDMYADKGFLRDRIILSVGVIPTGSFFNQDYLACSFMNVSVCGNPAPSKYVPGGRDWPSGNLGAVLRVRPTLRTYIMGGIFAVSPHAYNGGISGWALGQDGLGKLSSQVEIGWSPSFGRHHLLGHYKIGYWYDNSRYPNLYADINGNSFQATGLPRRYESGMNAAWFLFNQMIHRSGDGLANGLIVIGGADYTQGSQVAMRDHEWIGLLQSGTPWGRPLDQVGAMFQYMEMGHTVTLQQESSLALGLPYLSNQWGAVYGIQSHENVWEAFYSIHVARGTAFQPDFQYLQRPGATTTFHDAAVIGFQFTTNL

>Carbohydrate-selective porin 3, OprB family (encoding gene at position 1433875:1435551 bp)

MTHSILTKRILAGPSRFVPPFHTPHGSMCRQGLCAASCALGMGLIFSTSGMAQTQIEEDRARLGNSTPLIQQIDPANVRDSERAQADVEEKAAGDGDKLDTSGNLLGNMWGARPWLYKHGITFDIQEVDEVWGNGTGGSASGNDGAGGSGTGPAYDGVTMPTLTIDTEKLFGLKGGLFNVSALQTRGRSISQDHLANFNPVSGFEADRSTRLFELWYQQSFLKGTLDVKIGQQDLDTEFLISDYASLYLNANFGWPMAPSVNLYGGGPSWPLASPAIRIRYRPSEKFTFMFAAADDNPPGNRYNSTPIQQATGSVSGYNSDPTSQTYDGANGTNFNMGTGALLITELQYALNPQPADMSNVTKNPGLPGVYKLGGYYDTAKFADYRYNRNGGSLGAASVNPDSTESDLTPRWDRGNWMVYGIIDQMIWRPSIRSARSVGIFARATGNSGDRNMISFAVDAGINLKAPFRGRDNDTLGLGWGIGRASSGQRQFDRDSGSYVQGNENHLELTYQAQVTPWMVMQPDFQYIWHPSGGVADWTGLRRVGNEAVFGLHSSITF

>Carbohydrate-selective porin 4, OprB family (encoding gene at position 2853448:2854926 bp)

MKYAIDTRMTRPFPRLFVSLPLFFLALFALCESASAQAIPGEGQGVVGAQPSLNVNSRRNVSVNDPGSFFSAPYGNQHFFGDWAGLQPFLLKHGVHIEADVHEELAGNFRGGAKQGVTDAGQVGVEIDIDWHKLAGAPKNFWTHTMIVNGHGRNASTDYIHDSLAGVQQIYGARGNVVAHLVYMYAEQSLFHNRLDISAGWIPVGSFFAASPLFCDFMNVSICGNPAPGKYVPGGRDWPSGNLGVVMRVMPTVDTYIMASMFAVSPHSYNGGISGWSWAQSGLGKFSTPVEIGWLPEFGRNHLAGHYKAGYGYDNSQYNDLYSDINGNSAVLTGQPFRKQSGVSTAWFQADQMIMRNGAGPTNGLILLAGYMYTSGKVSAMKDHTWAGIVETGAKWGRPLDTVGAMFHYYEMSRASILQQESSVLAGTPFLNNQWGKVWGIQTHENVYEVFYNIHTARGMSFQPDFQYINRPGGTTTYHDAAVMGLQFNCIL

>Carbohydrate-selective porin 5, OprB family (encoding gene at position 3040876:3042462 bp)

MKIPDPPPPRWTALSRLLFLSCMLIGPCGATTAHAQVPRTQIADDRARLGNSTPLIQQIDPATVRDSERAQADAQAPPSADALDTSGSLLGNMGGARPWLYRHGISFDLQDVNELWGNATGGSASASDGAGGAGTGPAYDGVTMPTLTIDTEKLFGLKGGLFNVSALQTRGRSISQDHLADFNPVSGFEADRSTRLFELWYQHSFLGGKLDVKIGQQDLDTEFLISDYGALYLNANFGWPMGPSLNLYAGGPSWPLASPAVRVRYRPDETFTFMFAAADDNPPGNSSNSFVIQNGGNRADPTSQTTNDGSGTQFNMGTGALLITELQYALNPQPADMGSATRNPGLPGVYKLGGYYDTARFPDYRYNMQGRPLGTYGGMPRQDRGNWLLYGIIDQMIWRPSLASPRSLGVFARATGNSGDRNMISFAIDAGLNLKAPFRGRNNDTIGLGWGIGRASSGLREYDRTSGALLQGSENHLELTYQAQVTPWMVMQPDFQYVWHPSGRVADWSGLRRVGNEVVCGLHASLTF

>Carbohydrate-selective porin 6, OprB family (encoding gene at position 3439017:3440453 bp)

MSVPGHAQTIPVAARDVWQADEIPASESQDTPSAAGGSLLGDMGGLRPWLARYGMTLGIQDVNELWGNATGGIASTSGDGRGAGTGASYIGVTMPDLTADLEKLMGLVGGTFNVSALQIRGRAITQDHLADFNPISGFEADRSTRLFELWYQQSFLKDTLDIKIGQQDLDTEFLISDYASQYLNASFGWPMGPSANLYAGGPSWPLAAPAIRLRYRPGGNYTVMFAASDDNPSGNRDSNVFGVTSNPADPTSQTMNDGSGTQFNMGTGALLITEIQYALNPRSGDRPGAVRHAGLPGVYKLGGYYDTARFPDYRYNMQGQSLGAYGGTPRWDRGNWLIYGIVDQLIWRPSPEGARALGVFVRATGNSGDRNIISFAIDAGLNLKAPFAGRTNDTLGLGWGIGRATSGVRAYDRARGALVQGNENHFELTYQAQVTPWMVLQPDFQYVLDPSGGLGNPSRPMRRIGNEAVFGLHTNVNF

>Carbohydrate-selective porin 7, OprB family (encoding gene at position 3440518:3441825 bp)

MVVFLAVLSPAYAQTVPVSVPSAGVTPRQSVPDHIDPRTRLSGDWGGMRNWLLAQGIDIRISDTDELWANPVGGAQASENYIGSTAVEMVTDLHALTGLALGTFDISAMEIRGRPFSNAPLYVFNQTSNIEADDNGRLYELWYSQKFLRERLALRIGKLDLGHDFMVSSVGLTFLNASFSWPIMPDNDLYDQGPVSPVTTPAIRLRYTLSPRWNFLFAAADDNPVGGPFINVRDPWNQNRDPGGTRFSFSTGALFFGEVQYRRDISGRQGTYKLGGYFDTGRFPDQSDFAKSHKTNWAVYGIVDQTLRHFGRITTLDAFIRGNWTADTDRNQIVYAVDGGIALSAPFHRRGDVLGLGAGLGAASPCLAAADRRSGLPAQGNEYHLELTYQAQVTPWFMLQPDIQGIVSPSGGVLDDRGRRVHDEAIFGLHGSVTF

>Aquaporin Z\_1 (encoding gene at position 1386137:1387120 bp)

MKYIEIHGKRRSAYPTCRSTLFPHPPCSFKNIRGLEKGQKAHSPFPSNDNKRIKWANMLKNRQFLGELIAECIAVAIIVMIGDSVAAMYALYDPSPYKLAYWGVCIVWGLSVTIAIYITGSVSGTHANPAVSVALALYRGFPWRKVPAYCAAQILGGVIGAALVYTLYQPVIDHYNQLHALTRADGGAAGVFFTHPGEFITPFHAFVDETILTGLLVFGIFAVTCEYNTVAPQANSGALIIGLLVASIGACSGYLEAWAINPARDFGPRLFCFLAGWGDSALPGPDHFWWVPVAGPVLGGVLGAGCYQFLIRPFIPRQASPAVPPVS

>Aquaporin Z\_2 (encoding gene at position 1847677:1848606 bp)

MRLPHLHLPYLHVHVHDRPLAGDPHPHNPFHWKLYFCETVATAILMVLGLSGVILLTAPGSPLSPPLLHHPYVQTALCGLVFGLSGTAAAMTPFGKVSGAHINPSVTLAFSLAKRIGGVDALNYMIAQVIGAFLGTAVVYGLGRLVTWWGSMAVAVRYGATVPYGRISIWWAMWSEMFVTAALIAMLYWLAAHPRWKFITPWSGGLFFLIMNPFTAWLSGNSVNFARTLAPALFSGQWTGLWVYVVGPFAGASLAVMAIRMNLMGRLHLLEARLVNFGHHGRVPGLDDPHRKLNHPDDPDHVPPGTGPA

>Aquaporin Z\_3 (encoding gene at position 3161790:3162686 bp)

MTATRPPGGSAITDRPLAGAPHPDHPLHWKLYGCEMVATMVLMLCGIVSVTLLTTPQTPVGRMLAPHPVIQTMLCGLFFGLAGTVAAYTPFGRVSGAHVSPSVSLAFSLARRLGWVDLCGYVAAQMLGACLAAVLLAGVGHVLPVWGKMAQDATFAATVPFSGVAVVWPLVTEMVLTCLLVIMLCALAAHPVLKWFTPWAGGVFFCLCNPVSAWLSGNSSNLARSFGPAVVTGQWDSFWIYALGPFTGAAMAIWLLRSRLLGRIEVEEARLVNFGHHGRIPSLLHPGRRMEGGPAKYD

>Quinoprotein glucose dehydrogenase\_1 (encoding gene at position 1924182:1926572 bp)

MNTPLRSAPLLAAAIGVCALAGLYLLGGGLWLCAIGGSFYYVVAGALLLVTAFLLFRRQAVALTVYAALLLGTMAWAVNEAGLDFWALAPRGDILVPIGIVLLLPWVTRHLQPATPGARLPLLGAIGAAVVVIGAALMGDPQDIAGSLPPVAQNAPEPGDAHQMPDEDWQAYGRTQFGDRFSPLRQINTGNVSRLKVAWTFRTGDMRGPNDPGEITDEVTPIKVRDTLYLCTPHQILFALDARTGKQRWKFDPQLQYNPTFQHLTCRGVSYHEDRVEAQADGAPAPAPAECARRIFLPTNDGQLFALDAESGARCASFGNNGVVDLRDGMPVRTLGFYEPTSPPVVTDTTVIVSGAVTDNYSTHEPSGVTRGFDVHTGALRWAFDPGNPDPNEMPSEHHTFVPNSPNSWITSSYDAKLDLIYIPMGVQTPDIWGGNRGADAERYASAIVALNATTGRLVWSYQTVHHDLWDMDIPAQPSLVDIRNEHGEVIPTLYAPAKTGNIFVLDRRNGQLVVPAPEQPVPQGAAPGDHLSPTQPFSRLTFRPSQKLTDADMWGGTMFDQLVCRIMFHRLRYEGTFTPPSLQGTLVFPGNLGMFEWGGLAVDPERQIAIANPIAIPFVSKLIPRGPNNPATPDRSLPSGSESGVQPQFGVPYGVDLHPFLSPLGLPCKQPAWGYMSGIDLRTNKIVWKHRNGTIRDSAPLPLPIWMGVPSLGGPLTTAGGVAFLTSTLDYYIRAYDVTTGRVLWQDRLPAGGQSTPMTYAVDGRQYIVTADGGHGSFGTKLGDYIVAYTLADQN

>Quinoprotein glucose dehydrogenase\_2 (encoding gene at position 2594170:2596791 bp)

MRQDLPFESHAREIPRNPSGAACLHHAVQTRWPHTGIESIMFPRPIENFRKNAGMREGKQKLFSIITSALLALVGLFLFFGGAQLMVLGGSWFYVLAGCLLLAVAVTGVKAPQLAMRVYAAFLVVATIWALTETGFNIWGLEVRLLAPIGFGAWMLLPWVWRSGGNWLADKRDMLGAIGLAVVVLVISCFTSYSIDGTVPDDRMAAQGQADPAADGVADADWQAYGRTMGGDRYSPLAQITRGNVSHLKRAWVTRTGDVEQDGEGTVAGPDQGHEFNLEVTPLKVGDTLYMCTPHSWVMALDATTGKVKWKFDPHPDTADLAKNVYLACRGVSYYRIPDEIQTSCRTRIYSPVADVRIVALDAETGKPCDDFGDHGFISMRAYLGHVPHGFHFITSPPLVAKNRLITGGWIFDNQANFEPSGAIRAFDATTGEIAWAWDAGHSPETWKPGPTDVLTRDTPNAWGVYTADPALGMVYIPTGNAPPDNWGGSRRPFDDATSSATIALDIVTGERRWTYQTVHHDLWDMDIPSGPSMVELPGPNGESIPALVQSTKRGEFFVLDRRTGAPVPGYPVEERPVPTAGAAPDDRVSPTQPYPAAMPSLTPPNLKESDMWGATLLDQMICRIQYRQSAYEGQFTPPHVGRTTIVYPAFYGVVDWQGITIDPQRKIMLANASYLPFRIKLEKRQGLEGKGVLPRWNGQGEEPAAKGDALSVSPDYGTPYIALTNPWLNPLQIPCKGPVWGTITAIDLVTKKIVWQHPVGTTRDTGPFRTHNNLPLPTGMYNIGGSIVTRGGLVFMGATADDYLRAFDLATGKVIWTDRLPAGGQATPMSYEIGGKQYVLIAAGGHGGLGTRSGDYIIAYTLDGEKGAASAQ

>Glycerol uptake facilitator protein (encoding gene at position 1285133:1285972 bp)

MNRVFLGELISEALAVFIIIAFGDSVAAMYLLYDPSPYLHAYWGVCIVWGLGVTVAIYATGSVSGTHANPAVTLALATYRAFPWKKVIPYWFAQIVGGFLGAALVYALYYPVIDHFNDMHQLARMSGGGAGVFFTAPAPGITLWHAFSDEIILTAILVFGIFAITEQYNEMAPGANFGALIIGFLVAAIGASMGYLEAWAINPARDLGPRLFAYVAGWHEAALPAAGHYWLVPVAGPLIGGLLGATAYEYLIYPFLPAQLRARQALQGKIAEETIIIGE

>Glycerol kinase\_1 (encoding gene at position 1286008:1287507 bp)

MTDYVGAIDQGTTSSRFMIFDRKGTIVSVAQKEHRQIYPRPGWVEHDPIEILENTNEMIGAAMARANLGAASLVSVGITNQRETAVLWDRTTGLPLHNAIVWQDTRVDQLVSEYGRDGGQDRFRAITGLPLASYFAGLKLRWLLDNVEGARQKAESGQALFGTVDSWLSWNLTGGTRGGIHITDVTNASRTQLMNLKTCAWDEDMLAAFSIPAACLPRIVPSSQVYGTITIPSLQGTKLAGILGDQQAALVGQTCFSPGEAKNTYGTGSFLLMNTGTDPVQSKAGLLTTVAYQFGTEEPRYALEGSIAITGALVQWLRDNLKLFDLATQIEPLARSVADNGGVYIVPAFSGLYAPYWKENARGVIVGLTRYVTRAHFARATLEATAYQVRDVVAAMEEDSGIVLRSLKTDGGMVANELLMQFQADILNVPVVRPKVVETTALGAAYAAGLAVGYWKNIDDLRANWEVDRTWQPTMPPEQRARYLAWWKKAVQKSFDWAE

>Glycerol kinase\_2 (encoding gene at position 1389048:13890547 bp)

MNKKNRILAIDQGTTSTRSIVFDRDIAALSVARVEFAQHYPNQGWVEHDAEEIWSNVLSTAREAIAKVGGPATIAGIGITNQRETIVVWDRKTGSPVHRAIVWQDRRTTPVCMRMHEQGYEPLVRERTGLLLDPYFSATKIAWILDNVEGARARAERGELACGTIDSFLLWRLTGGRVHATDTTNASRTLLFNIHTCAWDDELLALFNVPRAILPEVRTNSEIFGETEADLFGEPLKVAGMAGDQNAAMVGQACFKPGTAKATYGTGCFALLNTGTTPVNSENRMLTTIAYRIGDETVYALEGSIFVAGAAIRWLRDGLGLITHASQTDDMATRVPHSHGVYMVPGFVGLGAPHWDPDARGLICGMTLGSTAAHIARAALESVAYQTLDLMEAMREDGGGKLNALRVDGGMSVNDWFCQFLADMLQTPVERPRQVETTALGAAFLAGLATGVWSSIPELEGTWTRGHLFRPTMDKAQRDSMVAGWHLAVRRTLSSTVAA

>Glycerol dehydrogenase\_1 (encoding gene at position 1201435:1203437 bp)

MRRYRFLAMGMAAAWLCLPVSSHAQFAAAGSGGPPGASIPGPGRADEPAEQTPADPGYFAGPSPYAPQAPGVNAANLPDIGSVAADSLPAMLPQAGAAPAPGDWATYGRDDAQTRYSPLAQITPENVSHLQVAFTYHTGSYPRPGQTNKWAAETTPIKVGDGLYMCSAQNDIMKLDPATGKEIWRRNLGEKYEAIPYTAACKGVTYFTSSQVPQGQPCHNRILEGTLDMRLVAVDAATGEFCPGFGHGGQVNLMQGMGESVPGFVAMTVPPTVVNGVVVVNHQVLDGQRRWAPSGVVRGYDAESGRFVWAWDVKHPDDHDQPTGNRHYSRGTPNSWAAMTGDDALGLVYVPTGNAAGDYFSGYRSAAENAVSTSIVALDVRTGSPRWVFQTVHKDVWDYDMGSQVTMMDMPGTDGQTVPAIIVPTKRGQTFVLDRRTGQSILPVEERPAPAGDVAGDTRAPTQPWSVGMPSLHMPDLREQDMWGMSPIDQLYCRIKFRRAHYVGEFTPPSLDRPWIMYPGNNGGSDWGSMAYDPQTGILMMLREYGGKPLVEWLVLLLGVVIFLVGLVFVAGGAELALLGGSLYYLLCGLVLLASGTAMLMGRTLGALLYLAALAYTWAWSVWEVGFSPVDLLPRAFGPTLLGLPVLFSIPVLRRMATRRAIGGIC

> Glycerol dehydrogenase\_2 (encoding gene at position 1673449:1676036 bp)

MSRTPMPRGLLLGATIITGLSCATALAQVPPADQPPGTGNATVPPAQPTPPADAFSAPSPNGPQAPGVNAANIPDGPPAEPSEATPMVEQVVANPAHDDWPGYARDDRATRYSPLDQITPANISHLKRAFIYHTGSKPGPGQVNKWAAETTPIKVGDGMYMCSALNDMMRIDPATGKEVWHFHANEKYESIPYTAACKAVVYYTSSTVPEGEHCHHRILEATLDERLIEVDSEDGKVCEGFGWHGMVNLMKGMGESVPGFVAETAPPPIVNGAIITNQEILDGQRRWAPSGVIRGYDAETGRFLWAWDVNRPHEHGEPKEGEHYSRGTPNSWAAMIGDNALGLVYVPTGNSAADYYSAMRSPEENKVSSAVVAIDVKTGEPRWVFQTVHKDVWDYDIGSQPTLMDFTKPDGSSVPALIMPTKRGQTFVLDRRTGEPVLPVEERPAPSPGMVPGDPRAPTQPWSVGMPRLGFAPLKEADMWGMSPIDQLYCRLKYRRAHYVGEFTPPSIDKPWLEYPGYNGGSDWGSVAYDEKTGILIANWNNTPMYDQLVSRKKADQLGLMPVDDPNYKPGGGGAEGAGAMAETPYGIVVSPFWDEYTGMMCNRPPYGMITAIDMHTQKVLWQHPLGSARANGPFGLPTHLPLTIGTPNNGGPVITAGGLIFVAATTDNMIHAFDIHTGREVWNDVLPGGGQATPMTYEYKGKQYVAIMAGGHHFMMTPVTDDLVVYALDNVNMSAFVTPQTPAGWATLGLAVIIILLGLPLLYMGAELAFIGGSWYYVIVGLAVTVAGLLMAMGRVAGGLLYLAAVAFTWLWALWEVGLDGWGLLPRVFGPTLLALGVLACLPVLKRAEAARSTLVREVA

>Dihydroxyacetone kinase (encoding gene at position 1848749:1850380 bp)

MKRFFNTRETIVTEALDGFLRSAAGQHLCRLDGYPDTCVIMQREPERGLVSVISGGGSGHEPAHAGFVGRGMLTAAVCGALFASPCVDAIVAAILATTGEAGCLLVVKNYTGDRLNFGLAAERARALGKQVEMVIVGDDIALPDSATPRGVAGTVLAHKLAGYGAAQGWPLTRVAQFVRDGAGRMRTIGMALEDCNPYEPGRASRLAADEAELGLGIHGEPGAQRIALASASDLMRRVTETLEASLPATVRNTRFAVVLNNLGCVPEVEMALLLEAFSHTRLARRVSHVIGPAPLMTALDMNGFSLTLIELDESITHALQAPAQPPAWPGMVPLGSPAVAPMPVMPDAFPYPASTDPTVRAMLEHGAKVLIANEAPLNELDGKIGDGDAGSTFAGAAREITAALDRLPMADPHQLMTTVSNILTQHAGGSSGVLFAIMFSAAGRSRAPWREALREGLEHMMACGGAKPGDRTMIDALYPALEALARTGSLTDAALAARKGADATTTMETARAGRAAYVPSAHVRNVPDPGAEAVARLLEGLARG

>Triosephosphate isomerase (encoding gene at position 2116868:2117611 bp)

MKQIIVGNWKMNGLSADADALVDALATGLAALPARADVVVCPPFTQLARLAPKLKAAGMALGAQDCHKDRSGAHTGDISAPMLVDLGVEYVILGHSERRAEHGELDETVREKAVAAMAAGLTPIVCVGENADQRDSGDSQEKVGWQIQGSLPQGFTGIVAYEPVWAIGTGQAASQQDIADMSAFIRAELVRQFGEAGKTIRILYGGSVNERNVTDILPVENVDGALVGNASLKADAFVPLVRAARAS

*Enzymes involved in BC biogenesis*

>bcsA1 (encoding gene at position 666919:669156 bp)

MSEVQSSAPAESWFDRLSNKILSLRGASYIVGAIGLCALLAATTVTLSVNEQLIVALVCVVVFFIVGRRKSRRTQIFLEVLSALVSLRYLTWRLTETLDFDTWLQGTLGVTLLLAELYALYMLFLSYFQTISPLHRAPLPLSPNPEDWPTVDIFIPTYDESLGIVRLTVLGALGIDWPPDKVNVYILDDGKREEFARFAEECGARYIARPDNAHAKAGNLNYAIQHTSGEYILILDCDHIPTRAFLQISMGWMVEDKKIALMQTPHHFYSPDPFQRNLAVGYRTPPEGNLFYGVIQDGNDFWDATFFCGSCAILRRKAIEEINGFATETVTEDAHTALRMQRRGWSTAYLRIPLASGLATERLVTHIGQRMRWARGMFQIFRVDNPMLGPGLKLGQRLCYLSAMTSFFFAIPRVIFLASPLAFLFFSQNIIAASPLAVLAYAIPHMFHSVATAAKVNKGWRYSFWSEVYETVMALFLVRVTIVTMMFPSKGKFNVTEKGGVLENEEFDLGATYPNIIFAVIMAIGLMRGLFALAFQHLDIISERAYALNCVWSVISLIILLAAIAVGRETKQIRHSHRVDARIPVTVYDYEGNSSHGITQDVSMGGVAIHMPWRNVTPDQPVQTVVHAVLDGEVVNLPATMIRCANGKAVFTWNITSLPIEASVVRFVFGRADVWLQWNDYEHDRPLRSLWSLILSIKALFRKKGRMMIHSRPQNKPIALPVERREPTSSQGGQKQEGKISRAAS

>bcsB1 (encoding gene at position 669157:671572 bp)

MRPRDMKMVSLIALLVFATGAQAAPVASKAPAPQPAGDNLPPLPAAAPAAAAAPAGQQPAGAASAAPAVDPAAASAADAMVDNAENATGVGSDVATVHTYSLRELGAENALTMRGAAPLQGLQFGIPGDQLVTSARLVVSGAMSPNLQPDNSAVTITLNEQYIGTLRPDPSHPAFGPLSFDINPIFFVSGNRLNFNFSAGSKGCTDPSNGLQWASVSEHSELQITTIPLPPRRQLSRLPQPFFDKNVRQKTVIPFVLAQTFDAEVLKASGILASWFGQQTDFRGVNFPVFSTIPQTGNAVVVGVADELPSALGRPAISGPTLMEVANPSDPNGTILLVTGRDRDEVITASKGIGFSSSTLPVAARMDVAPIDVAPRAPNDAPSFIPTSRPVRLGELVPVSALQGEGYTPGVLSVAFRTAPDLYTWRDRPYKLNVRFRAPDGPIVDLARSHLDVGINNTYLQSYSLHEKDSVVDQLVQRFGGRGQTSGVQQHTLTIPPWMVFGQDQLQFYFDAAPLTQPGCRPGPSLIHMSVDPDSTIDLSNAYHITRMPNLAYMASAGYPFTTYADLSHSAVVLPDHPNGTVVSAYLDLMGFMGATTWYPVSGLDIVSADHVNDVADRNLIVLSTLANSGEVSSLLSNSSYQIADGRLHMGMRSTLSGVWNIFQDPMAAINNTHPTEVETTLSGGVGAMVEAESPLASGRTVLALLSADGQGLDNLVQILGQRKNQAKIQGDLVLAHGDDLTSYRSSPLYTVGTLPMWFMPDWYMHNHPVRVIVVGLFGCLLVVAVLVRALLRHALFRRRQLQEERQKS

>bcsC1 (encoding gene at position 671575:675549 bp)

MNRRYVFSLSAGLLASSCMTVLVAVPLARAQQASTAMTGTQASGGSAAPRQILLQQARFWLQQQQYDNARQALQNAQRVAPDAPDVLEVQGEYQTAIGNREAAADTLRHLQQVAPGSTAANSLSDLLHERSISTSDLSQVRSLAASGHNAQAVQGYQKLFNGGKPPHSLAVEYYQTMAGVPAEWDQARAGLAGIVASNPQDYHAQLAFAQALTYNTATRMEGLARLKDLQGFRSQAPVEAAAASQSYRQTLSWLPVTPTTQPLMQQWLDSHPNDTELREHMVHPPGGPPDKAGLARQAGYQQLNAGRIAAAEQSFQSALQINSHDADSLGGMGLVSMRQGDAAEARRYFQEAMAADPKTADRWRPALAGMEISGDYAAVRQLIAAHQYDAAKQRLSALARQSGQFTGATLMLADLQRTTGQMGAAEQEYQSVLARDPNSQLALMGLARVEMAQGKTAEARQLLSRVGSQYATQVGEIEVTGLMAAASQTSDSARKVSILREAMAQAPRDPWVRINLANALQQQGDMAEANRVMQPILSNPVTAQDRQAGILFTYGSGNDAMTRRLLAGLSPEDYSPAIHAIATEMEIKQDLASRLSMVANPVPLIREALSPPDPTGARGVAVADLFRQRGDMIHARMALRIASTRTLDLSADQRLAYATEYMKISNPVAAARLLAPLGDGSGTGAGNALLPEQVQTLQQLRMGIAVAQSDLLNQRGDQAQAYDHLAPALQADPEATSPKLALARLYNGQGKSGKALEIDLAVLRHNPQDLDARQAAVQAAVNSGRKSLATRLAMDGVQESPMDARAWLAMAVADQADGHGHRTISDLRRAYDLRLQQVEGTRAVASGTGEQESLEPPSSNPFRHHGYGRQTELGAPVTGGSYSMEATSPEASDQMLSSIAGQITTLRENLAPSIDGGLGFRSRSGEHGMGRLTEANIPIVGRLPLQAGESSLTFSITPTMIWSGQLNTGSVYDVPRFGTDMATQAYNQYVSYISQNNSSSTLHSELVKGGEAEAGFAPDVQFGNSWVRADLGASPIGFPITNVLGGVEFSPRVGPVTFRVSAERRSITNSVLSYGGMRDPNYNTTLGRYARQLYGKELSSQWSEEWGGVVTNHFHGQVEATLGNTIVYGGGGYAIQTGKHVQRNDEREAGIGVNTLVWHNANMLVRIGVSLTYFGYANNQDFYTYGQGGYFSPQSYYAATVPIRYAGQHKRLDWDVTGSVGYQVFHEHSSPFFPTSSLLQSGAQYIADSYVQNATSSDYLSQETVNSAYYPGDSIASLTGGFNARVGYRFTHNLRLDLSGRWQKAGNWTESGAMISAHYLIMDQ

>bcsD (encoding gene at position 675549:676019 bp)

MTTFNAKPDFSLFLQALSWEIDDQAGIEVRNDLLREVGHGMAGRLQPPLCNTIHQLQIELNSLLAMINWGYVQLELLPEDHAMRIVHEDLPQVGSAGEPAGTWLAPVLEGLYGRWITSQPGAFGDYVVTRDVDAEDLNSVPSQTIILYMRTRSSSN

> bcsZ (encoding gene at position 664722:665759 bp)

MGRRSFLSVMAAAGSIPFLSTALAADDPAINAQWAIFRAKYFHPDGRIIDTGNSGESHSEGQGYGMLFAATAGDQATFEAMWSWTRANLQHKTDALFSWRYLDGHNPPVADKNNATDGDLLIALGLVRAGRLWKRADYIQDAIAIYGDVLKLMTLQVGPYLVLLPGGVGFATKDSVTLNLSYYVMPSLMQAFALTGDARWQKVMGDGLIIINQGRFGEWKLPPDWLSINRQNGHFSIANGWPPRFSYDAIRVPLYLYWAHMLSPDLLADFTRFWNHFGASALPGWIDLTNGARSPYNAPPGYLAVATCSGLSSAGGLPTLDKAPDYYSAALTLLVYIARGEGGGM

> ccpAx (encoding gene at position 665756:666736 bp)

MTTPNKESTEATPRPVVDMDNPQDVTRMLSSGYGLSGEGFHYHSFTRPVMLDMTPELPHDSVDDTEHHLDDNVTEHESAPATAPVFVFDAAPEPAAPPVVAEAAPPPPPPPPPEPAPPEPPPAPPPYTPVVTHVPPPPPVEETPVPEPVAEAAAPARPRPVPPAQPAPDMASTGGRERRGLQPFAAPRAPSEPPVSSRAAAPATPFVQADDWAPVPKAQQRRGQRPTGPGFFFAKGNDRVATARLFQPVAVARPASKPDSKVTTMTKFDKTAQNAPTGRRPAPSDNSPTLTEVFMTLGGRATDRLVPKPSLRDALLRKREEETGQS

> bglX (encoding gene at position 676251:672452 bp)

MKPSRKSFLLSAVAWGLVAALPAHARHAATAGDPADDQARQVLAHMSLQDKMALLFSVDGGGFNGSVAPPGGLGSAAYLRAPAGSGLPDLQISDAGLGVRNPAHIRPNGAAVSLPSGLATASTWDVDMARQAGEMIGREAWLSGFNILLGGGADLTRDPRGGRNFEYAGEDPLQTGRMVGSTIAGIQSQHVISTLKHYAMNDLETSRMTMSADIDPVAMRESDLLGFEIAIETGHPGSVMCSYNRVNDLYACENPYLLNTTLKQDWHYPGFVMSDWGATHSSARAALAGLDQESAGDHADARPYFTALLAADVKAGRVPVARIDDMAQRIVRSLFAAGLVAHPPQRGPLDVVTDTLVAQRDEEEGAVLLRNEGGILPLSPTARIAVIGGHADAGVISGGGSSQVDPIGGEAVKGPGKKEWPGDPVYFPSSPLKAMRAEAPNAHITYESGTNIAAAVRAARAADVAVVYATQFTFEGMDAPSMHLDANADALITAVAAANPRTVVVMETGDPVLMPWNSSVAGVLEAWFPGSGGGPAIARLLFGKVAPSGHLTMTFPQAESQLAHPDIAGVTADNVFEMQFKTDQELVYDEGSDVGYRWFDRNHLKPLYPFGYGLTYTTFSTDGLAVHRHHDAVTVTFTVHNTGNRPGVDVPQVYVGLPDGGARRLAGWQRVSLAPGESRAVTVQLDPRLLAHFDGKKDRWSIPSGTFRLWLGTSATDDSQQASLHLSGRTFAP

>bglX2 (encoding gene at position 522700:524739 bp)

MKYASLRYGLSALRCLIALCMGGLVLSALPVQARAAAGGSAGSAHAADMAARMQPAEQQAVLQARPIGGGEGATQAAADGLLAWPGVARLGLPALRMPDFSSPARPADEGGHPMLPWLALAATWDPDLARRAGGARARAEWEQGRAVVRVGGIDLLPSGRLQAGEDQVLAGTMAGMIGAGLLSGHVLPVFGSVAGDEQARADGAVPGRTAPVPAAWLADGSLLGVAMALEVAHGGALLCGGLAVCQTVTGLGAMVHDAWHFPGMVMATPGGLGPARPDDASLLPGALGTGVDMEQVSSREGGHDMFGAPLRQAVRDGAVRPAQLQAMGMHVLASFYMAGSLDHPPAFTPAHAAASPPVADTLVSDVEAEGAVLLQNENRVLPFDPALGPVLVLVRAPMRHAADLLADELRHAGLGVSVVVAADGANAPGTLPPATAQAARTLVLSGTDADNRMISTLADLGGHVVVVLTGDDPDRQMPWLDMVDSVVQAWAWRDAHARPLAALLSGQQEFSGHLPVTLTGGFYPPGMVDADYRAFERAHVAPLFPFGYGLSARGHLTLSDLHVVREGTHLNASFSVTNPDGTAVRAIPQLYVSPSSDQAAPRRLAAWRSIMVAPGHTLRLTLPVSLRLLAQWNAPAANWAVAAGDYAFSLGFSSVMLVRHADVRLPAMHLPAALDMAAD

>bcsAB2 (encoding gene at position 1020008:1024567 bp)

MAQFVDKITRFMEQAATGRVPSWVPIVIGVVMMSFVGSVALLPDMQGLISIGTVLLLLVLNRFKGRGITIFLMMLSLLVSMRYVVWRLTSTIEFHGWIQSALSILLLLAEVYALSTLCLSYFQMAWPLGRKEHPLPEDTSSWPHVDIYVPSYNEELSLVRSTVLGALKLDWPEDKLHVYILDDGRRVAFRDFALEAGAGYIIRSQNNHAKAGNLNHALKITDGQFAVIFDCDHVPTRGFLKRTIGWMIADPKLALLQTPHHFYAPDPFQRNLVAGAHVPPEGNMFYGLVQDGNDFWDATFFCGSCAVIRRSAVLGIGGFATETVTEDAHTALKMQRRGWRTAYLREPLAGGLATERLILHIGQRVRWARGMLQIMRVDNPLLGRGLRWEQRLCYLSAMSHFLFAIPRVTFLVSPLAYLFLGQNIIAASPLAISVYALPHIFHSILTLSRIESRWRYSFWSEIYETSLALFLVRITIVTLLQPHKGTFNVTDKGGLLEKSYFDVGAVYPNVILAVILFAAFLRGIFGIVWQFHDRLALQSFALNTLWVVISLIIVLASIAVGRETRQTRAAPRIAVALPVRITDMEGRSFAGHTRDISLGGLGVDLHWPADVARPDRVMMEYVNERDGIHATVPATVLALDERSMRLQWERRDLEDESQIVDMVFGRNDAWANWADFEPDRPLRSIAMVLRSIGGLFKWQAREIPRHVADDEEAKAPVVEAKLEKQSLVLKPVRRSARNGAAASAVLLVALAALSPVAMAQVQPAASASVPDQTGVSAETPFGDSNTGTVPDMIPVIDQAAADRISDSEVTRTLSFRNLGATSGPLTLRGYSPLQGLDVIVPANRVVTHARLSISGALSPSLLPEASAVTVTLNEQYIGTIKVDPEHPQFGPLTFDIDPLYFTGDNKLNFRFAGEYRRDCNDLFNEILWARISDMSQITLTTVRIAPERKLSRLPAPFFDPNLRSTLRVPVVLPDTNSKSSLKAAGLVASWFGKIADFRKLSFPVFTAIPASGNAVEVGENLPVDETGTRPRGPMLAEIANPNDRWGTILVVTGRNAQEVEAAARSLVFSADTLGGVAAKVVDDVSLEARQPYDAPAFVPTDRLVRFGELVGAADLQGGGFTPAGMTLPFHLPPDLYTWRGRPFLMDMWIRAPGGPVVDLETSRVDVSLNNNYLQSYTLSPPGLWQRWSQRLVNLHAGAVGHTTALPTWLLFGQNQLLFNFDARPIDRGACRRTPGDIRMSVDSDSTLDFRRGYHFAELPNLSYFAEAAFPFSRMADLSETTVVLPSHVDAGTAGAFLDLMGFFGASTWYPAAGVQIMTADQVGAAQPGGDIVVLGTAEQLGSATSLLSRSPYVIRDGRIQVGEHMGLQGIWYLFQDRDHAGLKNGVTARLNAPIVEAGLMLAAQSPYDHARSVVAFTGDTPERIHDLVLSLRNKTDLPSLQGDLVIKNGNQFTSYRTAPTYTVGSLPLWVRADWYLSHHPLALYLTGLAGAALTALGVWGWLRRLSRRRIENEELAGEQ

>bcsC2 (encoding gene at position 1026603:1030553 bp)

MTRQYCPARGRQPAVAWRKAPAAWVMRPAACRPSSAWLAGGGWKIICGMVAGVIMAGEIAQAEPAWTAGPDSAASPAGGSTQITVTPDAGQNAANAHLAHAAAVLELLLNQGYYWLGQHNLPKARETIQRALSIEPDNNEALFLLGRLQMAEGQTKLAAATLGRLIQNGNAPGLVADLRAQIHAGPIDPRGLAEARALAAEGKMMPAMFKYRALFKNGDPPPDLAMEYYRVLGATTLGYQEAATRLAAWVARNPRDLDAKLSLDRILTYHVTSRDEGLEGLRQLARSNASAAIRDGAIAAWRDALLWEPVTGPTIALYNEWLDLHPGDAEIIDRRHKAQDAQNIIDGANYRQQGFVLLSRRNIEGAADLFHRALAINAHDADSLGGMALVAQARQQPALARHYFQQAIQADPDSAAHWRAALKAMEAGGGGGMDPLVARIIQAINSGHYDAAQSDLALLGRRGNTITLQALQGMLARRQGHMEEAERLYREILRRAPGNADALFNLGGILIETGREAEAQDIIARLAHIRPDLARHLEVAGLSARSDRTRNNDEKLSLLNRAMAMAPTDPWIRLKLARALDEAGNHAQAQAIMDGVTSGRAVTPDDLQAAILYAMGRHDMARAEQLLARLPPGIESPGMARVAEQIELVRRIQELNRVPRAPNALLVALADRPDPTGERGMRIANALLDRHAPQDAQQVLATEERLTQPPQPSQLLAYAGVYLRLHSAVDATRCLNAFDAMARARPTDITADQQEIRNQIAIGLAIMTADGFNRYGQTARAYQVLAPVLQAHPDSAEAHLAMGRVYQTRNMARRALEEDQIALRLKPHNIYALAAAARDAGGLHQMAEAKDYSTRLAHEDPDGPMSWEVRSDIERIEGNTRAQLVDVEHARHAQCTLDGEGTCDGQHESFLPDYRWPEIDSNYINLHGATLPATYHYIPEDDGPEAMDRQIVYLRDSVSPQIDANSYVRSRTGTAGLGQLTEFAVPITGTLPFESWEHRLSFSIVPTLLFTGNPLANPYSAHEFGTYAINGALPGSSHHYYTQGVGLSLNYVNHWFSADVGSSPLGFPITNVVGGVEFAPRLTRNLGLRISGGRRMVTDSELSYAGMRDPGTGRLWGGVTRMFGHGALEWSEPTWNLYAGGGFAYLGGTHVVDNTEVEAGAGGSATVWQSHDRQWLRVGLDLMYFGYKRDTYSFTWGQGGYFSPQQYYGAMIPVEWSGHDRRWTWFLRGEAGFQHYHSNGAPYYPTDSALQALSVAHQPDYYGDEGESGLAGNIRGRVVYQFTHRLRLGMEGGYSRAGNWSETSGMWMAHYTFDGQ

>bcsAB3 (encoding gene at position 2139998:2144443 bp)

MIWRILKSPFVTGPLFALLMAVVSLTYLTPDHQFFVAVGGGVLFFLVRRHDERWSRCFLMVLSIVVSGRYLVWRFTSTLDLDGVLQGSLVLALAVGEIYTTIRVGFTYFQLAWPLRRQIHPLPEDEGTWPVIDVYVPTYNEDISIVRTTVLGCLSMDWPADRLNVYILDDGRRRAFRDFAGQVGAGYINRAENVHAKAGNLNHAIGVTSGDIIAIFDCDHVPVRGFLKKTVGWMLADPNLALLQTPHHFYSPDPFRRNMSRGMQVPPESNLFYGLLQDGNDFWNATFFCGSCALLRRRAIVSINGFATETVTEDAHTALRMQRKGWGTGYLREPLAAGLETETLLLQIGQRVRWARGMFQMLRIDNPMLGRGLRLTQRICYMAAATNYFFAIPRMMFLLAPLAYLFLGVTMIAASPYELAVYALPHLFHTTMTMSRLQGRWRYSFWSEIYESMLAPFLVRMTFVTMIAPHKGSFNVTDKGGLLDRERFDWRASYPGVIVAVVLAVGLVSGIWAAIVHYHETLVFRAMAVNSIWVLFSLIIVLGGVAAARETRQRRHSHRVAASLPFELVDAQGQVHACRSVDVSMGGCQLDAATVPGAAGGRVMLRWSLPSGPATMGATIIARCGGRLHLQWVIAGLASERQVVALVFGRDDAWARWSDFPPDRPLRSLYLLVASICALFRPPPRVRDETPHAVARKTAAQDETLPRQQLVIPPDRTVVLRDIGTALVLAAMLLLPAMDARAQAAPAMADAGPAVVADGSVDAIDNAHMTSADVDEVSHQPVTRTRTLADMGRTEDMVLRANAPLHGLSAGVGRDIIITAARLGISGTARGAAGRVAVAVSINNQDAGVICPTADGAFGPVDLPLSPMFLDTRNRINFRLFLRAPQPADPSAPACGPDARGRDGSAAQVSDPGVQVVISPRSTLTLTTVGLVPHRLLSALPYPVLDPDAARTAAVTFVLPGGRDPAQLEAAGMVASWLGLQSRESGIHFNVAAIPPDQGSAVAIAPGQPGPWGRAPAGPALAVMPNPHDRFGTVLVVTGRTPAEVRTAAQALVLGAEHDAPGAFAAAPVVHPPARQPYDAPGVVRTDRPVTLRELVSTAALRTRGLTSGTLDIALSLPPDLRSWRSRPFMARLQISAPEGGVLDRAKSRVSITLNGTYLHSYPLVPLSLNPFRTPGAPVEHDLELPVWKMARHNELRLYFDVHPRHMTDAAAAASDAVVELDPSSTIDFSKSRHFAVLPDVALFAASAFPFSRMADLSETTVLLPPHPADGTVGAFVDMMGFAGAISRYPATGVTVRATDMPVDASVTGDILLLSTLDGLGNGRAALARAGCVRAPSLLARLRARVTQGRDVPACDFTQGALVAAQSPFAAQRSVVAVLGGTPDALSAMVRDLRDPADTPRFQGDMVIRHGARLDSYRTGGLYTVGNMPAWMLPDWYLGGHPLLLCGLGGLAALCGTSCAMRVLGARSRRRILNDDLTGDL

>bcsC3 (encoding gene at position 2136184:2139981 bp)

MPDGFAMPCRAFMPVGRPVRARMWGGVVLAGALCLYMPRAEAQTPLRYAETILDGQIEEGAFWIHHGDDMHALHALQRALRIEPDNLEAGLMLGAVQVHQNDMAGARATLQALQAQPGAQAQVAALRGWIGQAPIDPAALANARSAADTGKKLQATLLYRAVFQGAHPLPDMELEYDRVLSGSLSGYTEATQRLRALGALLPHDLEIRMALAQALSYRPATRPDAIEDMRQLATAATTPDFIRGEVMQSWRRTLEWMGADPQAEPYYQEWLALHPDDTEIASRLKAEQAARAQAARLALVGAGYHALAHGELEQAERDFSSSMGTDPPRPEALEGLGLVAQRRGDIPAARRWLEQARALAPDDAGIRNALAGLDAPGGDPQLARLWALVARHQYDEAQAMLPAVEKDHGRIADTLRVRAIIAHARHELPRAEAAWRAVLRLVPGDLPAAAALSDVLIEEGRITEAEGWVARLRAAHYPGVTGLEAGVLGAMAENEPDQARRALLLEQALRDAPHNGWLRLHLAQLWLARGQATRARALMAPLCNLPPKTDEDTQVCFAFALQDQDMPRADALLARLPRADITAQMADGVAQVRLWHQISHLPPDDAQAVPMLEHMPVVPDPEGTQARLVVNALLTRHAPVTAAAGVLHRALADSAGHVSVNQSLSYAGLFMQIDDPVAAQQVLDGLPAVARGRRLTPTQARDLRDMTRSLAIAQADRDDIGGHPDAARRLLDPLLAQGPDDADLLLARGRVEAALRQPAQAVVYDQKALAIRPDDTMAQAALARDSLASGHEQAARAMARTLQATHPQWGDTWEIQAEIAGLDGRDRRRLADVQRARALDCTPRDDGDDSTGYGTRIDAGCAPYRAHAGDEWPDIGTNFVPGMGAGMPEVYHYDPSLTPVQALDRQADYLQRALVPQADGNLEIRDRSGQPGLGHMTVVNIPMTAIVPFSSTQHQLALSVMPSVLMSGDPLASGATAQQYGSVAAGGVRPGFHVPAAVAGVALSAHYQWRWVAADVGSTPLGFTTTNVLGGIELAPHLTHSLTLRLTGERRAVTDSLLAYSGARDPATGRVWGGVTRNRGHGQLEWAQPGYNLYAGGGYAVMQGTHTVANHEAEAGAGGSGLLWHRQDAQHLRLGLDLVYFGYRRNTYFFTWGQGGYFSPHAFMAALVPLTYDGHAGRWTWLFRGEAGYQHYTEHATAMFPLGEGGAMAGQRYAGQSTGGLAGNVLARAVYQLTPALRLGVEGGYSRSGSWDEVHGMLMLHYAPG

>bcsAB4 (encoding gene at position 2248494:2253065 bp)

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>NAD-dependent malic enzyme (encoding gene at position 1377838:1379562 bp)

MSDTAHFPGQVPLHTALSGRELLDCPVLNKGNAFDRRERDLFGLHGLLPARIATLAEQVDLACMRLAALPDNFARHIALREIQDRNETLFYAIIDQAPESWLPIIYTPAIGRACQQFSQIWTRPRGLFLNYTDRGRIAEILASPQWDGVRVIVASDGGSILGIGDQGANGMAIPIGKLSLYTACGGLDPACALPVLLDVGTDNAALLADPDYIGWRHARVRGAEYDAFIAEFVTAVAARWPDIALHWEDLSGADALRILRRYRGSLCTYNDDIQGTAGVTAGALLAAIRAGAAPLADQRIVIFGAGGAGCGIADLLAQMMVRAGMAAHEARSRFFMVDINGLVRHGMEGVTEGQMPFAQPADVAADWQVADPAHVTLAEVMAHVCPTTLIGTSGQGGAFTRQIVAPMARQAARPVVFALSNPTANIEALPADLLEWTDGRAIIGTGGPFAPVTHAGRTRPVDQINNSYVFPGVGLAVMAGGITRMTDGMFLAAADALAGLSPAVGAGGGHDAALLPPVSALRPVAMAVARAVIRQGQAEGVAPAMPETGIGAMLAAAMWSPRYRPYEKTPPARP

>Pyruvate phosphate dikinase (encoding gene at position 2567253:2569928 bp)

MTKWVYSFGDGLNEGRADMRNLLGGKGANLAEMAANGLPVPPGFTITTEVCSAFYENGRKYPDELKAQVDAALQRVEQSMGLRFGDPEAPLLVSVRSGARVSMPGMMDTVLNLGLNDQTVEGLARSSGDARFAWDSYRRFIQMYGSVVMGVPHHHFEDVLEQFKRANNVEDDTAITAGQWRAIVVDYTHIITTHTGTDFPTNPQDQLWGAIGAVFGSWMNPRANTYRKLHEIPASWGTAVNVQSMVFGNMGDDCATGVCFTRDPSTGENIFYGEYLINAQGEDVVAGIRTPQPMACARAEAGQHPMETTLPQAYAELLRVRSILETHYKDMQDIEFTVQRNVLYILQTRNGKRTAAAALKIAIDMAREGLITQEEAIQRVPAASLDQLLHPTLDPRAERVQLTRGLPASPGAAAGAVVFTAEECEARAAKGEDVILVRIETSPEDVHGMHAARGVLTTRGGMTSHAAVVARGMGRVCVAGAGGIHVDYAAGSLSVGSHTVKEGEWITLDGGTGAVYLGRVPTIEPVLSDDFNTLMGWADGVRRLGVRANAETPDDARTARRFGAEGIGLARTEHMFFGPDRIGFVRQMIIADEESVRQKAIAALLPFQREDFASLFRIMAGLPVTVRLLDPPLHEFLPHEAAEMAEVAQALGRSVEDVRARCAALAETNPMLGHRGCRLGLTSPEIYAMQVRALIQAAVLVEKELGRPIHPEIMIPLVATKAELATTRRAAEDEIARVLKEEGTNLSYSIGTMIELPRAAIQADQIAEYADFFSFGTNDLTQTTFGLSRDDAGSFLPYYVDQGLLPRDPFVSIDRDGVGALVRLGVERGRQTSADLKLGICGEHGGDPDSIAFFDEVGLDYVSCSPFRVPVARLAAAQAALATRQKAASPA