

S1 Fig. Amino acid sequences of *Leishmania donovani* proteins identified in urine of visceral leishmaniasis patients. Bold, underlined text indicates peptides identified in urine by mass spectrometry. Boxed text indicates predicted epitopes within each protein.

Indian VL urine

Hypothetical protein (LdBPK_191140 / XP_003860289.1)

MAGLQSEINISINSTRLEPEQSTSDKDICVFCLRRATSSASDPHAPLFFPFLVDCRHYACQPCALVHCDNAGRRIFCPKCHCVSRLAQSGRRRTRSAATAADADADR
 VSIDDGVSSTRSRRTGTTPHRSALKGKSGTLKRRASSVQFPANPTTSIVPGDGVSVASGAVAVPSEGDSAGEQHHQRRASSPLTQEAVDALPLDPVEARRRRA
 REQQQLRAAEAAAKAEKAVGLYAITAAPPKVPAPPPSATAASGLATNEGFKVKDRSRSQPVPKLPHTILEPKEEYVPPPLVHTVEEEEHAPAATGESGR
 DAKPVLPAAGATAAATAEEDVKAESASALAPAWKTSVTPRQMEDEVEAAMAASADKSQTTGVLPPPTGTPEELARPHQLDDCENTEAEEERGVDGLEA
 HERAALMQRMEEEDTAIRARRGLVVEFDSTPILSQQHQHTLQNHSHHDNTGSLVDFSDQVSVTSDDELSQRASGYKSATRSDSASRRRRRTSVNGASELRA
 QSHENMAGESDARPEKGGQAAAARTPGDALSSAAKSVAGSGSAEITLSPMTAARQGRVLAASEVDDGGKLIATRAALAEADAK**AKAEAEAA**RAAAEAEAHAE
 AIRTAEEAR**ALAEQGER**ARQRLQREAVEEAAEQKRQQQRQEEVLRQRQHEERAFAFCQALQDREGLAREALEQAEAAVREHYERGADEWLTAALPHELE
 AQLRVRAAEERRRQEQQAHLAAEEGLDRDEVEEAEANAWSWLLSGARVDRVVAATEEGDRVQ**EYEELR**FERLQLQREDTAELVHEEAHGRASFIYEAE
 ATRSLQLSHHAVQRQALAEGERRQVEVLLKKAARREALRQRFQWELDELDAEEVSGRAMLREVEREERTAHVFLQTLASIRRKEVLAQHAAAVAAAAAA
 DEPGGTSVLSEASTMIAAQVHRRVQQRQTDAAVPLMIEGDGDGVDNTADMVGAATPPQFRPLITAKELAREAREASYAAELQAAALERLREARRVAEEAA
 IRAQAEQERQAAHAESRQLQEAQRAEQRIREARDAEEQLLQALDLRDEAVRRAEHAAVMQALAEQRAVLEAKLQAAQRQLDEAQQRAQEQVRRAR
 ADAEMAADAARAAREAQRRDEEWQERCRAEHLRLAEQEREKEEAVRRLAEIEVRAAEAVRLAREEAARTAAEAQERLAEMERRQQAREAEVQSAQRV
 RSVRDSLREFDSSQSSRYATPFRVAVLPQGRPPPTSSSYRAPSLVAASSTHATHTAGAVATQASVHTPLQTPPLVPSSTSSAVRRQPSAQSPTRVAARVPAAG
 AAASLAPSDATPPKVISSQHTPLSSAVAPGLGRSGAAVPSSSASAAAGATSLAAMDPAIIRAIRSAVQEIQAQRRTQLQDRAEQNVLSERRVHRRQSDRLR
 AARDVAAIESSYAASEVDESEERHQRWRASQPHQRTRQRQPVRGYERDSRVASSRMSEERLSVRSRGGDYAQEVSESPWTRSSSSPASRLSPTGAPLSTA
 PPAPAARSVSSNTLLSTSSVYFDNSYQPSAAAFGAHQHFRNRGCDYAAVQQQQQQQLASAFYSSASRVLFAPRVAHQAREAWAEDGECGYAQRMH
 AGVGARAYSRVASEQQQRYATGAAQPPRQPLQTVGVAALPSAAHAYNEPEPLPAPAAMEYSPPPRRSTTRAAAEVPPQQSRPAGVGANVGSGGGIA
 ALPEPSRMCPRCYRTDTPCWRCEGEMICRHCGLPPGSARKLCTAHHRAQLREFTRRKYTESGAATTVGAGKVPSPPPPQQQQQQQQQLRGEQQVQT
 SFASSAARSHDAAHFADEPARLDVGTSLTSSPMSISPAYRAPEQRQRQQQQAQPHYPSYQAFMAGPAAPSQQPIYSPGYHSAATTYPYAYSH
 MSQPHQLPTHQLPFYADSERPHMPMPPLDPYVQPFQGPQYAPFGYSVRAATAALGSAATGADFAAPMTVSEAQRQQGTTAVAAEAWATHEVPPESRAA
 AFGAVARHHASPAELTQSPPPSALPPSQEGASEVMGLRAAEGGAMIETVAPAAAADDTPDAQVQRRPSTSSW**VDDRTHREA**EQTVAENRTPNATVA
 AAVAGSAAADASLPDSAPEKQGGTTAPVDARSTPDGGAAAENDGDGTSAAATAGATAAAVLEEPKTERKKTFAFFVSLGDGDDAAEPRRPKPTPRNFVPSQL
 APPTPRKQQRRLTSPGMLLTSQNRSGRQSAHHQHCRKLSPLQAHETNCARNSRKSVSPCRFGGAH**RRQRHTSP**SPYEQVPKASGARDGPRKTPSPHSSK**Q**
RQRQHAHANGTATSITKSIKSYKLSLPMVVVDESGTPVVYEDVRKVESNPNWMMQQQPQRQGWSSATATPAAHDIYSSGGIRSVGAEE**RNRPESSH**GHSK
 MGRYYVNVPSQPHDSSPQKHQHQQHQRSSHSDSYYPYFTSSGATSETQSQQPQQQLQHLIAPPQSHIQTIDITYAAPFVDRRVRTLAELEKRLQQLRIVDEYEA
 AQYHRRQAQRAHQQQQRIHVLLHSPGAVAAGGNTGAFVTAASSWATRELAQPLQRHSSATGRHPQQRVTSPPWRDLNSSPVRPRWDISQPSPIYHPAP
 ATMTGN

40S ribosomal protein S9 (LdBPK_070760 / XP_003865205.1)

MPTSSQASAS**SSRRASTTKPGPPPRAS**SAAPPLPARFSPHSQAPLPSATTSRRGSAIPELIGTRRDSSIGATSTNPRLRGGSVIDA AAAAQRSSAPRNPIDFASKESQE
 AMNRLRLFLPVMRMRVILFRFRSRWKGQPPRQYTPGVSVAAIMSTKSLLDACPQRMVESLAAGATFMSLTPKEIIVYANESHVSCGIVVLLYGLQEERRPEP
 GGKKNAGGGGGSTRPICTQPHRLHKAMSVLCLMPVMCEDRATSFATRESEADVAIISRWFWEVYTSYMAQASLTADVMTGRTLREVVLPHRRDLLADYF
 PTSVLLRSWMMWSMLTASDRV**LSRSMEVR**VLSVGDVLFDEGDYCPYIYVRRGALAAIVKGETLAVLEAGAAGVGEESVLFHRRNCRVVAITVELYALHAHH
 LLRRFLKYPESARRIVAAIERQVWVMEGRTRDVFGLVSILSGVPCLGHTTDAMRDEIARCASVLIIPQGHVVSANTPCTFFCVIGRGSVTLISSMKTAAVAET
 PSSVNGIDSKGESQLGMRRSSAMKPMNSNPATEMRRESRAGDFFGELCLKPHLWPHYDVMCDSTVSLWQFDREAVLGLVLRNADADAQALEVCRQGIGLYRTQ
 RGETSIIDGFEPATPNAPANGWRSCIGGQRSRAQSTDFATAPPGARSSSAGSRAGRRLSLSHAAPEWLSRSGSPSEGRTPRGRRRAGVEWTPQWTTYAMT
 RLQDGLRAEDAKETPPAPSERLGVDEVEKTMNEKVLQVAVQPETPPNPADCDISGDSSELQSIIVGQLFLIMTEKQSRFLRQVKDSNVRLITEDE**GMQLVGE**
LNDSLDDMSGMDALHNSEALVEVTEVMQLEDISASPLEGSHFLPQRAMPVSLVRDSTDATDIYINVHRVDDALSVEGSGGALAGWMPNPNASIGRTRRSTSVGA
 LGEASVVLGASLNPRSSLNRSFVRPSSAVPPSPRCASGRDFFLSPGAIGVVRPASSEPRMMPARTRPASVDFNQFNKLSVDRSTSMIDRYVKIEDQNYFDS
 FVKVLPQRDEMWPADGVNTDSEMGTGSMVLLLLHVRKCDYLSAKVMQRCARPVIVKTLGERVLRVTSVMENRTAPRWPIEHSSSIFVRRGTDIVFVSCDAG
 DECRIVYQASFTASIHENGVEQRTMPLTELSVTGFPAEAEMDADVKSVESVGRMQRSAKKPRMTMTMLAVTANKYKALRQYLETKEKIVDPPGTPESTKL
 FLQVMSVEGLKHRIEATVTASLYNGATSTVLKTERVIPKTRSPAWPGDTSFVSIISGEGGILFDLHHRDAVIGSTETTVDLIFGGVGLRRLPLLQAQTGRVIGHLV
 VGVGLGARLGDVSRNRDWWTHLAVEELSLAREGFSINPDPIVLRSGTGAELMRTPLAFAFEASWSMSEASCLLQCPRLCGSTVSYQLEVCDSDEKEVIGRATIL
 LSDRGLGPGHLDLSDLPPGRGVVRLRSLCLPVLELPARGAAGKASSAAALCPPFSSHLHLSATLHLLHMGCTNLPGGATVELQIDAIGTSLVDAQPYLRTAV
 QEATTALQWPLSKASVLLRIPSRGDVDDRAAEAVDLRQWQCQGHQCHFAVYDGVVDDVSIQGVAVPLSLLNTALHTYPLFPRCMDADGGG**LDQQPSVGT**
TRPRAAAERTLGNLQVFTLLGSLDHQVRGTAEQETDLLTSLVPAAGGHAPPDQLPYYPNESADITAARLASALPTTVVLSVSNICHVLPASEKYVQIVVRRGATV
 VLSVERQMGLVSHAESWPTASAVVSCGALPADAALVELVAMDVVEGRSDEEDGITPSAAGAKAESTARDKTRRTITKGNASAAANPLGHAELPVSR**LSV**
QAGEVRVVTMLMSRSQRSSSLETTGRLPRVTPSMCALKDAQVWVPTVSCFICGNRA

Hypothetical protein (LdBPK_323250 / XP_003863736.1)

MRQRTVSRSRARSQIRISAAEEDDLRVGLQRF**LDKLR**QHQLFTEDDVTAISFPPEGSSSSCVGGGSPHSSASTSPRHSPSRADNEEATLDGTFKGGGSSPSMAK
CRKVPAASPTTTGSPTFASASVIDLDVPLSAPFLTAVNIFEAKLLSKSRVSTDAKLVQRQAYALVWRDPGYLATLMNGDPCLAGSSSTGSSSTTTPDGWSSRRPSSV
PLASSLSKPHLTCQALFASAPAPTQRPDRRLALQLDECIRLLVYANTSVNLQCSVSTNTRTLALLAFVTCARRLEEEDDVPYGDGPGSVADIVVGNRNHLHAEM
KKLESLWRSCGIEGRVADYLRECYLVEFLDAALPPAVCSARYDGLQMAVHEKKQRIISDVVASRAGFASMMRMAPLRGLCGLANMSAFGNSKLRARLLDKMA
SEGVVVERLAAEMAAAAMEAVLAPDTATTTPAHS**STKRPRQSAVYGG****G****SPAHQSRAGASRSASRQG****G**SLDSVSPAGKERRAMTIARASTSLERLLDSOPTPVERIGQ
CVDILMLLTCPLRPPDGGEESPSRSSTSSASAVVRSTTASRDAALHEICLYLLAICFVSKTHARYAELSSLQLYAADCLMQCAAYSQAFYAMVVHAMDVLDIMI
ESMSAAPVASAQRTPSSGRASCRLVSPQKNWRKDAEEGDRDSEGRRRVLQHLLPGDEAGLLPLLNLLQYTIHAQANAKSIRRWFGFLADRLLPEVFEAPQL
TTGRRSSATWGLQQQEQRRRSQADSASRLPGALNGSPAAADGAFDAPVLARDLTRAEVVAAAPYFCFARRAVEETSWRDGTELLFAKVVLLAFHVIVTQG
HRCNLLFGQACACYDVVAPVLLRSSQ**SDNGASPGSRSPRSSRSSQSS****T****ATYR**STLLMHLREDERASTQAPLHNSNEASEDGGVAGSEERETKGADEEKEVF
IGSTRRRSLSTRQRQGSVAVKGSAAEAERHLLATKAGEDDQGFSPFIQSPSRSLVVFYACSPSDTEASSDSPLDRRGSRRRRSSSSDRSSDGGRSGLGAALDEAAF
AAPTASATLAESPEAVTHSWTGRSLRSLSSIGGHSEAPLLDKEKRA

Protein kinase (LdBPK_262110 / XP_003861796.1)

MSNRSLHGGHTTIHNNAYHDAAKEERQLQEQQKPSMPGSHAAVERMTAVQVVDRLRWWRTHRVREQPIVDHFVLRGSYANYSSFGTRPLAPSVTRLLQK
ARTVRAQYLRTQQQPQHEAPRQSRQVSSLLMAPTAGASVRSASNERLGSADGETERTTGCISEEGQYGERQQRQLREMNDDAKEKVNKRRAAVIASWPRS
PRPLNEVAIACLGEPAQRDSATDNITRISLSASGSAGTSPPLVRAVSGSAPSVDTPSGALYVPSEQEARVAERLLMLFRPRAASAPLRSRRYRCTAGRLLDATSEFS
GEPPLQGDWGHAEATGLHHERMTRVSADEITDVRRAPGAAEAVIVLHAPRLVLYEKGLNPKAALRAAGISSDALESDDAAEAESSAELFALRNLPFAFERFFY
QQQLRGLAETRRSHTPGMRSASADASAESAGVPESDTASAPTGAAGAVAAADTAVDDDIANGDDAFFFSSPLTATLACSLKTVVPLSSVAAAAAPGSRGRD
GRDAAARQAVQHRGRGRDDGNSRRRGRAALRAVSPALPPVYKGGCPQMTLATHSHHLLSSGARL**QQQQSSNRPS****P**ILSAGLRSSKAPQNGAHLCLRVDD
LQDVYVFNPVVDMIGKGAFSKYAAVPILRGKEGLRRFASPLLDGQAAPCGSDELSSGSPREGRRVSTVRR**VSPVRRNSSTAL****R**VDPAAGAAVGDAAAGPLTD
DEAKRRPQAQSLAASLHSPVVALKVIPRKARQKPKAAPDPLATTHSTAAAAAGSVASNAQQAQNDQNSVRRRELVIEIERVLSLHHTGCSQFFFAIRTPDA
FVIAMRVFPGSMADALFQVSTVQYLHNFGLIHRDIKLENILLSEADAGVDPARIREVGLPALHKS DTSAMMTEIEGGRKGCASATTA
AETRTRAAQRRYSMLSRNVARLLRVTLIDFGLARRTRASTLSPIVAASRGRGAGAGHSLNATITSPHLSFPPTSASLAASHPHASHNP**NSSYSGLGSPAS****S**SA
GCAAGVVM**L****ANGGNSSNSY****T**PAKPAPPKPPLLCRPPSAAVG**AGTARLGSS****S**AGISAM**E****RSTPRAGMP****P**SPMPSTANMFTRFLDLEEMDEEENGGAAGTSN
TTANTTTKVGDLGRGRRDMAENEDDSGAFSTDVSASETDCESEGGSTAEPKEGSAPNGEERLETGPQQEHVARK**ALISPSVLR****A**HPQTPPGSAIIVSPPLPTP
MLLSSTTAFTLDHFNAENSSSCNTSGPAAGGAGLRNRCASCIYTSHQQLSPAPPVVAAGVSSAPDDTEATLLTPCGTEKYLPEVLSWILEHWARRSTTVGLA
RAMDLYSIVAYVLLSGCFPFNASSRATLLQQQQRVPRCNSARWTGVSSAAISFVQRLEPNPKRMTAKEALEHPFLHEARQLAEKLSLVPHGEGEEASHPST
WRDGSMDNHHRSIGGTGRHFEDDANVHARSHWATSTATTNLPHSAPSPHDPHTHSGAAIERASTQPSSSVLAVYDSQRRHAGGPECLEAAANEPSPLS
SNSGADGGGELLCHHVESGTAPTATSISSGCR**LSDAPRVC****R**SSDECERDDVRAVTRDVPQKVPQLLQVCKESPSTTPPVPTPLAKPCTAALARAASIELPALS
SLVAHPAKPSPSTLYFTATGTTASADGGRAERATLPEPESAAAGSSAPALAPGSKDAAAANRPVLSLPAATTSTARATEGGEDDLFESLYNNIMSSD

Sudanese VL urine

Hypothetical protein (LdBPK_160110 / XP_003859699.1)

MPIESAMSEHTDFRGCSSLPDFAAVADVSSERTGVYGLQYSNGAIYEGEWLNGERHGLVCYYPGNIQFVGGQFRSGLMEGPGTMFFATGECFCGFEFRDSTIYKQ
VYSRQGREICGVWVDGNRVSEMPKKAPEVLQRRARAALFATIEQVNEYLWGAASNPTKLVLSAPPEGAALKAPLDILSSSTDAHGTPKTPPQHLLTVIPTFDAGN
QSFTS**V****VRFRPNASLADGDAKSSAHGTVTQYGS****P****A**TVFACAAPAPNEIFSVRRFTLRCFVFLFPFLSLPWPVPVAPLRITSLHEER**EFVVS****G****AALRS****D**FDAPSFSMCI
AVGMLCQIVAILVASRVLGKVQDGKLTPEMVVPCVLLVLLVALVKASYISFFRPHGLERDRLTPKLSALAASLVDKSSVCIYTDGKGVMMNRHYKYR
WLLFGVVLGLLMSLAPATRGYGHNMFGSNGFQLTAALLAFFATFLFAATLTFVSL**KIDM****Q****REIR****A**KLHVLTNLAFLEERRCLMSPSKHASIAFDLDESFNKNV
FSGFPGWYLSRLIYASACANHRARTTAMRVFVAFVCAFIVGIADTLLMIQNNRPGDQYYSTAHSYAFFTFLFWGALLHRYLYVCISTRRELQHHLIYMDIAGL
YHRVKLSDSEAGDIIQCCRCISESNDAEPIFPVVIYCFVFLTVILNLAAMTAICYQLGRAIYR

Protein kinase (LdBPK_351070 / XP_003864692.1)

MTVLPPKINVPATPALDGDVINSYDVNHGKLLGKGGFSEVLAVRHIPSGEIRALKVMMRPSLVGKKAEMVAHEKEILRRTCHPAITLHEAVQTPDKVYFALDLM
NEDLFEFIVRN**K****TVNEDLS****R**AIMHQLMSGIAYLHEQSIVHRDIKENILINVVVSEANNA**AND****D****S****E****A****T****R****V****E****G****L****Q****V****M****S****D****I****N****S****I****P****L****E****K****L****N****V****E****V****K****I****A****D****F****G****L****A****K****V****V****M****E**
WDVCSCTPCGTSFYIAPEVIRGIEEQGAKPLCTNQRLVKSDVWSAGVVFVLLCGRPPFHGQVRTGQDRRDLRRIDHGVLFNPNHGWDSISAEAKNLILKMLD
QESSKR**ITS****D****E****V****L****R****H**PFFTAAGYSRVPASDARRRFMQMQQLSLRTKVPAAQSAEAQVKTMSPLSGP**D****G****Q****K****V****S****S****G****G****S****S****K****G****S****S****N****S****T****G****S****F****L****S****S****K****I****D****F****F****G****H****R****S**
KHTSDIS**K****E****E****R****Q****R****M****H****A**ELAEQATVIAEEDQEEDVTSYKPSMPVKEAKPARTAVNMKAKVGPDALRK