

## S1: The Amino acid sequence of LsfLEA genes

>LsfLEA1-5

MHSAKEKLSDMASAAKEHVDIYKAKAKEKIAHEGRKAKEAQAKMEMHEAKARHAEK  
LNAKQSHLYGHQVHEPPLVAHIIGTMNQWWVSMMDTMGRSLELRPLYLYR

>LsfLEA1-4

MQAGKNAASAKETAANAAASAKSGMDKTKATMQEKAERMTARDPMQKEMATEKKE  
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GQTTEGYVAEGAAGSKPTGINTGTGQTTAHNTRAGGGTNTGGFGTGDYTY

>LsfLEA1-1

MQSAKEAVSNMTASAKAGMDKTKATVQQKVEKMTAHDPIEKDMATQRKEAKITEAELN  
KQETREHNAASKQAGKAGVAGGTTTTTHSTTGLGGFSTGGHPPTTHSTTGTGGYTTGGH  
PTTTHSTTEAAGGYPTGGHHMSAMPGEWTWQPTWQEAELLVPRGTGTGTGGTTGNTR  
LGGGATTGNGTGDAYS

>LsfLEA1-3

MHSAKEKLSDMASAAKEHVDIYKAKAEEKVEKAAARTEEEKKIVHEGRKAKEAQAKME  
LHEAKARHAAEKLNAKQSHLYGHHVHEPPLVGAHHRHNEPVVGVHGHGAQPVGTVAP  
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>LsfLEA1-2

MHSAKEKLSDMASAAKEHVDIYKAKAKEKVEKAAARTEEEKKIAHEGRKAKEAQAKM  
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LYLYR

>LsfLEA2-42

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HHHQQRPGKSKLSNSCLALIIASISVAVMFVIYAIVSFLNAFEPFTLNSVVSISPFNLSVHSH  
TTTTNWNVSFYIRNPNRRMSFSYDMVQASLFYKDAQFLSPGTIPPFSQGTEDSTSVQAKL  
AASSVYVDDGLRKAILDCWSRRGAAVDLNVKVQALIRFDPGTNSERGSVWVFCCKDVKT  
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KKALISMF

>LsfLEA2-33

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TPQTMLPPLYHRKHSTVALSPMLGGGMVPVSVEVTNGLAMDEAYGVVALRLVLLGRLR  
WKAGAIRTGRYGVYVKCDMLVGVKKGVTGQVPLLGAPECKVDI

>LsfLEA2-3

MTKSDGQKRKCFAYVAAFVVFQTHIIVFALTVMRIKSPKLRFGAVEVENFSTANANSVSM  
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>LsfLEA2-53

MADAKQSHLNGAYYGPSIPPTKSYHRHGRGGGCGCGCLLSFLFKLIFSIIIIVGLAVFV  
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QRFNTVPLTPFYQGHKNTSSLNPVFNQSLVVLGASELSAFDAEKSAGVYNIDVKLYLRIR  
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>LsfLEA2-23

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MDVSSNGFSDSTKLSNDLNSRILTLSSQANLRGKVTLMKVMKKRKTAKMNCTMSVDLDS  
SIVQILDCK

>LsfLEA2-20

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IGSTPLLPFYQEPKNTTVVYGTFSGATLTVDSQRWTDKFNALAKGSVIFRLELTSTIRFKIS  
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>LsfLEA2-52

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VGEARLPPGRAKARTRLRMNVTVDIVPSRILPIPGLKSDLGSGALSMSSYTKIGGRVKILNI  
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>LsfLEA2-49

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LCFVVGVALFTVFSLLWLGASKTYRPFKIFKNIVFRNFNIQAGMDSTGVPTDMLSLNSTV  
RISYRNPATFFGVHVSSTPLELYYYQLKVASGHMKEFYQSRKSNRNVTMVLGYQVPLYG  
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>LsfLEA2-18

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LAISPEFDVTVRAENPNKKISIIYEEKDSSVNIYYSDVKLCSGVLVVFYQPSKNVTVFQTALS  
GSGIVLGSTVHETLVNAQNQGQIPFKLKLKAPVRIKVGSVKTTWITVTVKSCDITVNKLTAD  
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>LsfLEA2-44

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VLGNSAPIAPYNGLALSQRSGEWERAGLDQDGWTGEMESWDIHIGEVS PVRQVSGVSHL  
WES

>LsfLEA2-47

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>LsfLEA2-37

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SYTFKSSGRVIASGTIPDPGSLKANDVTMLDVGLKVPHNVLVTLVKDIGADWDIDYELEV  
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>LsfLEA2-11

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QVVIPKGGKAGLRSTKKRDVVVELNSAALTSTSSLGSDINSRILTLSSQARLNGKVELMFVM  
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>LsfLEA2-36

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GKISADSTMPMSVTLTLLADRFLSNSDIYSDVLSGTLPLSTYTKISGKVYILKVFKFHVVTE  
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>LsfLEA2-30

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>LsfLEA2-48

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>LsfLEA2-45

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>LsfLEA2-24

MAWTATTSTTEAQDKTVTGYPAQPSQIAAGYPPPTTFPVTTAYPYAVPPPAVFSQTYHPPSP  
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LSATWDITFRVRNPNEKLSVYYHRIEAWVVYGEEDLLYGTDLPPFYQEKRETTVEAQLA  
VVSADTADGYVLRAISEEKARGLVSFDVRVLALINFRKGVWQTRRHLLRASCEGVIFGFSAP  
NNGTGTLMGGRACKVGL

>LsfLEA2-4

MCDSKNFYVWLLQV FALLGLLAFLLWTLRPNPTYTIVDFSVPTSNSQSNNTSSENGAISY  
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LRSTILNATAELKVGLVTKIRYKMWGRKSKHHGMNLQGGIRIGSDGKISGKNKKIKLKHT  
SKRWRORYA

>LsfLEA2-50

MAEKNQVYPLAPAARQPRSDDEETATLQSKERRRKRQIKIAAYVAAFVVFQTHHIAIFAVT  
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>LsfLEA2-9

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QISSNDINSGVLTLTSEAKLNGKVHLMKVIKKKSAAMSCMMAVNLATRAVQNLKCK  
>LsfLEA2-54

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>LsfLEA2-16

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NLQCK  
>LsfLEA2-1

MENPPRPVTGYPVVTGYPPPQSATNPRPNGYPYNAAPPYYNPNPYIYANPRATFLRRFIAMI  
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DSIVSSLFYEA AFLSRTTLPPFDQDTRNLTTVRAEFAAAGVYVDGRLVNEINSERARGAVG  
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>LsfLEA2-21

MAEKEQVDRLSSYDADDKEALLHLKKIRREKCIKCCSCVAALMLVQAIIVIII AFTVFRVK  
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>LsfLEA2-8

MASSPKTQPTLYYHPIPPPDHHPQNYVVLPLYYPAGHRRRLPCRLICTISFLLLALAVYV  
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LGHVRSSHGHVRARGSSDVDAELEFNGVEVLYDVVYLLLEDLAKGTVPFDTVTKVRGQL  
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>LsfLEA2-13

MSKAHRPPSGRTNLASCIVATIFLIFVVIILIVFFT VFKPKDPQISVNAVQLPAFSISNNTANF  
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VAPSAEAGLGPPLSDVGNFRLGPTLEIESRMDMAGRVRILHFFTHHVEAKAGCRVAISV  
ADGSVLGFHC  
>LsfLEA2-28

MEDQKTLAIGYPLQFGYPTNTNSASTTTTTT VATNNNNNNAVD AHVVQLPPVVPYPEPPCR  
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WNISFYVRNPNRWTSIAYDVIWALVFYQDQLSDGTTSPFQQGRRGQTVVTASLAAKSVH  
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>LsfLEA2-38

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>LsfLEA2-35

MASCNPSRRGLKICCGVTAIFLIIVVHISVTLSTLIFKPKQPQVTAHPTSLENIQFTVVPVPSLN  
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KLILSPYFWDVAAGCLNLTSMATLHGKVSVLKILKIRATAFSTCEISVVFVQSQNIKSNCQS  
KIKL

>LsfLEA2-22

MTSRANANGEHTARPTNSHHQHYYPSSSSSSASFKGCCCLFLLFSFLALLVLAVVLVIV  
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KFTVMYRGIPLGRASVPGFYQPAHSVRQVETTVAVDRVNLQADAADLIKDASLNDRVEL  
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>LsfLEA2-34

MSVKDCGHHHDERRRRNRWILACLVLFLILFTIFLVWIILRPAKPRFILQDATVYSFNVS  
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NRNTGIPVGPAMKFQLAQGCSVDVGK

>LsfLEA2-10

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CN

>LsfLEA2-26

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VGQVVIPKGKAGLRSTKNIDVTVDLNSDALASTSSLGSDISSGILKLSTQAKLSGKVELMF  
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>LsfLEA2-43

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>LsfLEA2-5

MVEKDQQAAYPLSPVAAGHPRSDEESATFQSKELRRKKRIKIAAYVVAFAVQSIHIAFAVTV  
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GRVVIPKGKVGFRSTKKIDVTVDLNSSGLTSTDGLGSDISSGILKVNSQAKISGKVELMFV  
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>LsfLEA2-56

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VAITARNPNKKIGIYYESGSQITVWYTGTLQCGSLPKFYQGHRNTTILNVPLTGQTQAT  
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SCKFRLRL

>LsfLEA2-12

MADSAIRKTEDSPSSKPSNPTSKPVRHVVFSEIPRRPHKPKERRRRGCCSGCFVVCCA  
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EVSNKNDRAKLSYGTMTVDVSSEKISLGQTKVVAFSQKPKNSTELKIHTKVTRLAVDKED

GAFLLKSNVKDGEVDFVLSGTIGVGVGRFTINGLPVTMACHGIQQSQVDIGQEPCSV  
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>LsfLEA2-19

MEGQKPPVIGYPLQFSHGQSPNPLSDNPTAQPPHSTTTTTTAAAHVVQLPPIVGHQDQPRP  
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NWNVTFYVRNPNRWASIAVDVTQASVfyEDQLLSAGTISPFQQGRREQTLVTTASLDAKS  
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>LsfLEA2-57

MGRIFSRRLKICCGVTAILFIILVVVIVLSLTIFKPKQPKITTQSVTLEHAKLVIFPVFKLN  
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VKF

>LsfLEA2-55

MASSDNPDIIVERGDKEKDHKEDDKDEGKGGFIEKVKDFIQDVGEKIEEAIGFGKPTADVA  
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LTVIYDDIKSTYDDIKPGSIIPYKIKVELIVDVPVFGRLTLPLEKTGEIPIPYKPDIDIEKIQFKR  
FSFEETVAVLHLKLENKNDFDLGINPAELSESTKLDKNGIGHINIPITFKPKDFGSALWDMIR  
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VE

>LsfLEA2-51

MAEKNQKQSAAGHTRSDEESATLQSKEFRKRRIARIAAYIVAFVQSIHIAFAVTVMKYRT  
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DLSARALQALECN

>LsfLEA2-27

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GMTVGQVVIPKGKAGLRSTKKMDVTVELNSDSLTSMSLGNDISSGVLKLSSQAKLNGK  
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>LsfLEA2-39

MADHQKIHPVVDVEAPPTPLVPHGSFRSENGDPVQQNPPKHATVIPVIHSIPPKTERS RCC  
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NPNKKIGIYYEKGGRLSVWYTGTRLCEGSLPKFYQGHHTTVLDVSLTGQTQYGSTLMT  
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RLKL

>LsfLEA2-2

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ASSLEVNNGVMNAIAADMSHGAVGFNVMMVVARVRVDRRYTWIQKMRGMRVTCEDVKV  
GLWSHTTAGTMLGGSTPCNVHL

>LsfLEA2-40

MTDRVYPQTKPTTTTTNPPQTVNGGATTNPTPFSTTKPQLYNPTRHPYRPQPRNNRRSRR  
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TTFNITLSAQNPKNKLTFFYDPFTISVLSNDVLLANGSFPLFTSYAKNTTILRTTLSASRDLA  
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>LsfLEA2-14

MAEKNQQVYPLALSTGGQPRSADEESATLHSKEFRRKRQIKIAAYVAAFVVFQTIHIAIFAL  
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GMTVGVQVAIPKKGAGLRSTKKMEVTVELNSDSLTSMSLGNDISSGVLKLSSQAKLNGKV  
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>LsfLEA2-6

MAEKNQNNALAPERPRSDEESAALQSKELRRKKRIKIALYIVAFVQSIHIAIFAVTVMKYR  
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>LsfLEA2-7

MAEKNQQVYPLAPAVANPRSDEESDLQSKFRRKRRIKIAGYIVAFVQFCIVIAVFAVTVM  
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>LsfLEA2-32

MADSAIRKTEDSPSSKPSNPTSKPVRHVVFSEIPCRPHKPKERRRGRCCSGCFVCCA  
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VSNKNDRAKLSYGTMTVDVSSEKIRLGQTKVVAFSQPKNSTELKIHTKVTRSAVDKEDG  
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MFSFRLHTFLFILIINY

>LsfLEA2-15

MANPAAPPSQTPLPPRRSKLVRCIALILLALIVLVGLVLLIWLVVVKPRIVYTVEAASLSGF  
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>LsfLEA2-46

MGRGKCLAYVAAFVVFQTIHILVFALTVMRIKNPKVRLGVVAVEDFSTTNSTINMRLVAQV  
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>LsfLEA2-29

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>LsfLEA2-17

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>LsfLEA2-25

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>LsfLEA2-31

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NIH

>LsfLEA2-41

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>LsfLEA3-3

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>LsfLEA3-2

MAKVPINSFVILGRRSYAVVAENVRVQYSATNSVMRKA AESGCSTVTTEGAPEKQKEIFW  
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>LsfLEA3-1

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>LsfLEA4-1

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>LsfLEA4-2

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>LsfLEA5-3

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>LsfLEA5-1

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>LsfLEA5-2

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>LsfLEA6-2

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>LsfLEA6-1

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>LsfSMP-1

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>LsfDHN-1

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>LsfDHN-4

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>LsfDHN-2

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>LsfDHN-6

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>LsfDHN-5

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>LsfDHN-3

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