Appendix

immune related genes

Genes with a sex difference in variance

	Chrom	ID_ensembl	
IFNAR2	21	ENSG00000159110	Interferon alpha/beta receptor 2
TRAF7	16	ENSG00000131653	E3 ubiquitin-protein ligase TRAF7
CD38	4	ENSG00000004468	ADP-ribosyl cyclase/cyclic ADP-ribose hydrolase 1
CIITA	16	ENSG00000179583	MHC class II transactivator
ITGAE	17	ENSG00000083457	Integrin alpha-E
PSTPIP1	15	ENSG00000140368	Proline-serine-threonine phosphatase-interacting protein 1
PIK3CG	7	ENSG00000105851	Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform
NFATC3	16	ENSG00000072736	Nuclear factor of activated T-cells, cytoplasmic 3
IRF2	4	ENSG00000168310	Interferon regulatory factor 2
CD74	5	ENSG00000019582	HLA class II histocompatibility antigen gamma chain
LCP2	5	ENSG00000043462	Lymphocyte cytosolic protein 2
CD300A	17	ENSG00000167851	CMRF35-like molecule 8
CASP1	11	ENSG00000137752	Caspase-1
CXCR4	2	ENSG00000121966	C-X-C chemokine receptor type 4
CASP10	2	ENSG00000003400	Caspase-10
SLC44A1	9	ENSG00000070214	Choline transporter-like protein 1
HLA-DMA	6	ENSG00000204257	HLA class II histocompatibility antigen, DM alpha chain
ACKR3	2	ENSG00000144476	Atypical chemokine receptor 3
IFNLR1	1	ENSG00000185436	Interferon lambda receptor 1
IGSF8	1	ENSG00000162729	Immunoglobulin superfamily member 8
LAX1	1	ENSG00000122188	Lymphocyte transmembrane adapter 1
NDUFS3	11	ENSG00000213619	NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial

Table 1 – immune related genes with sex-biased expression

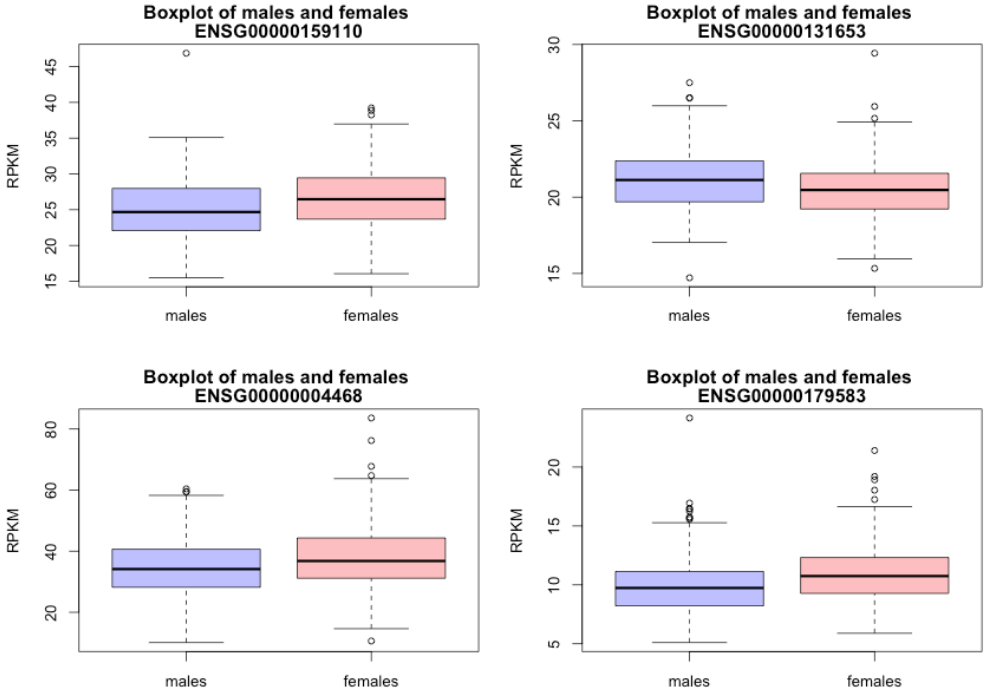

Figure 1 IFNAR2, TRAF7, CD38, CIITA. Gene expression between sexes

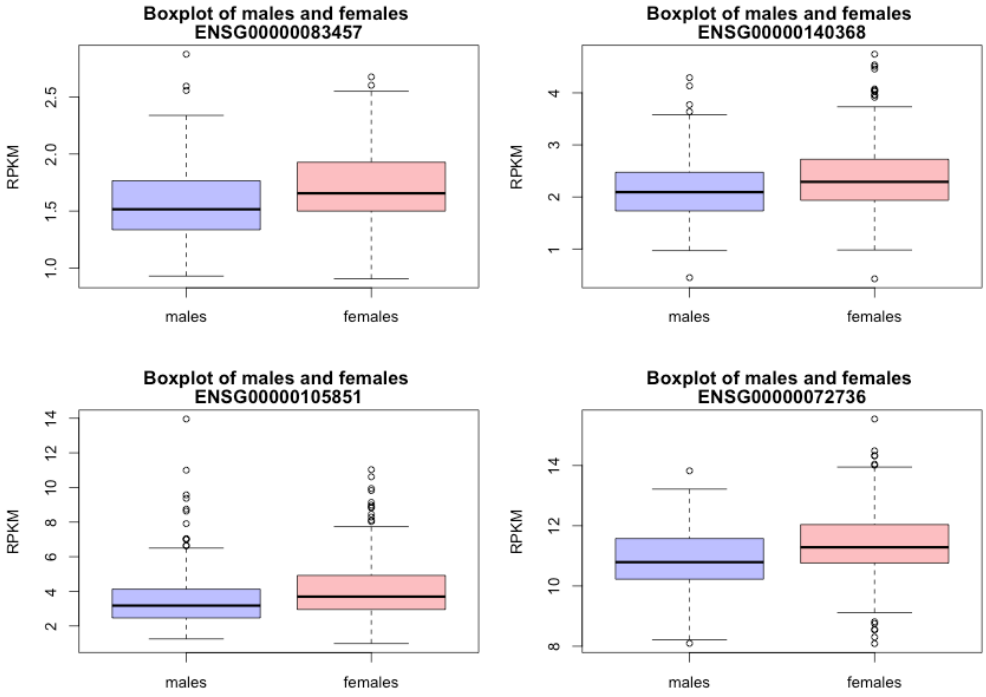

Figure 2 ITGAE, PSTPIP1, PIK3CG, **NFATC3.** Gene expression between sexes

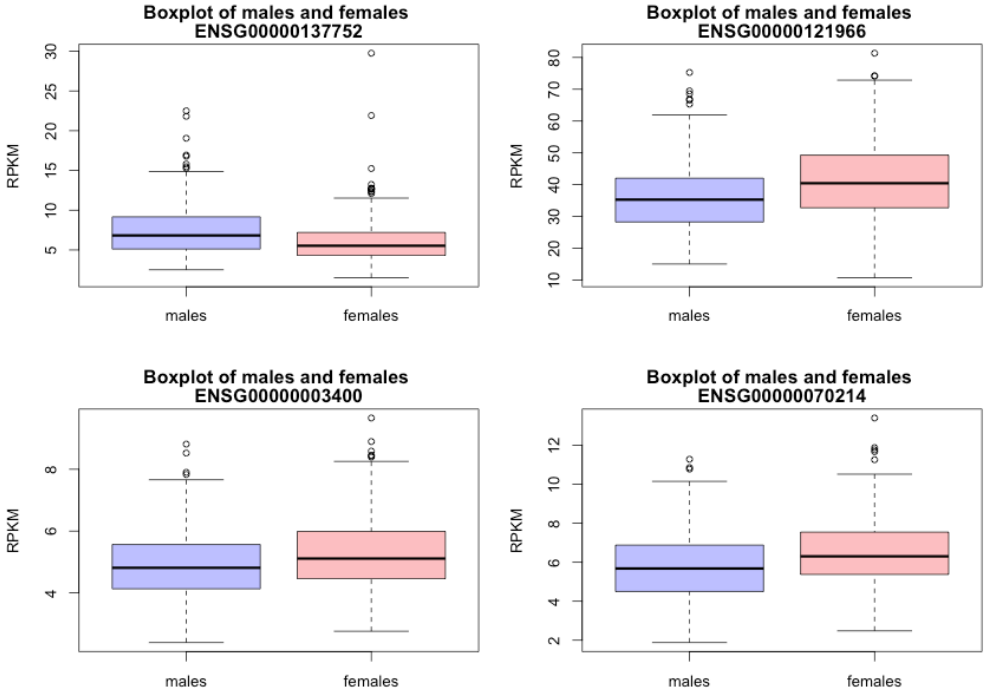

Figure 3 IRF2, CD74, LCP2, CD300A. Gene expression between sexes

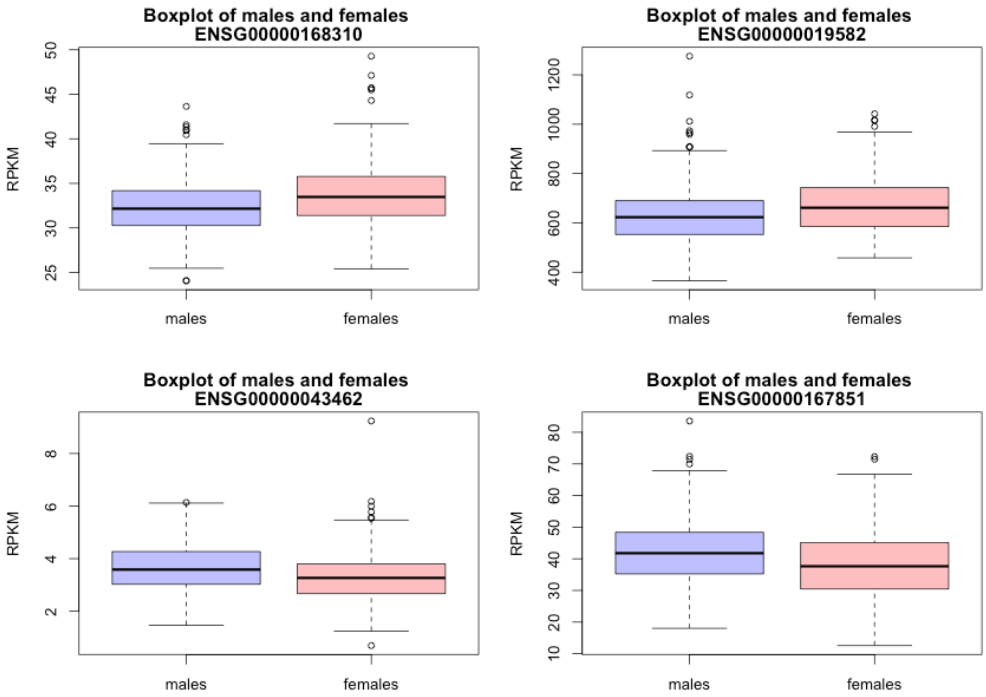

Figure 4 CASP1, CXCR4, CASP10, SLC44A1. Gene expression between sexes

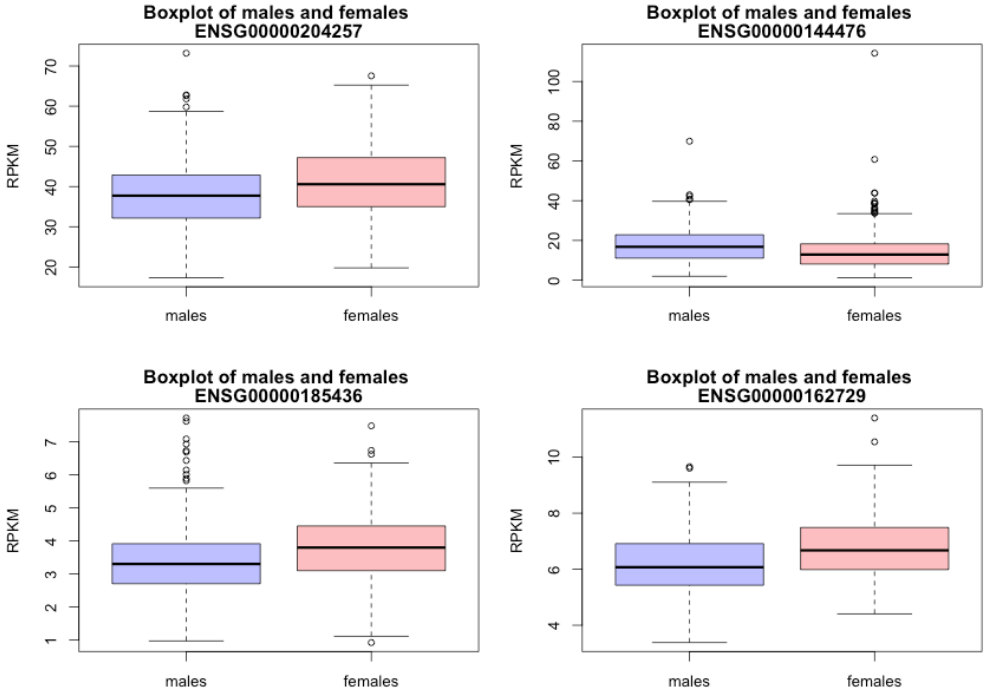

Figure 5 HLA-DMA, ACKR3, IFNLR1, IGSF8. Gene expression between sexes

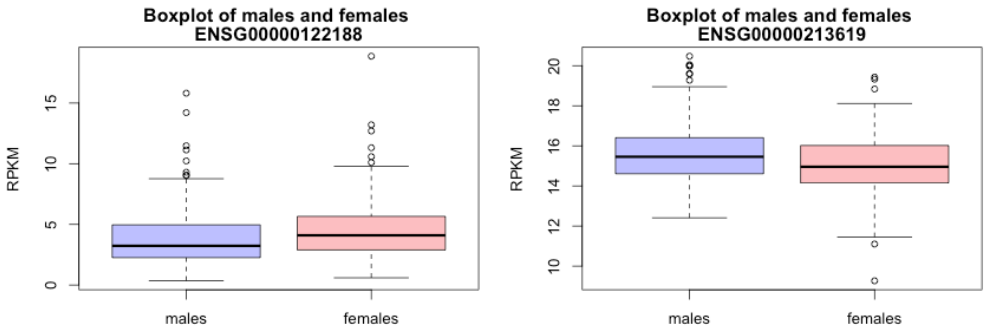

Figure 6. LAX1, NDUFS3. Gene expression between sexes

Gene	Protein -UniProtKB	Chr.	P_value	var Males	var Females	Protein Function UniProtKB
MSL3	Male-specific lethal 3 homolog	X	3,7750e-06	17,4629	30,7141	May be involved in chromatin remodeling and transcriptional regulation. May have a role in X inactivation.
ZFX	Zinc finger X-chromosomal protein	X	1,3356e-08	0,3558	0,7145	Probable transcriptional activator.
SLC39A 9	Zinc transporter ZIP9	14	3,5987e-08	2,9332	5,7635	May act as a zinc-influx transporter
SMC1A	Structural maintenance of chromosomes protein 1A	X	5,5095e-16	7,4878	20,4955	Involved in chromosome cohesion during cell cycle and in DNA repair. Central component of cohesin complex. The cohesin complex is required for the cohesion of sister chromatids after DNA replication.
P2RX5	P2X purinoceptor 5	17	1,2656e-08	114,2542	229,6768	Receptor for ATP that acts as a ligand-gated ion channel.
STS	Steryl-sulfatase	X	2,0273e-07	5,3789	10,1626	Conversion of sulfated steroid precursors to estrogens during pregnancy.
ALG13	Putative bifunctional UDP-N-acetylglucosamine transferase and deubiquitinase ALG13	X	3,8276e-20	0,2956	0,9346	Isoform 1: Possible multifunctional enzyme with both glycosyltransferase and deubiquitinase activities. Isoform 2: May be involved in protein N-glycosylation, second step of the dolichol-linked oligosaccharide pathway.
NRN1	Neuritin	6	9,1050e-08	36,4262	19,0966	Promotes neurite outgrowth and especially branching of neuritic processes in primary hippocampal and cortical cells
SEPT6_	septin 6	X	2,4740e-10	36,8899	80,3904	Filament-forming cytoskeletal GTPase. Required for normal organization of the actin cytoskeleton. Involved in cytokinesis.
GTF2F1	General transcription factor IIF subunit 1	19	1,3848e-21	13,0804	4,0645	TFIIF is a general transcription initiation factor that binds to RNA polymerase II and helps to recruit it to the initiation complex in collaboration with TFIIB. It promotes transcription elongation
EIF2S3	Eukaryotic translation initiation factor 2 subunit 3	X	1,2810e-06	76,1332	137,6128	As a subunit of eukaryotic initiation factor 2 (eIF2), involved in the early steps of protein synthesis.
WDR74	WD repeat-containing protein 74	11	2,2299e-54	5,2243	0,7266	
PSAT1	phosphoserine aminotransferase 1	9	2,1694e-07	39,5697	74,6421	Catalyzes the reversible conversion of 3-phosphohydroxypyruvate to phosphoserine and of 3-hydroxy-2-oxo-4-phosphonooxybutanoate to phosphohydroxythreonine.
MMP7	matrix metallopeptidase 7	11	3,7543e-14	28,2662	11,2641	Degrades casein, gelatins of types I, III, IV, and V, and fibronectin. Activates procollagenase.
ZNF473	zinc finger protein 473	19	2,7412e-10	0,0536	0,1167	Involved in histone 3'-end pre-mRNA processing by associating

						with U7 snRNP and interacting with SLBP/pre-mRNA complex..
GPR174	Probable G-protein coupled receptor 174	X	5,4295e-07	3,4336	6,3377	Putative receptor for purines coupled to G-proteins.
HIST1H1E	Histone H1.4	6	4,2480e-13	2,6317	1,0915	Histone H1 protein binds to linker DNA between nucleosomes forming the macromolecular structure known as the chromatin fiber. Histones H1 are necessary for the condensation of nucleosome chains into higher-order structured fibers. Acts also as a regulator of individual gene transcription through chromatin remodeling, nucleosome spacing and DNA methylation (By similarity).
EIF1AX	Eukaryotic translation initiation factor 1A, X-chromosomal	X	3,1292e-06	12,4157	7,0725	Seems to be required for maximal rate of protein biosynthesis. Enhances ribosome dissociation into subunits and stabilizes the binding of the initiator Met-tRNA(I) to 40 S ribosomal subunits.
ZNF101	Zinc finger protein 101	19	2,1187e-11	3,2953	7,5267	May be involved in transcriptional regulation.
FAM101B	Refilin-B	17	4,0727e-06	0,3636	0,6383	Involved in the regulation of the perinuclear actin network and nuclear shape through interaction with filamins. Plays an essential role in the formation of cartilaginous skeletal elements.
PRKX	cAMP-dependent protein kinase catalytic subunit PRKX	X	3,3180e-07	184,6806	99,6881	Serine/threonine protein kinase regulated by and mediating cAMP signaling in cells..
MAFF	Transcription factor MafF	22	6,8076e-22	1,2746	4,2637	Interacts with the upstream promoter region of the oxytocin receptor gene. May be a transcriptional enhancer in the up-regulation of the oxytocin receptor gene at parturition. Since it lacks a putative transactivation domain, it may behave as a transcriptional repressor when it dimerize among himself. May also serve as a transcriptional activator by dimerizing with other (usually larger) basic-zipper proteins and recruiting them to specific DNA-binding sites. May be involved in the cellular stress response.
CHM	Rab proteins geranylgeranyltransferase component A 1	X	2,2380e-07	1,2360	2,3298	Substrate-binding subunit of the Rab geranylgeranyltransferase (GGTase) complex.
MPHOSPH8	M-phase phosphoprotein 8	13	1,6179e-10	0,2006	0,4409	Heterochromatin component that specifically recognizes and binds methylated 'Lys-9' of histone H3 (H3K9me) and promotes recruitment of proteins that mediate epigenetic repression .
TRAPPC2	Trafficking protein particle complex subunit 2	X	8,2610e-09	3,3641	6,8246	Prevents transcriptional repression and induction of cell death by ENO1 (By similarity). May play a

						role in vesicular transport from endoplasmic reticulum to Golgi.
MAFG	Transcription factor MafG	17	2,4254e-13	0,2078	0,5144	Since they lack a putative transactivation domain, the small Mafs behave as transcriptional repressors when they dimerize among themselves. However, they seem to serve as transcriptional activators by dimerizing with other (usually larger) basic-zipper proteins and recruiting them to specific DNA-binding sites.
SLC25A29	Mitochondrial basic amino acids transporter	14	4,4339e-09	1,4552	2,9913	Transports arginine, lysine, homoarginine, methylarginine and, to a much lesser extent, ornithine and histidine. Does not transport carnitine nor acylcarnitines. Functions by both counter-exchange and uniport mechanisms.
DDX3X	ATP-dependent RNA helicase DDX3X	X	5,3261e-09	2,1694	1,0707	Multifunctional ATP-dependent RNA helicase. The ATPase activity can be stimulated by various ribo- and deoxynucleic acids indicative for a relaxed substrate specificity. In vitro can unwind partially double-stranded DNA with a preference for 5'-single-stranded DNA overhangs. Is involved in several steps of gene expression, such as transcription, mRNA maturation, mRNA export and translation.
TMSB4XP4	Pseudogene	9	2,1185e-09	44,6900	93,2786	
NEDD8-MDP1	Protein NEDD8-MDP1	14	2,1759e-15	0,8653	2,3171	-
MAL	Myelin and lymphocyte protein	2	1,4389e-06	45,8105	82,5651	Sialic acid-binding lectin recognizing oligosaccharides containing terminal sialic acid linked via alpha-2,3 bond to penultimate galactose residues

Table 2 - 33 genes with a sex difference in variance

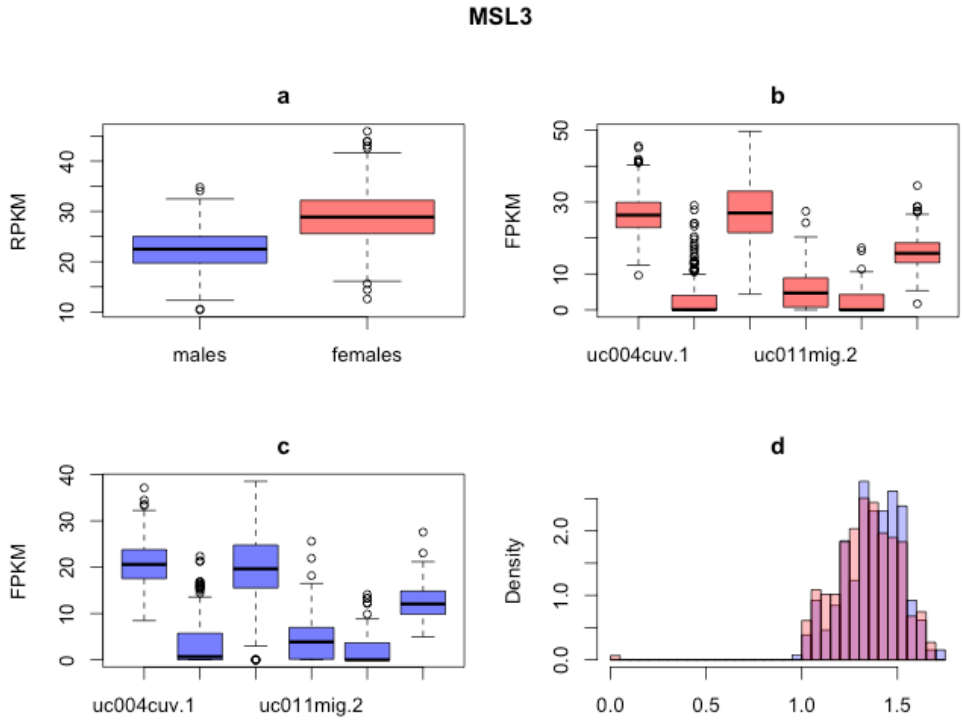

Figure 7 MLS3. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

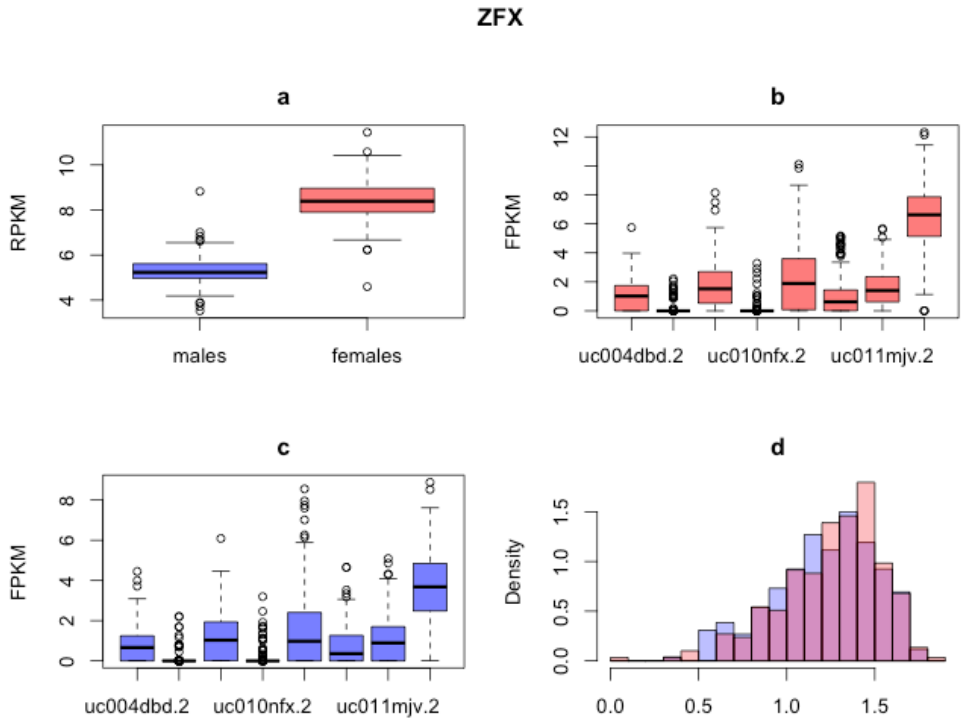

Figure 8 ZFX-. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

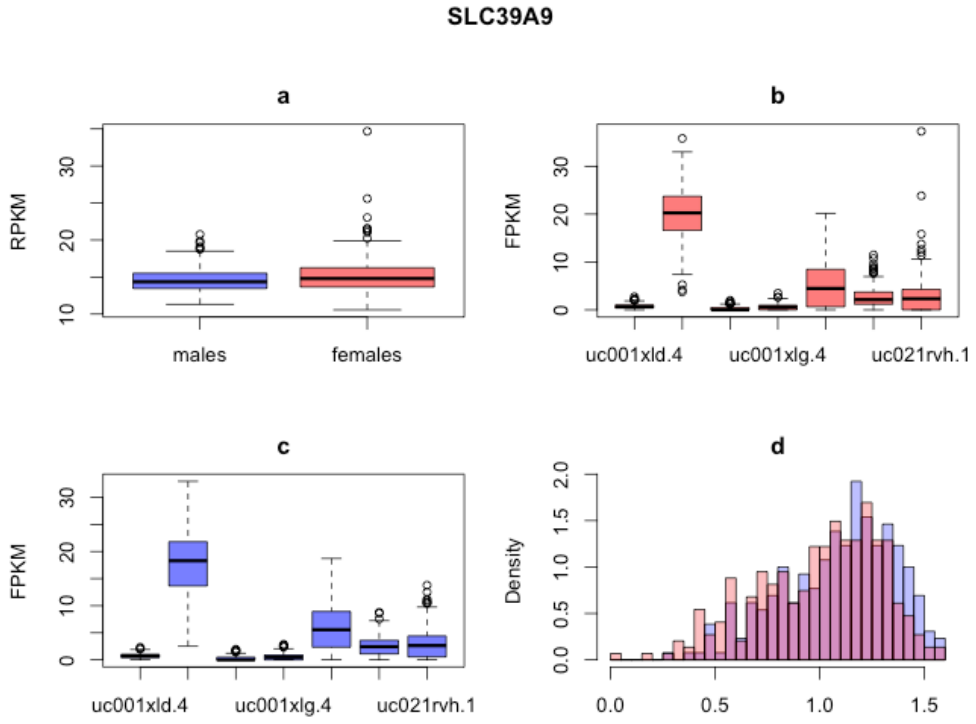

Figure 9 SLC39A9. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

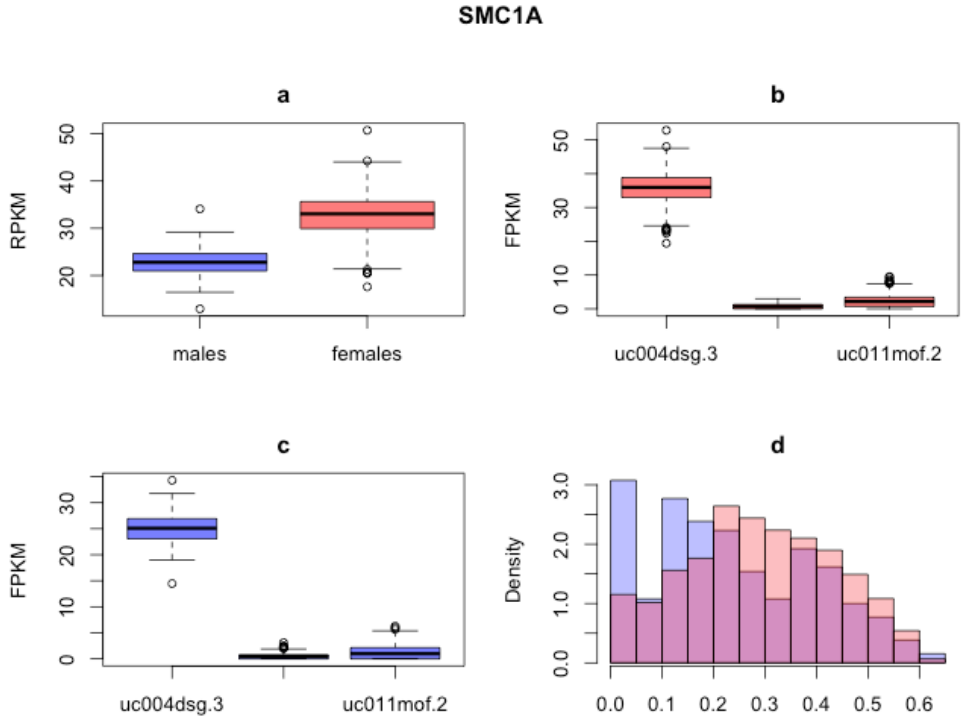

Figure 10 SMC1A. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

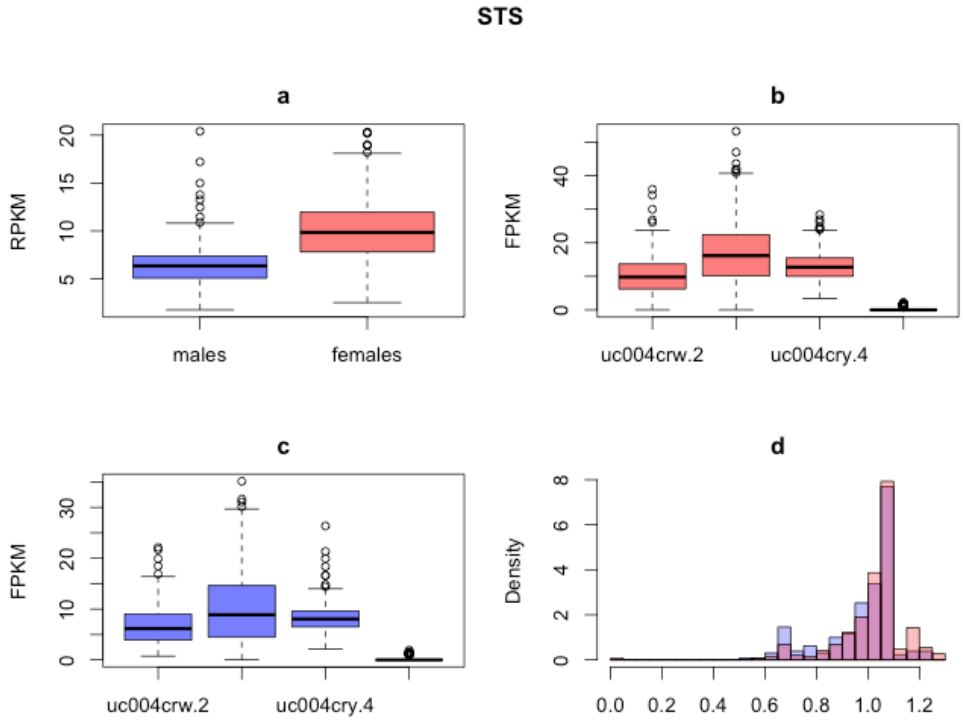

Figure 11 STS. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

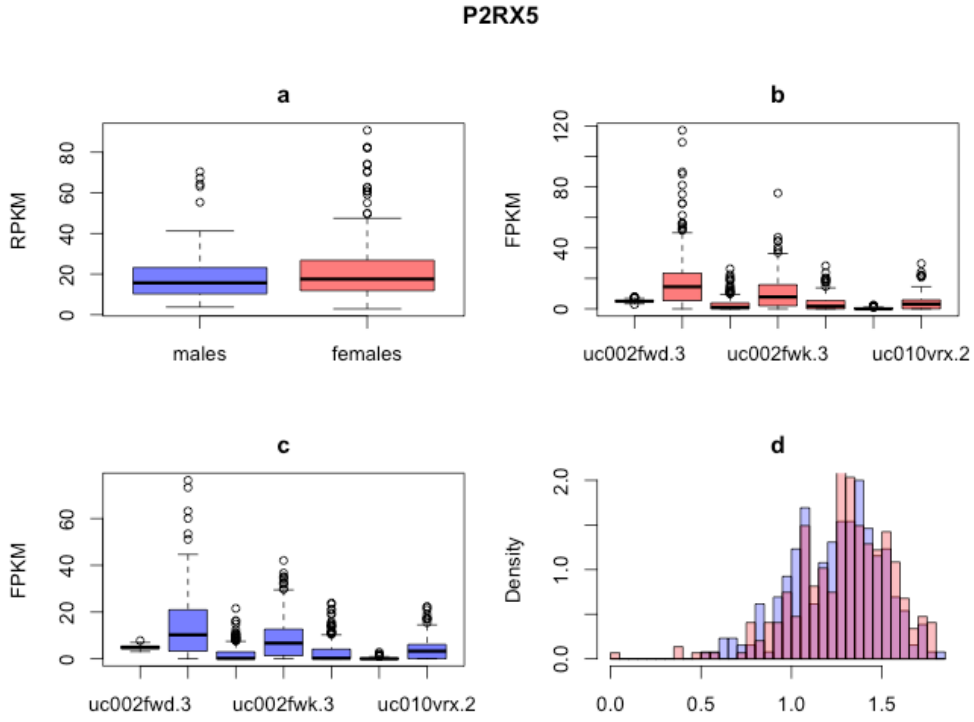

Figure 12- P2RX5. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

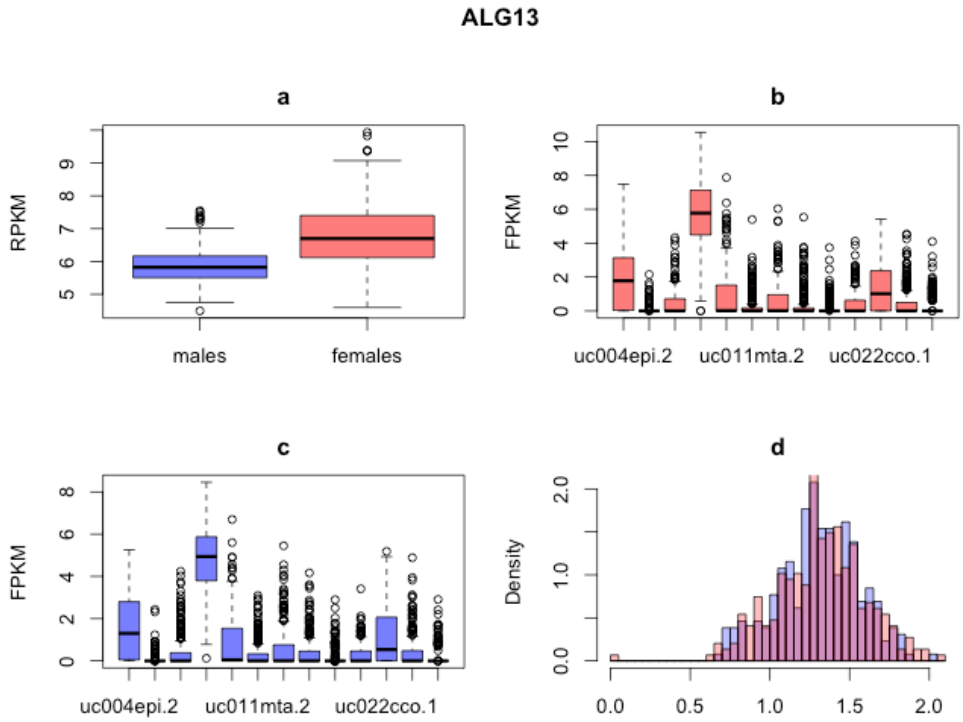

Figure 13. ALC13-. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

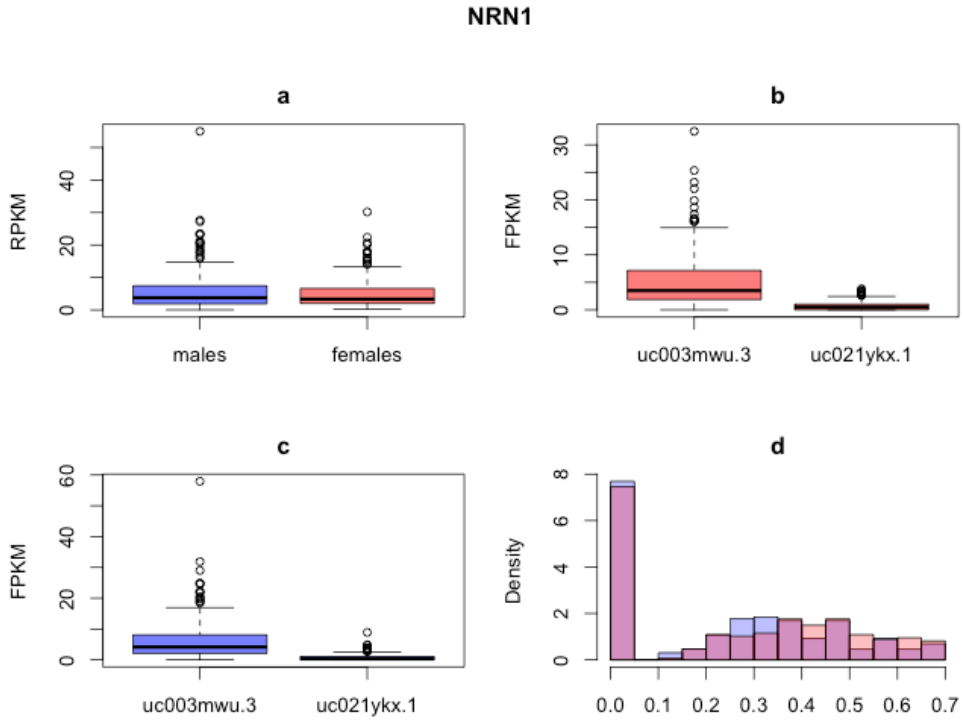

Figure 14. NRN1- a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

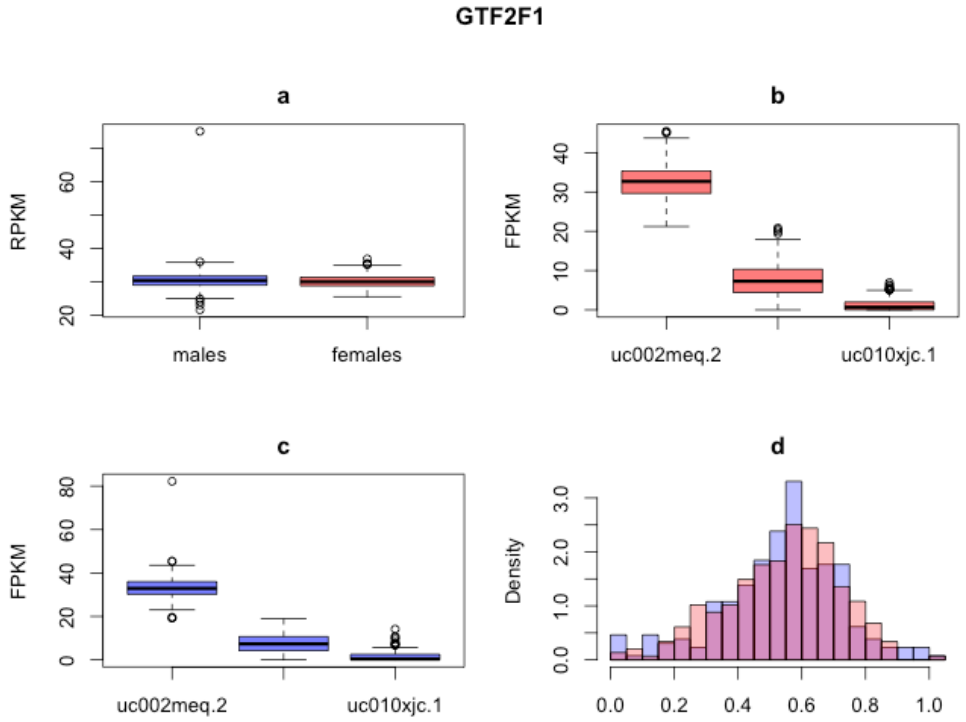

Figure 15. GTF2F1. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

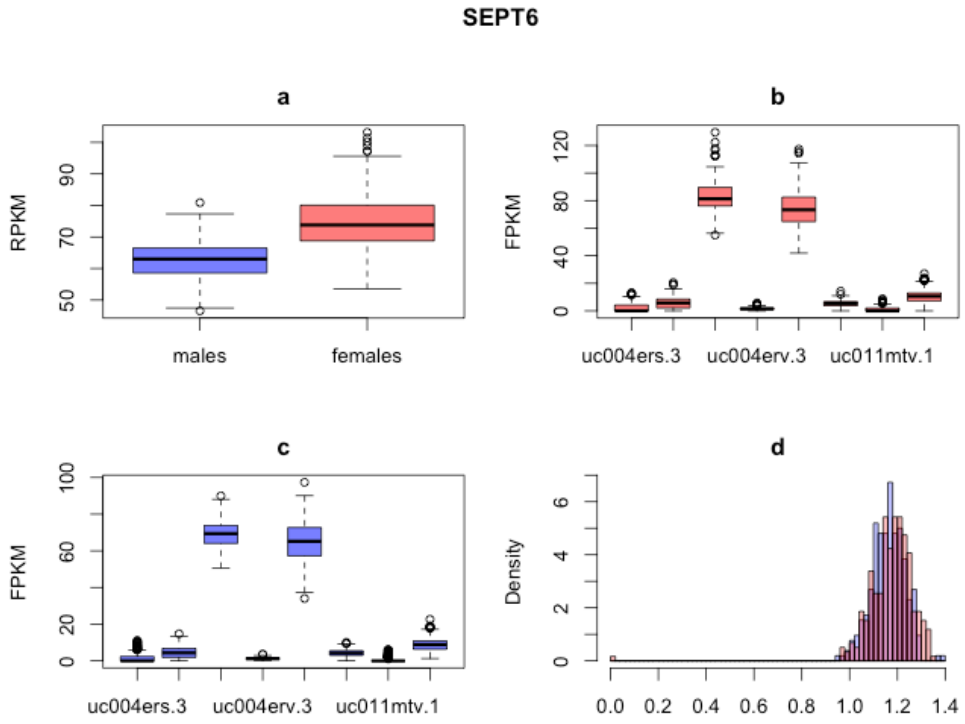

Figure 16 SEPT6. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

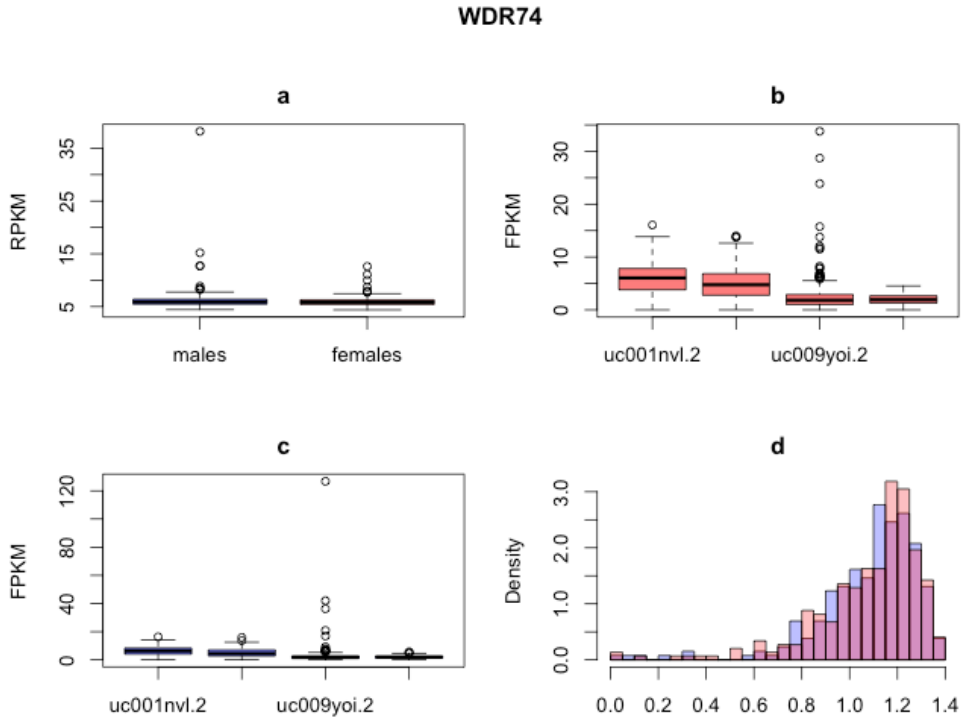

Figure 17 WDR74. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

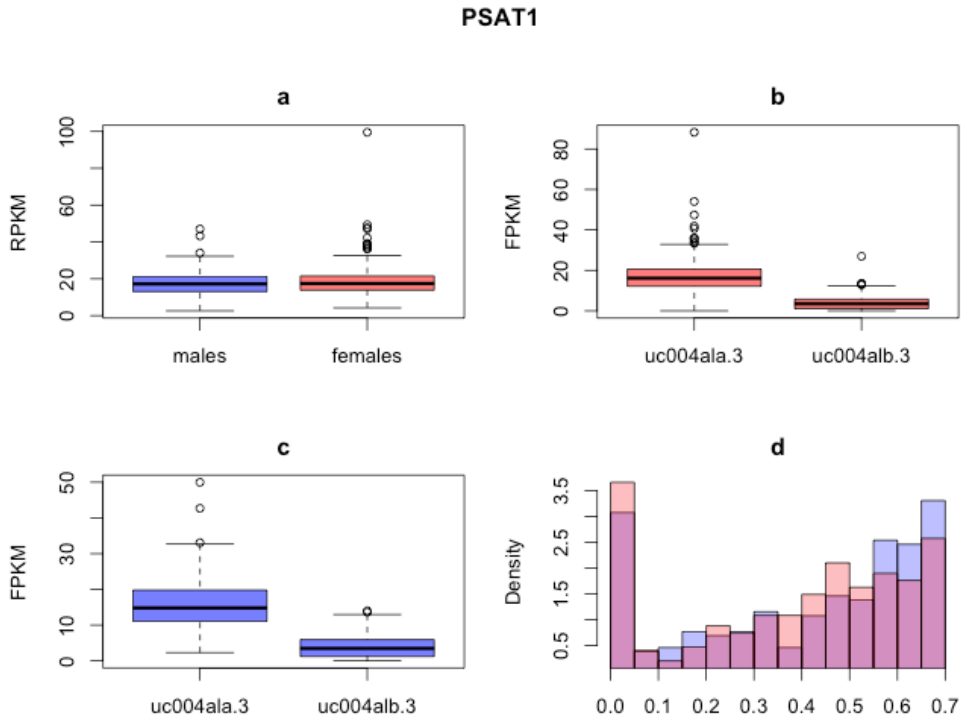

Figure 18 PSAT1. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

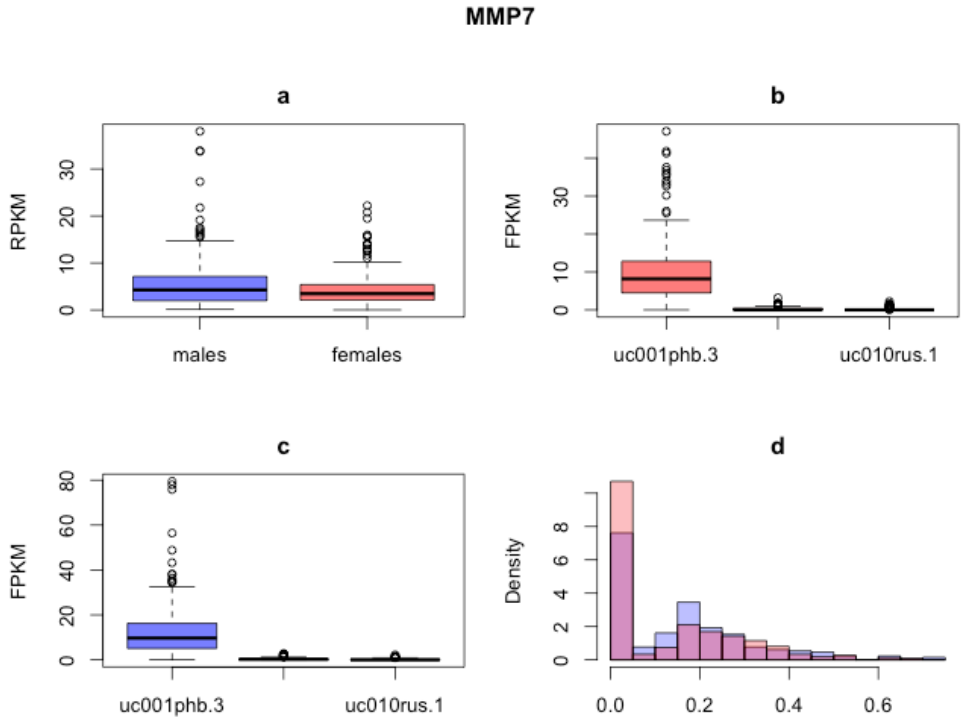

Figure 19 MMP7. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

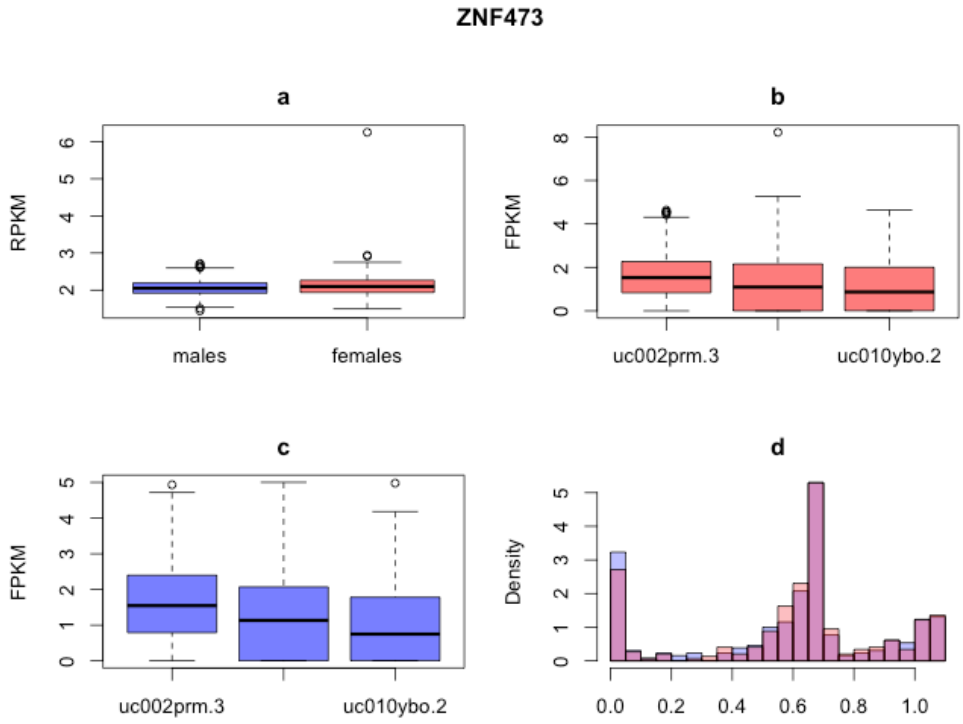

Figure 20 ZNF473. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

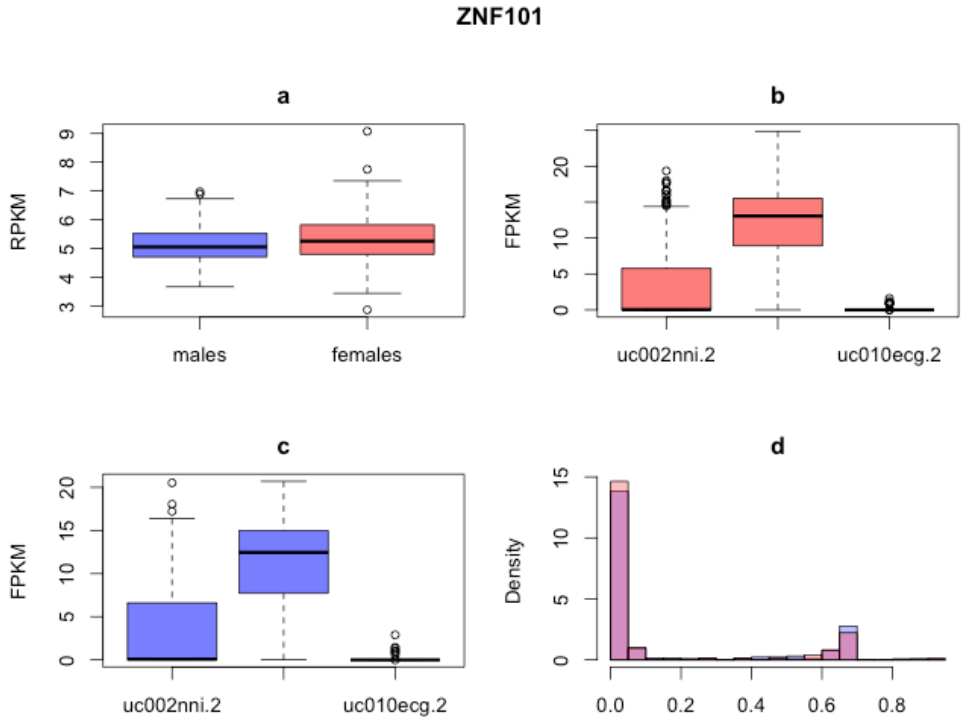

Figure 21 . ZNF101. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

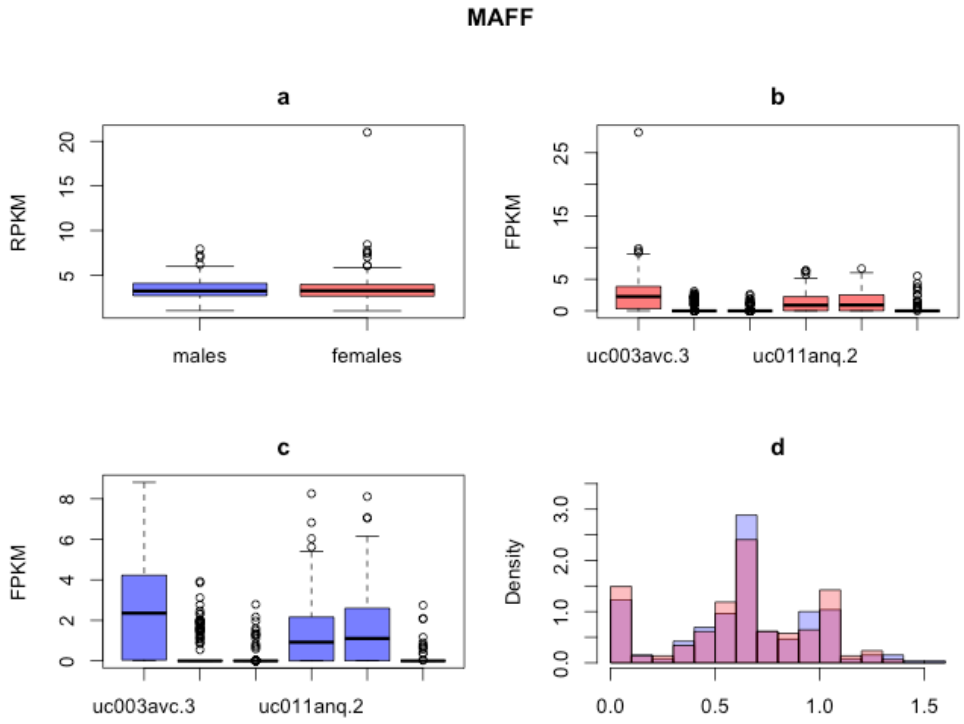

Figure 22 MAFF. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

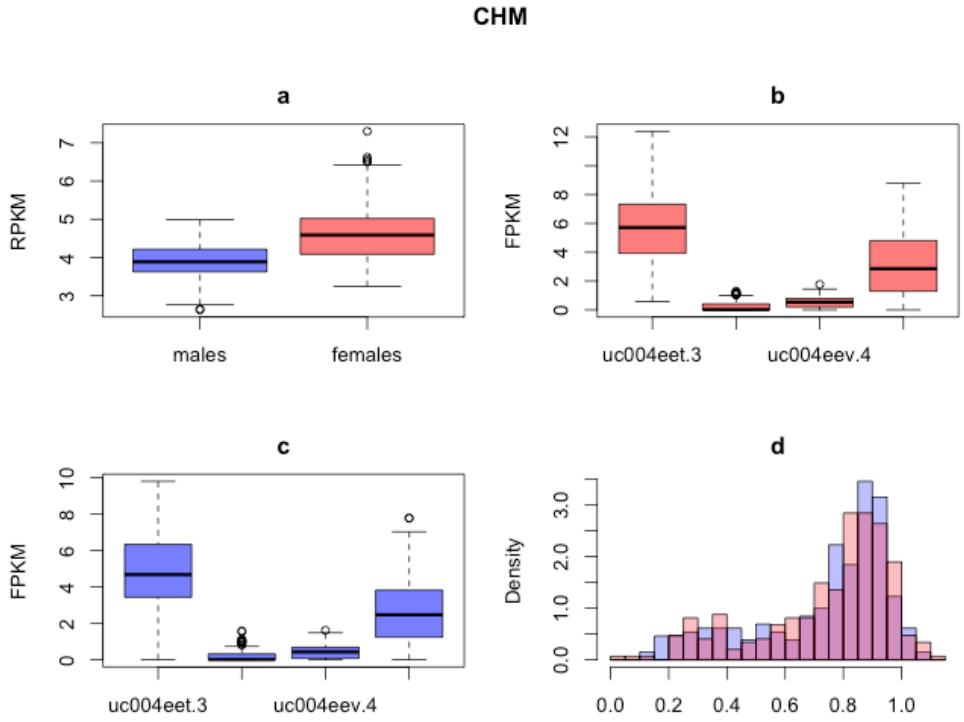

Figure 23- CHM. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

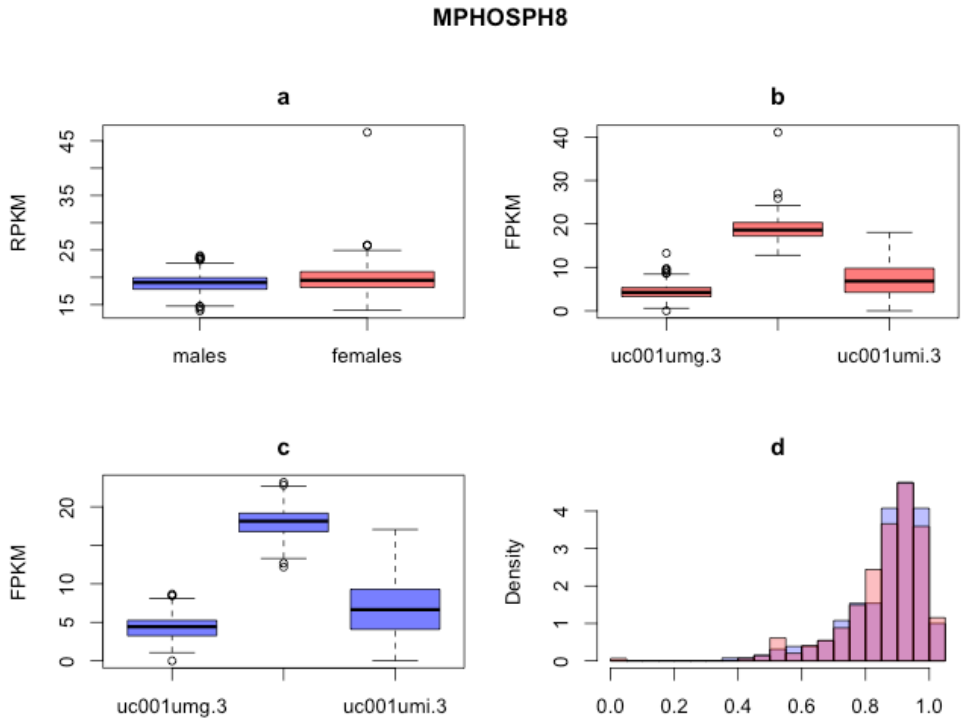

Figure 24 MPHOSPH8. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

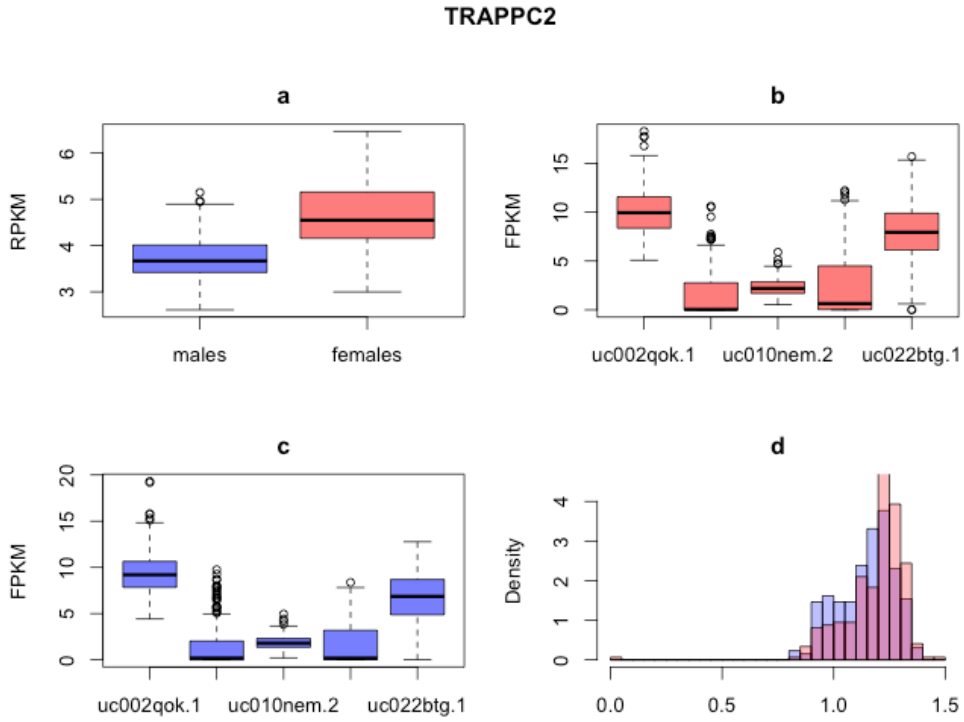

Figure 25 TRAPPC . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

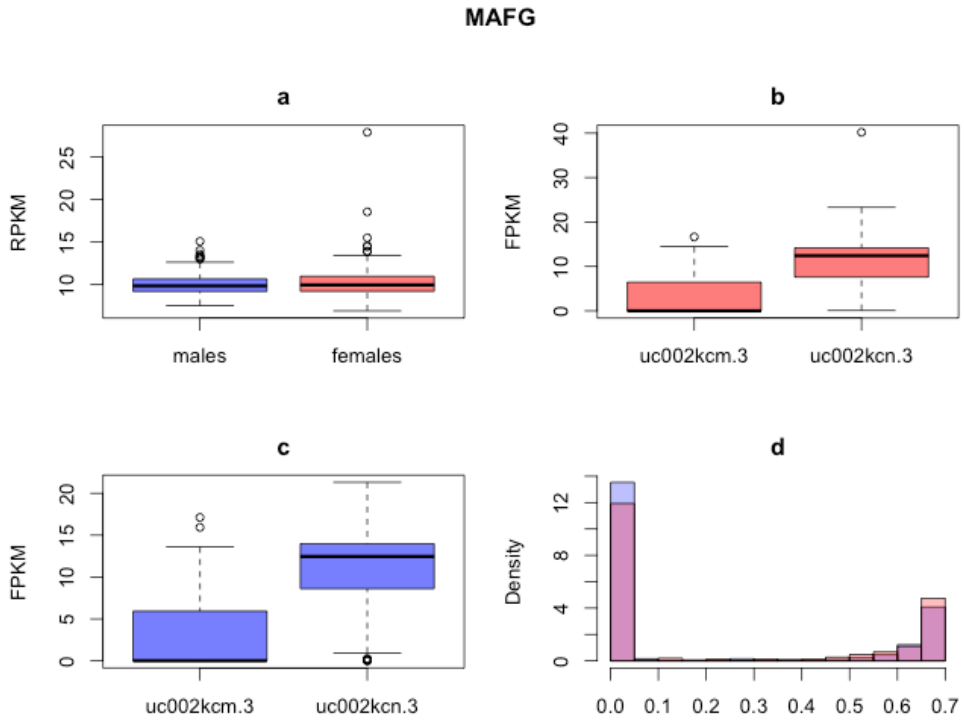

Figure 26MAFG. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

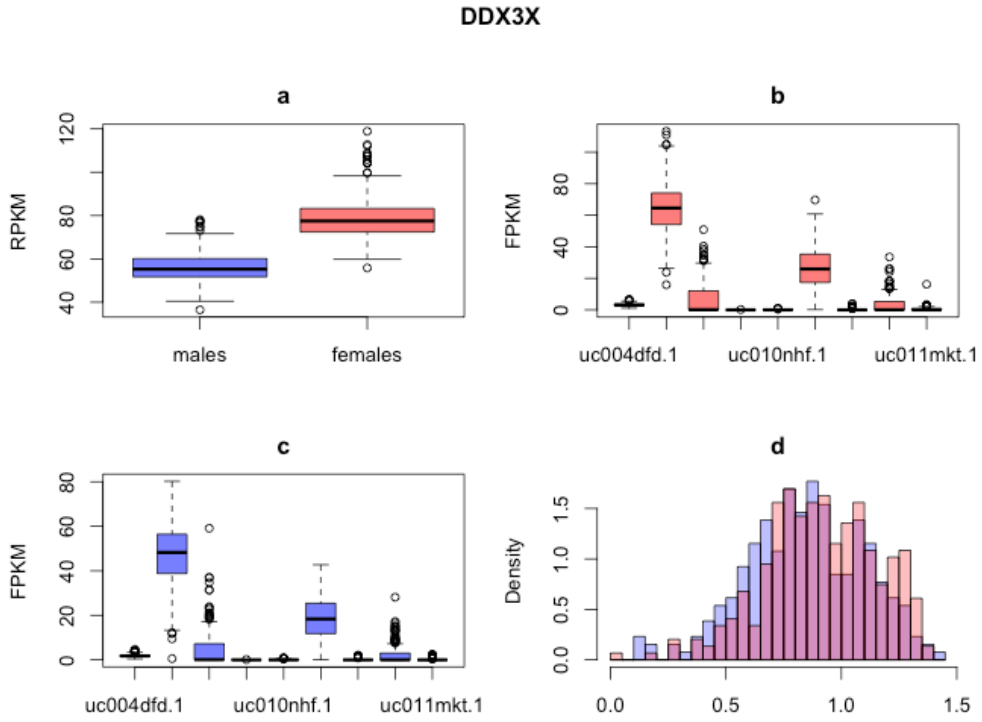

Figure 27 DDX3X. a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

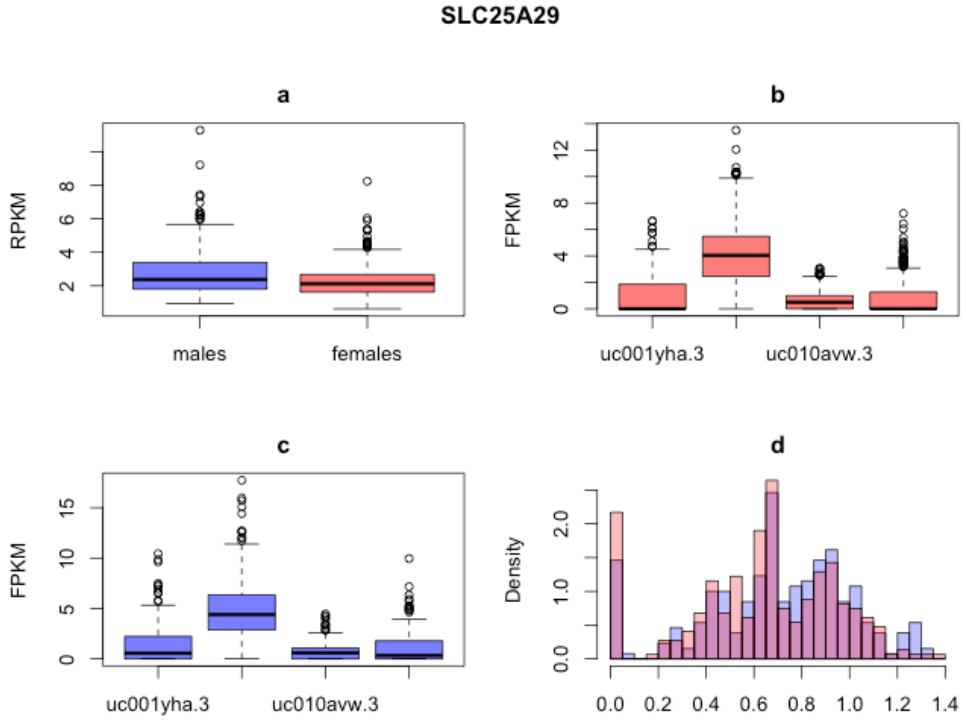

Figure 28 -SLC25A29. . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution

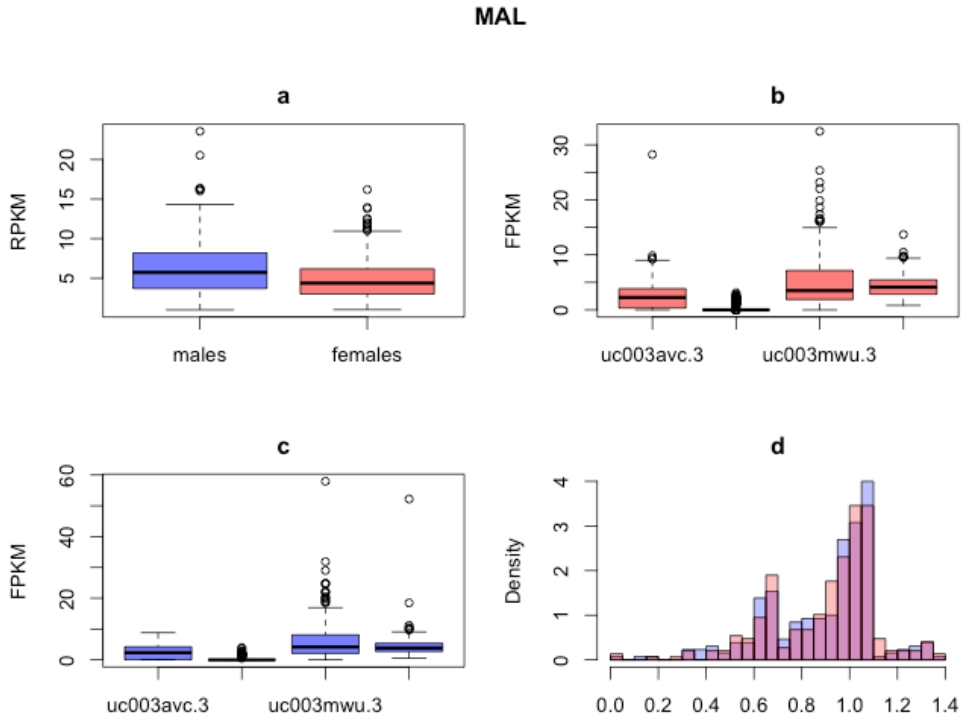

Figure 29- MAL . a : gene expression in both sexes. b :isoforms expression in females. C : isoforms expression in males. d : isoforms entropy distribution