Output results of CLIME (CLustering by Inferred Models of Evolution)

Dataset:

Num of genes in input gene set: 7
Total number of genes: 20834
Prediction LLR threshold: 0

The CLIME PDF output two sections:

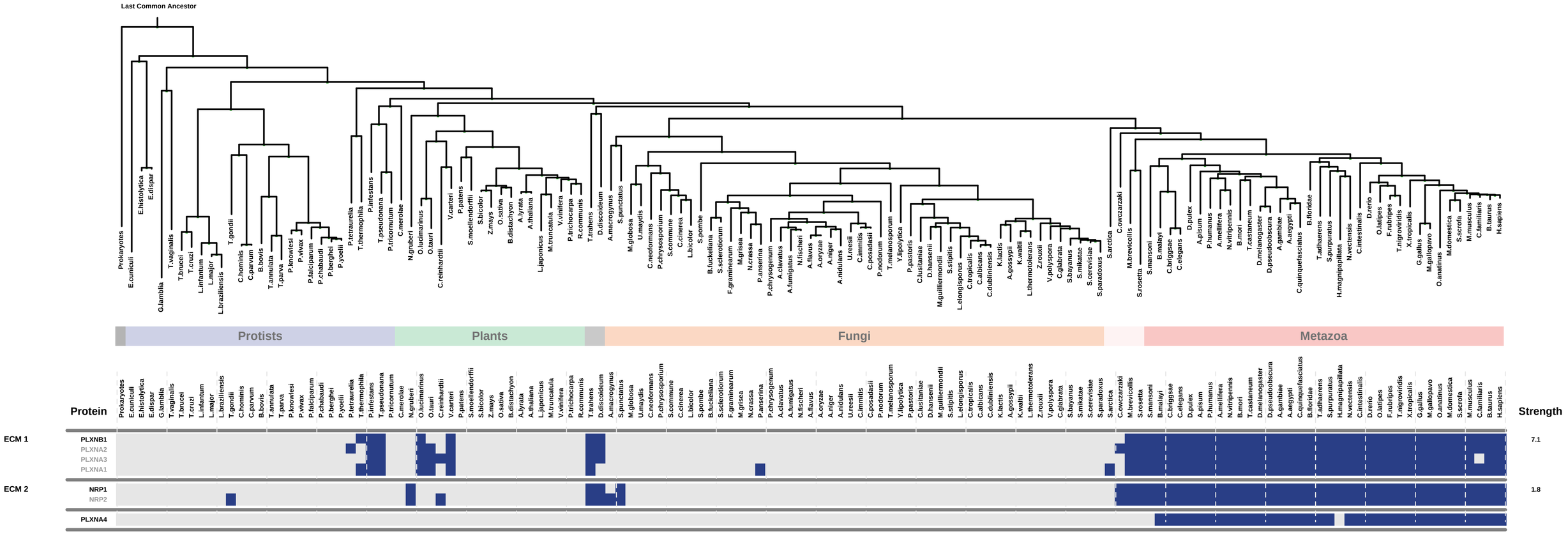
1) Overview of Evolutionarily Conserved Modules (ECMs)

- Top panel shows the predefined species tree.
- Bottom panel shows the partition of input genes into Evolutionary Conserved Modules (ECMs), ordered by ECM strength (shown at right), and separated by horizontal lines.
- Each row show one gene, where the phylogenetic profile indicates presence (blue) or absence (gray) of homologs in each species (column).
- Gene symbols are shown at left. Gray color indicates that the gene is a paralog to a higher scoring gene within the same ECM (based on BLASTP E < 1e-3).

2) Details of each ECM and its expansion ECM+

- Top panel shows the inferred evolutionary history on the predefined species tree. Branch color shows the gain event (blue) and loss events (red color, with brighter color indicating higher confidence in loss). Branches before the gain or after a loss are shown in gray.
- Bottom panel shows the input genes that are within the ECM (blue/white rows) as well as all genes in the expanded ECM+ (green/gray rows). The ECM+ includes genes likely to have arisen under the inferred model of evolution relative to a background model, and scored using a log likelihood ratio (LLR).
- PG indicates "paralog group" and are labeled alphabetically (i.e., A, B). The first gene within each paralog group is shown in black color. All other genes sharing sequence similarity (BLAST E < 1e-3) are assigned to the same PG label and displayed in gray.

Overview of Evolutionarily Conserved Modules (ECMs)

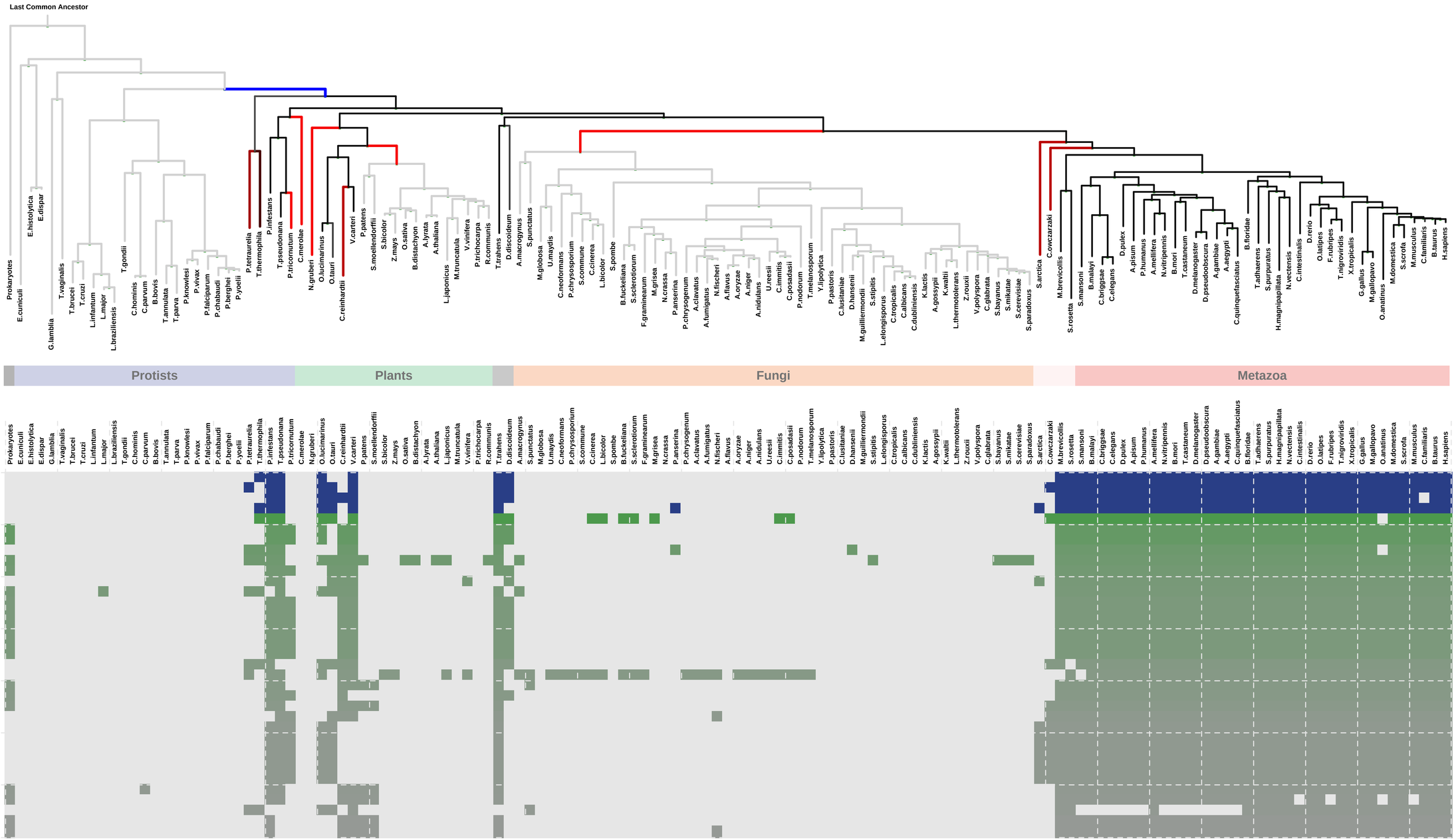


ECM 1, Gene set "semaphorin receptor complex", Page 1

Num of ECM Genes: 4. Num of Predicted Genes: 38. ECM Strength: 7.1

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
A	PLXNB1		1
A	PLXNA2		1
A	PLXNA3		1
A	PLXNA1		1
A	PLXND1	32.8	
B	HS3ST3B1	22.4	
B	HS3ST3A1	22.4	
A	PLXNB3	18.9	
	CATSPER2	17.4	2 / 3 / 4
B	HS3ST5	16.2	
	KCNA2	14.1	5 / 6
	CATSPER3	13.5	2 / 3 / 4 / 7
B	HS3ST4	12.4	
B	NDST2	12.4	
B	NDST3	12.4	
B	NDST4	12.4	
B	HS3ST2	12.4	
B	HS3ST6	12.4	
C	SCARB1	8.8	8 / 9
	TDRD5	8.3	10 / 11
D	CNTN1	8.3	12
B	HS3ST1	7.7	13
D	FNDC3A	6.6	7 / 14
	TRPV4	4.8	3 / 15 / 16 / 17 / 18 / 19 / 2
E	B4GALT3	3.8	23
E	B4GALT5	3.8	23
E	B4GALT6	3.8	23
E	B4GALT7	3.8	23
E	B4GALT1	3.8	23 / 24 / 25 / 26 / 27 / 28 /
E	B4GALT2	3.8	23
D	MYOM3	3.3	30
D	MYBPC3	3.0	31 / 32 / 33
	STIL	2.9	
D	CDON	1.7	34
D	IGSF22	1.7	

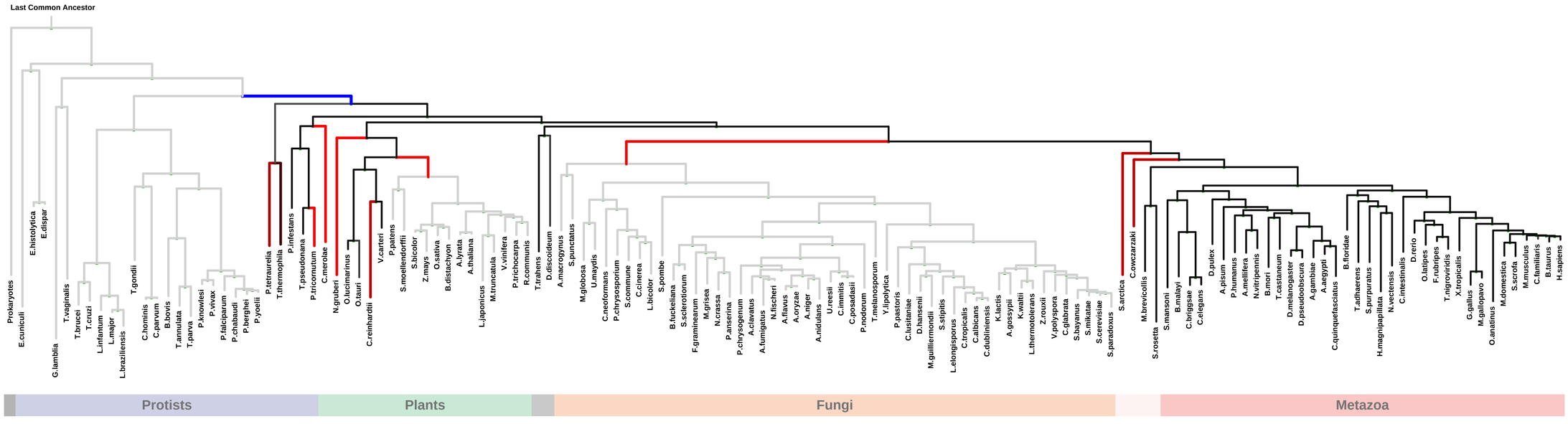
1: semaphorin receptor complex || 2: CatSper complex || 3: cilium || 4: flagellar membrane || 5: juxtaparanode region of axon || 6: voltage-gated potassium channel complex || 7: acrosomal vesicle || 8: caveola || 9: microvillus membrane || 10: chromatoid body || 11: pi-body || 12: anchored to membrane || 13: Golgi lumen || 14: vesicle membrane || 15: adherens junction || 16: cortical actin cytoskeleton || 17: cytoplasmic microtubule || 18: filopodium || 19: focal adhesion || 20: growth cone || 21: lamellipodium || 22: ruffle membrane || 23: Golgi cisterna membrane || 24: basolateral plasma membrane || 25: brush border membrane || 26: desmosome || 27: external side of plasma membrane ||

ECM 1, Gene set "semaphorin receptor complex", Page 2

Num of ECM Genes: 4. Num of Predicted Genes: 38. ECM Strength: 7.1

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
D	MYOM2	1.5	1
	C2	1.5	
D	EGFLAM	1.4	2 / 3 / 4
	ITGB2	1.3	5
	INPP4A	1.2	
C	CD36	1.2	6 / 7 / 8 / 9
	CDADC1	1.1	

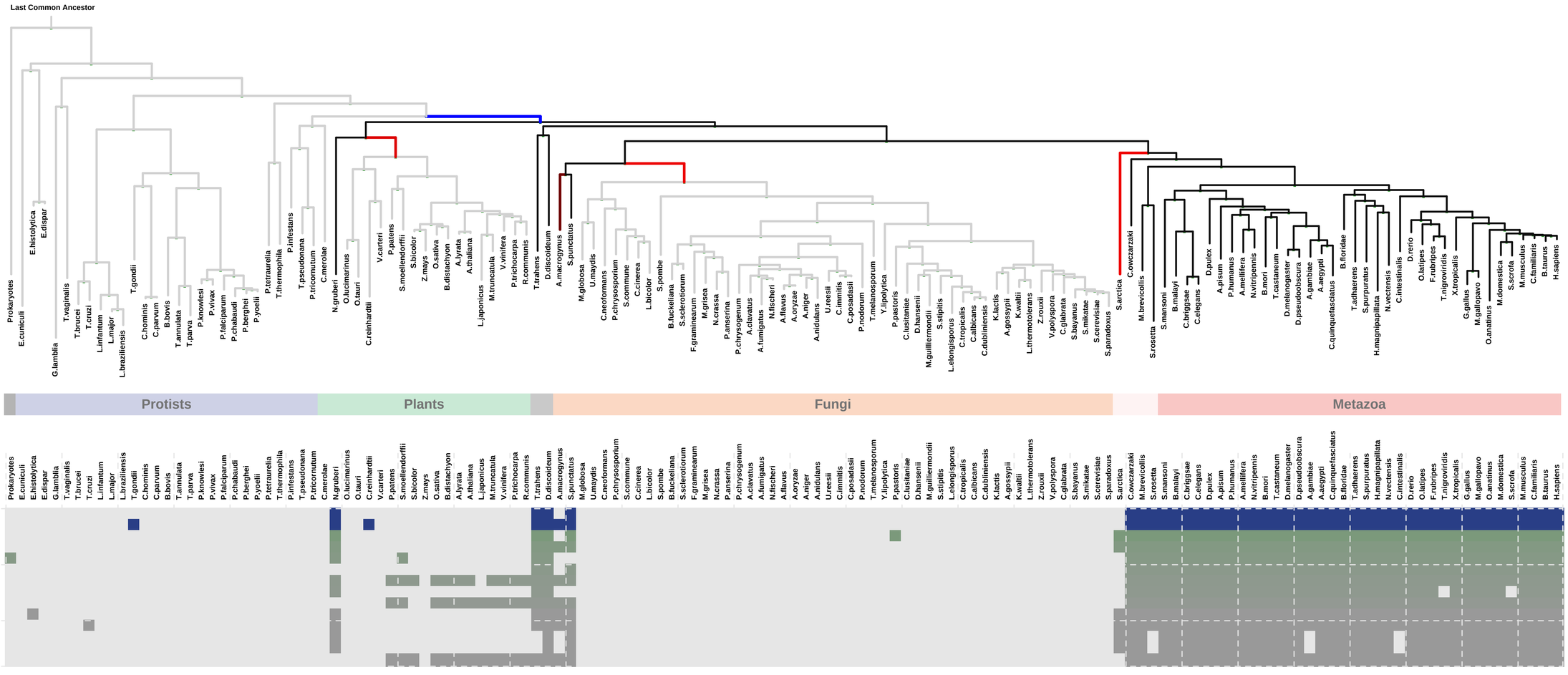
1: myosin filament || 2: basement membrane || 3: interstitial matrix || 4: synapse || 5: integrin complex || 6: external side of plasma membrane || 7: membrane raft || 8: phagocytic vesicle || 9: platelet alpha granule membrane

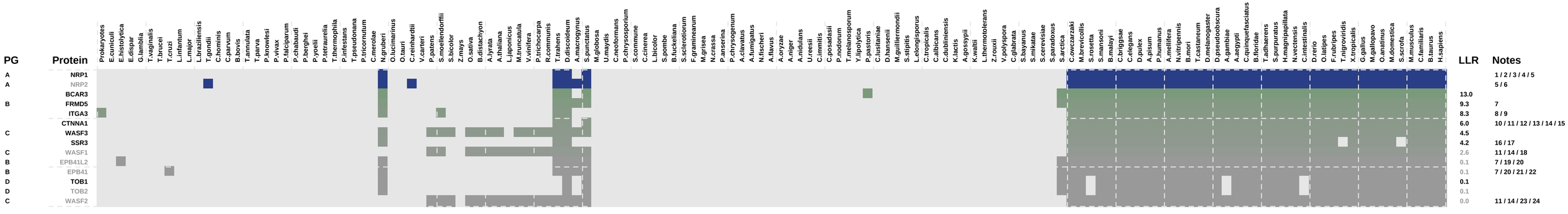
ECM 2, Gene set "semaphorin receptor complex", Page 1

Num of ECM Genes: 2. Num of Predicted Genes: 12. ECM Strength: 1.8

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60





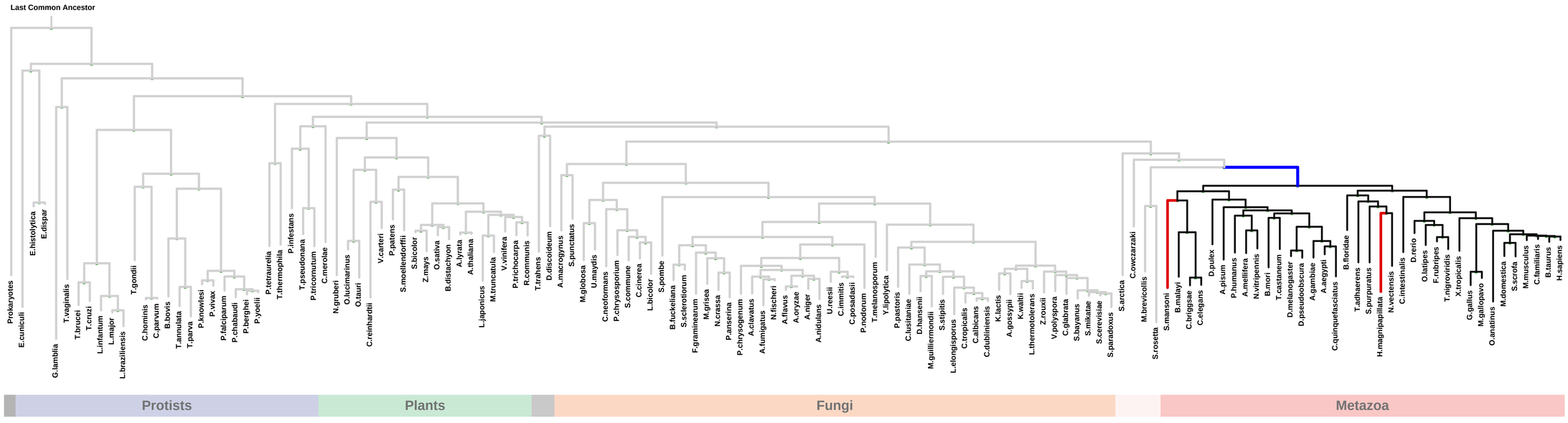
1: cytoplasmic vesicle || 2: growth cone || 3: neurofilament || 4: receptor complex || 5: semaphorin receptor complex || 6: axon || 7: extrinsic to membrane || 8: basolateral plasma membrane || 9: integrin complex || 10: acrosomal vesicle || 11: actin cytoskeleton || 12: catenin complex || 13: cell-cell junction || 14: lamellipodium || 15: zonula adherens || 16: integral to endoplasmic reticulum membrane || 17: Sec61 translocon complex || 18: mitochondrial outer membrane || 19: signalosome || 20: spectrin || 21: cortical cytoskeleton || 22: spectrin-associated cytoskeleton || 23: early endosome || 24: ruffle

ECM 3, Gene set "semaphorin receptor complex", Page 1

Num of ECM Genes: 1. Num of Predicted Genes: 121

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
	PLXNA4		1
	BHLHA9	8.8	
A	GPR31	8.8	
	HES7	8.8	
B	OR2T1	8.8	
	ROM1	7.7	2
B	OR2L13	7.3	
C	PLA2G10	6.7	
B	OR8G1	6.6	
B	OR8G2	6.6	
	NDUFB10	6.3	3
B	OR5B3	6.2	
	EVPL	5.6	4 / 5
C	PLA2G2A	5.5	6
	KIAA1143	5.4	
B	OR2Y1	5.4	
B	OR52A1	5.3	
B	OR52B4	5.3	
B	OR52M1	5.3	
B	OR5B17	5.3	
B	OR1Q1	5.3	
B	OR8D4	5.3	
A	GPR82	5.3	
	OR4F13P	5.3	
B	OR2T11	5.3	
B	OR10S1	5.3	
B	OR51A2	5.3	
D	LIMS3L	4.5	
	COL18A1	4.5	7 / 8 / 9 / 10
	EFNA4	4.5	11
D	LIMS3	4.5	
C	PLA2G1B	4.4	6
B	OR5D13	3.7	
B	OR2T10	3.5	
	ATG13	3.5	12 / 13

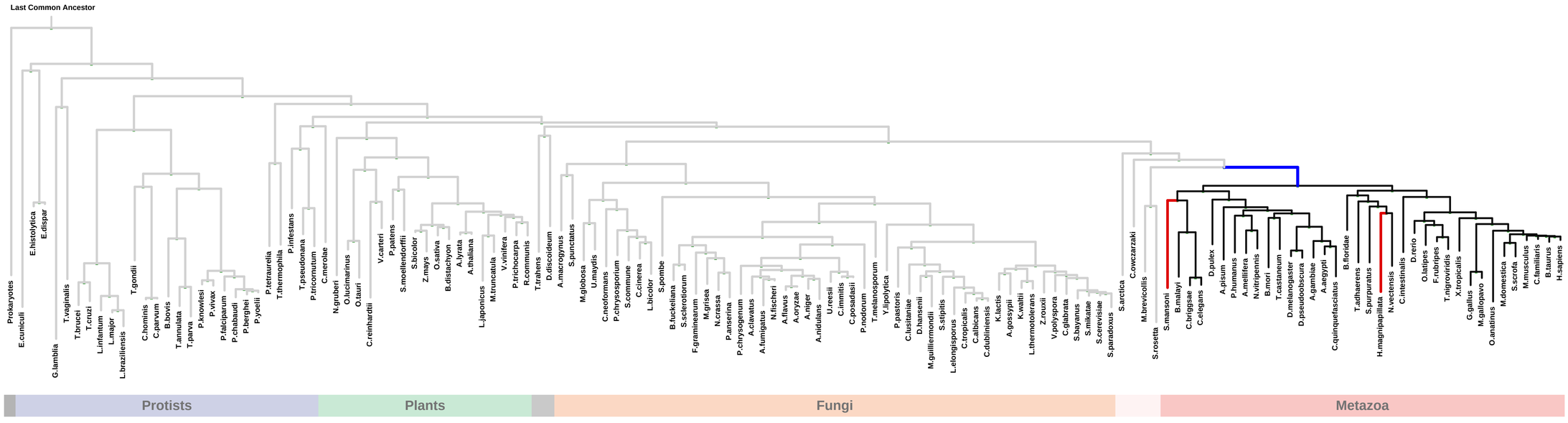
1: semaphorin receptor complex || 2: photoreceptor outer segment membrane || 3: mitochondrial respiratory chain complex I || 4: cornified envelope || 5: desmosome || 6: secretory granule || 7: basement membrane || 8: collagen ||
9: endoplasmic reticulum lumen || 10: extracellular matrix || 11: anchored to membrane || 12: pre-autophagosomal structure || 13: ULK1-ATG13-FIP200 complex

ECM 3, Gene set "semaphorin receptor complex", Page 2

Num of ECM Genes: 1. Num of Predicted Genes: 121

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
	FAM65A	3.3	
B	OR2T6	3.3	
C	PLA2G2E	3.3	
C	PLA2G2D	3.3	
	PVRL2	3.2	1 / 2
	TSC22D1	3.2	
B	OR8D2	2.7	
B	OR52I2	2.7	
B	OR10K2	2.6	
B	OR7G3	2.2	
B	OR2H1	1.8	
	PASD1	1.7	
B	OR8B8	1.7	
B	OR11H1	1.7	
A	GPR171	1.5	
	CD274	1.5	3 / 4
	VWC2	1.5	5 / 6
	POT1	1.2	7 / 8
C	OC90	1.0	
B	OR5D16	1.0	
	KCNJ13	1.0	9
	CACFD1	0.9	10
B	OR2A1	0.8	
B	OR2A42	0.8	
B	OR2AT4	0.8	
B	OR2B11	0.8	
B	OR2G6	0.8	
	GPR61	0.8	
B	OR2H2	0.8	
E	BCL7B	0.8	
F	DACH1	0.8	
	ID4	0.8	
F	DACH2	0.8	
B	OR2T29	0.8	
B	OR2T5	0.8	

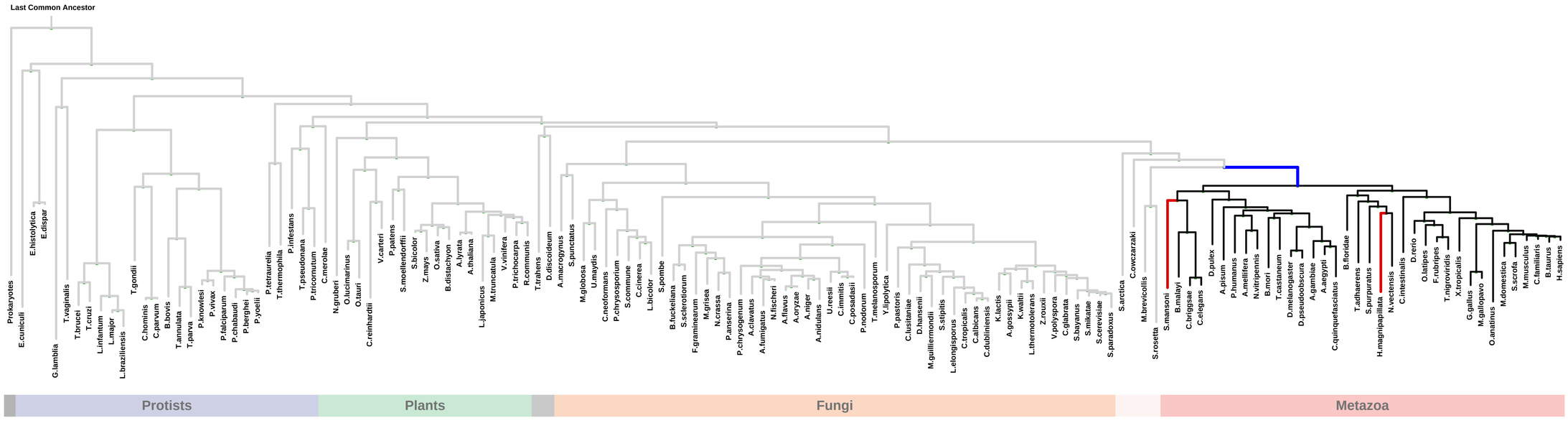
1: cell-cell junction || 2: zonula adherens || 3: endomembrane system || 4: external side of plasma membrane || 5: basement membrane || 6: interstitial matrix || 7: chromosome, telomeric region || 8: nuclear telomere cap complex || 9: voltage-gated potassium channel complex || 10: integral to synaptic vesicle membrane

ECM 3, Gene set "semaphorin receptor complex", Page 3

Num of ECM Genes: 1. Num of Predicted Genes: 121

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
	EDNRA	**0.8**	**1 / 2 / 3**
B	OR2W1	0.8	
E	BCL7C	0.8	
B	OR4A5	0.8	
B	OR4C15	0.8	
B	OR4D6	0.8	
B	OR4K1	0.8	
B	OR4K14	0.8	
B	OR4K17	0.8	
B	OR4L1	0.8	
	AGER	**0.8**	**4 / 5**
B	MC1R	0.8	**6**
	MRPS30	**0.8**	**7**
G	**MSC**	**0.8**	
G	MSGN1	0.8	
G	BHLHE22	0.8	
	NEURL2	**0.8**	**8 / 9**
G	NEUROD6	0.8	
	NTSR2	**0.8**	
G	BHLHE23	0.8	
G	OLIG1	0.8	
G	OLIG2	0.8	
G	OLIG3	0.8	
B	OR10A6	0.8	
G	ATOH1	0.8	
B	OR9A2	0.8	
	GPR27	**0.8**	
B	OR11A1	0.8	
B	OR11G2	0.8	
G	ATOH7	0.8	
B	OR13J1	0.8	
B	OR14I1	0.8	
B	OR1E1	0.8	
B	OR1E2	0.8	
B	OR1L8	0.8	

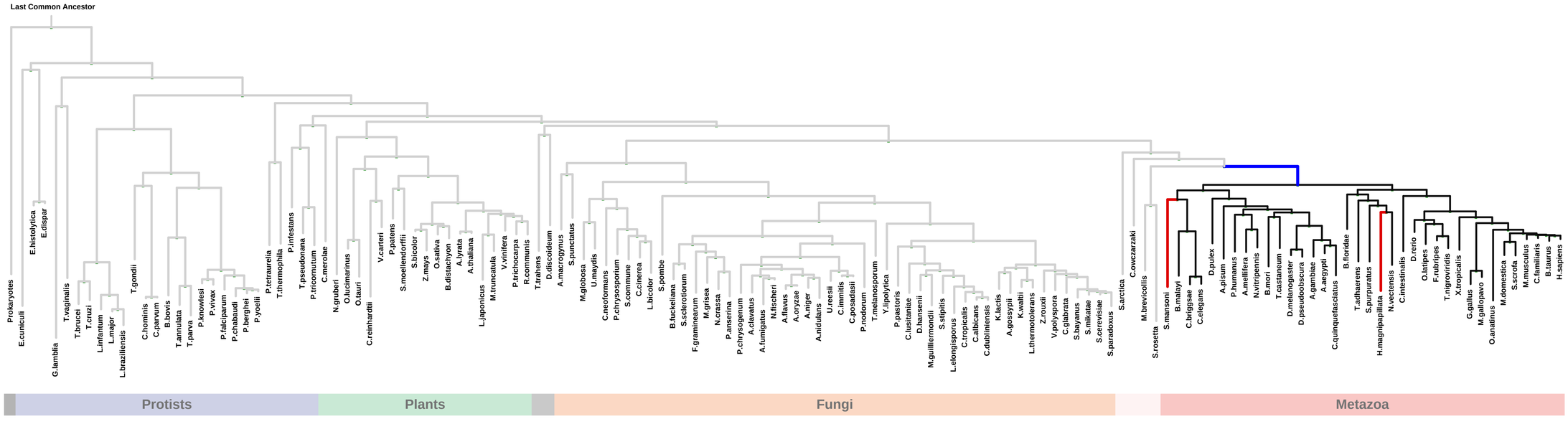
1: membrane raft || 2: nuclear membrane || 3: T-tubule || 4: axon || 5: basal plasma membrane || 6: microtubule cytoskeleton || 7: ribosome || 8: muscle tendon junction || 9: VCB complex

ECM 3, Gene set "semaphorin receptor complex", Page 4

Num of ECM Genes: 1. Num of Predicted Genes: 121

PRESENCE — GAIN — ABSENCE — LOSS

Log-likelihood Ratio Scale: 0 10 20 30 40 50 60



PG	Protein	LLR	Notes
	RUNDC1	0.8	
B	S1PR4	0.8	
B	S1PR5	0.8	
H	SEMA4G	0.8	
H	SEMA7A	0.8	1 / 2
	TFAP2D	0.8	
	TPM2	0.8	3
B	OR1N2	0.8	
A	PTGDR2	0.8	
B	OR5M3	0.7	
B	OR52A4	0.7	
B	OR5AC2	0.7	
I	CAV2	0.6	4 / 5 / 6 / 7 / 8 / 9
I	CAV3	0.6	5 / 8 / 10 / 11 / 12 / 13 / 14
I	CAV1	0.6	4 / 5 / 7 / 8 / 15 / 16 / 17 /
B	OR5W2	0.2	
H	SEMA6B	0.1	

1: anchored to membrane || 2: external side of plasma membrane || 3: muscle thin filament tropomyosin || 4: acrosomal membrane || 5: caveola || 6: extrinsic to internal side of plasma membrane || 7: lipid particle || 8: membrane raft ||
9: transport vesicle || 10: dystrophin-associated glycoprotein complex || 11: neuromuscular junction || 12: sarcolemma || 13: T-tubule || 14: Z disc || 15: basal plasma membrane || 16: basolateral plasma membrane || 17: cell cortex ||
18: cytoplasmic vesicle || 19: endocytic vesicle membrane || 20: endosome || 21: flagellum || 22: focal adhesion