HOR S1C1/5/19H1L in chromosomes: 1, 5, and 19

Variant #1 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6

Variant #2 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	6/4	5	6

Variant #3 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	2/6

Variant #4 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	6/4	5	6

Variant #5 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2/4	5	6/4	5	6

Variant #6 of HOR S1C1/5/19H1L in GJ212203.1

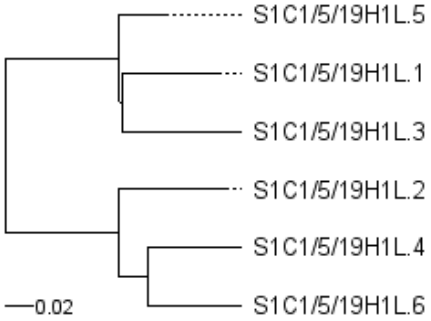
Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	6/4	5	2/6

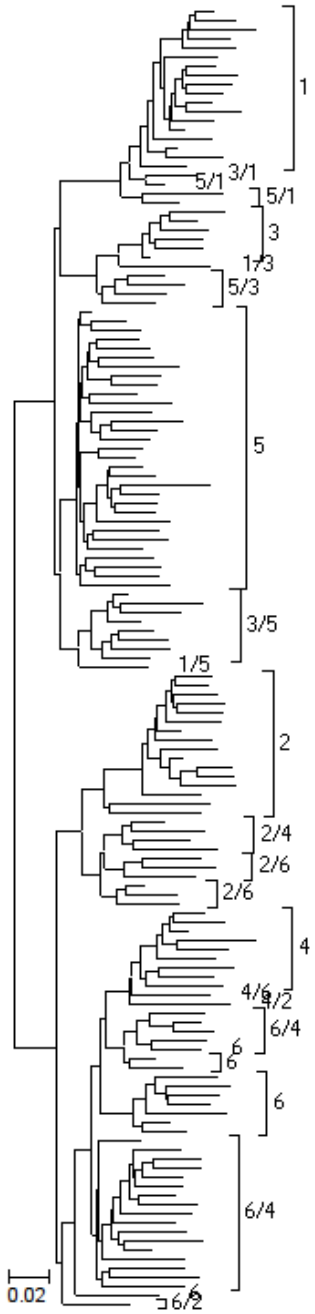
Variant #7 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6/4	5	6

Variant #8 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5/3	4	5	6





Structural variants of HOR S1C1/5/19H1L in GJ212203.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6	362
2	1 2 3/5 6/4 5 6	149
3	1 2 3 4 5 2/6	118
4	1 2 3 6/4 5 6	73
5	1 2/4 5 6/4 5 6	42
6	1 2 3/5 6/4 5 2/6	40
7	1 2 3 4 5 6/4 5 6	35
8	1 2 5/3 4 5 6	33
9	1 2 5 6/4 5 6	28
10	1 2/4 5 6	26
11	1 2 3 4 5 6/4 5/1 2 3 4 5 6	22
12	1 2/4 5/3 4 5 6	22
13	1 2 3 6/4 5 2/6	17
14	1 2 3 4 5 6/4 5 2/6	16
15	1 2 3/5 4 5 6	16
16	1 2/4 5 6/4 5 2/6	16
17	1 2/4 5 2/6	12
18	1 2 5/3 4 5 2/6	12
19	1 2 3 4 5 2/4 5 6	10
20	1 2 5 6/4 5 2/6	10
21	1 2 3 4 5 6/4	9
22	1 2 3/1 2/4 5 6	8
23	1 2 3/1 2/4 5 2/6	7
24	1 2 3 4 5 6/4 5/1 2 3 4 5 2/6	7
25	1 2 3 4 S1C16H1L.5 6	7
26	1 2/4 5/3 4 5 2/6	7
27	1 2 5/3 4 5 6/4 5 6	7
28	1 2/6	7
29	1 2 3 4 5 6 1/5 2 3 4 5 6	6
30	1 2 3 4 5 6/4 5 6/4 5 6	6
31	1 2 3/5 4 5 2/6	6
32	1 2 3/5 6/4 5 6/4 5/1 2 3 4 5 6	6
33	1 2 3/5 6/4 5 6/4 5 6	6
34	1 2 5/3 6/4 5 6	6
35	1 2 3/5 2/4 5 6	5
36	1 2 3/5 6/4 5 6/4	5
37	1 2 3 6/4 5 6/4 5 6	5
38	1 2/4 5/3 6/4 5 6	5
39	1 2/6 3 4 5 6	5
40	1 2 3 4/2 5 6	4
41	1 6/2 3 4 5 6	2
42	1 2 3 4/6 5 6	1
43	1 2 3 4 5 6 1/5 6 1/3 4 5 6	1

Full map and stats

Variant #9 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	X	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5	6/4	5	6

Variant #10 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2/4	5	6

Variant #11 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12
Type	A	X	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6/4	5/1	2	3	4	5	6

Variant #12 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2/4	5/3	4	5	6

Variant #13 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	6/4	5	2/6

Variant #14 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6/4	5	2/6

Variant #15 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	4	5	6

Variant #16 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2/4	5	6/4	5	2/6

Note: (1) Unusually polymorphic HOR structure may be due to mixing of slightly different sequences from 3 chromosomes. Low copy HOR variants are shown without PERCON schemes just to demonstrate identified hybrids. (2) Sometimes hybrids occur in hybrid context and sometimes in a context of a basic monomer (see Supplementary note 1 for discussion).

Variant #17 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2/4	5	2/6

Variant #18 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5/3	4	5	2/6

Variant #19 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	2/4	5	6

Variant #20 of HOR S1C1/5/19H1L in GJ212203.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5	6/4	5	2/6

Variant #44 of HOR S1C1/5/19H1L in chr1_FP565591.6

Mon	5	6
Type	A	B
Class	J1	J2
Num	5	6/4

Structural variants of HOR S1C1/5/19H1L in chr1_FP565591.6

Var #	Order of monomers	Number of copies
44	5 6/4	70

Full map and stats

Note: (3) Variant #44 and the statistics below are shown to illustrate the discussion of 5-6/4 dimer in section 1.2.2 of Supplementary Note 1.

Genome-wide statistics of S1C1/5/19H1L.6/4 hybrid (see discussion in Supplementary note 1).

Hybrid S1C1/5/19H1L.6/4 has 1458 copies in the assembly.

It occurs mostly in the variant n/5-6/4-5/m that has 1168 copies (where n=1,3, and m=1,3). Full statistics is provided below.

#	Order of monomers	Number of copies
1	5 6/4 5	565
2	3/5 6/4 5	340
3	5 6/4 5/1	229
4	1/5 6/4 5	18
5	5 6/4 5/3	9
6	3/5 6/4 5/1	3
7	1/5 6/4 5/1	2
8	3/5 6/4 5/3	2

Also, it occurs in the variant: n/3-6/4-5 that has 210 copies (where n=1,5).

#	Order of monomers	Number of copies
1	3 6/4 5	179
2	5/3 6/4 5	30
3	1/3 6/4 5	1

Also, it occurs in the variant: n/5 6/4 1/m that has 40 copies (where n=3, and m=5).

#	Order of monomers	Number of copies
1	5 6/4 1	35
2	5 6/4 1/5	3
3	3/5 6/4 1/5	2

Also, it occurs in the variant: n/3 6/4 3/m that has 3 copies (where n=5, and m=5).

#	Order of monomers	Number of copies
1	3 6/4 3/5	2
2	5/3 6/4 3/5	1

Also, it occurs in the variant: n/5 6/4 3/m that has 5 copies (where n=3, and m=5).

#	Order of monomers	Number of copies
1	5 6/4 3	2
2	5 6/4 3/5	2
3	3/5 6/4 3	1

Also, it occurs in the variant: n/1 6/4 5/m that has 3 copies (where n=3, and m=1).

#	Order of monomers	Number of copies
1	1 6/4 5	1
2	1 6/4 5/1	1
3	3/1 6/4 5	1

Other variants:

#	Order of monomers	Number of copies
1	3 6/4 S1C16H1L.5	3
2	3/5 6/4 S1C16H1L.5	5
3	5 6/4 S1C16H1L.5	5
4	S1C16H1L.5 6/4 5/1	5
5	S1C16H1L.5 6/4 5	9
6	S1C16H1L.5 6/4 S1C16H1L.5	1

HOR S1C3H1L in chromosome 3

Variant #1 of HOR S1C3H1L in GJ211871.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Type	A	B	A	B	A	B	A	B	A	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	Um	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Variant #2 of HOR S1C3H1L in GJ211871.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Type	A	B	A	B	X	B	A	B	A	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	Um	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	12/5	6	7	8	9	10	11	12	13	14	15	16	17

Variant #3 of HOR S1C3H1L in GJ211871.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type	A	B	A	B	A	B	A	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	Um	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5/7	8	9	10	11	12	13	14	15	16	17

Variant #4 of HOR S1C3H1L in GJ211871.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type	A	B	A	B	A	B	A	B	A	B	A	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	Um	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	5	6	7	8	9	10	11	12	13	14	15	16	17

Variant #5 of HOR S1C3H1L in GJ211871.1

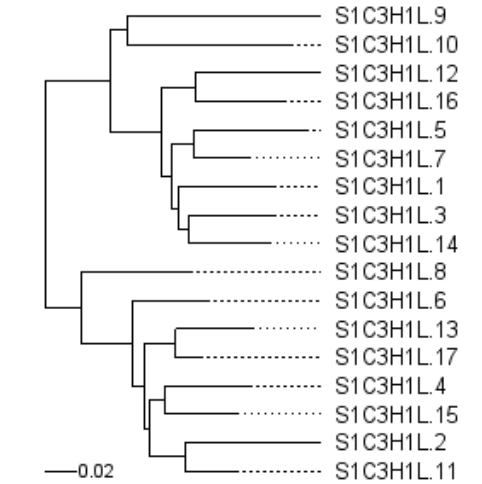
Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type	A	B	A	B	A	B	A	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	Um	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	7	8	9	10	11	12	13	14	15	16	17

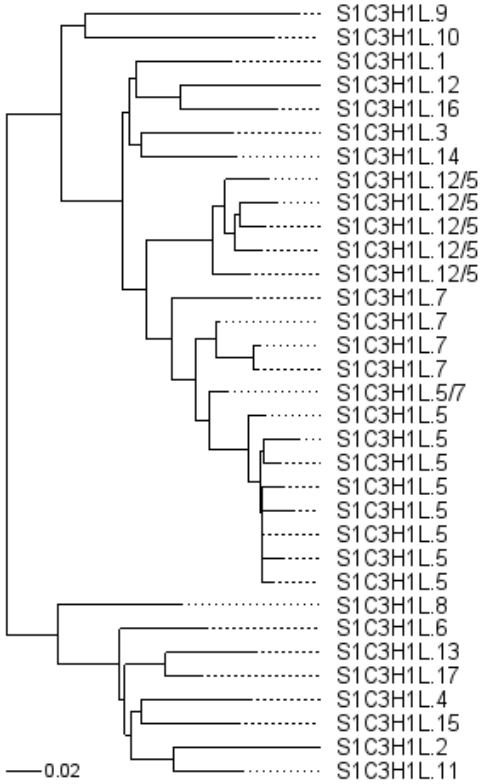
Note: (1) Monomers 8-9-10 branch with archaic SF1, others with modern SF1 (Fig. S2a Group1). (2) Hybrid monomer 12/5 is a dramatically different variant of monomer 5, its right half is very similar to monomer 5 and the left part is similar to monomers 12 and 16 (slightly more to 12), but with a lot of own mutations. However, it never occurs in its legitimate context (between monomers 11 and 6), but always in place of monomer 5 (between 4 and 6).

Structural variants of HOR S1C3H1L in GJ211871.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	544
2	1 2 3 4 12/5 6 7 8 9 10 11 12 13 14 15 16 17	70
3	1 2 3 4 5/7 8 9 10 11 12 13 14 15 16 17	38
4	1 2 3 4 5 6 5 6 7 8 9 10 11 12 13 14 15 16 17	10
5	1 2 3 4 7 8 9 10 11 12 13 14 15 16 17	10

Full map and stats





HOR S1C3H2 in chromosome 3

Variant #1 of HOR S1C3H2 in GJ211866.1

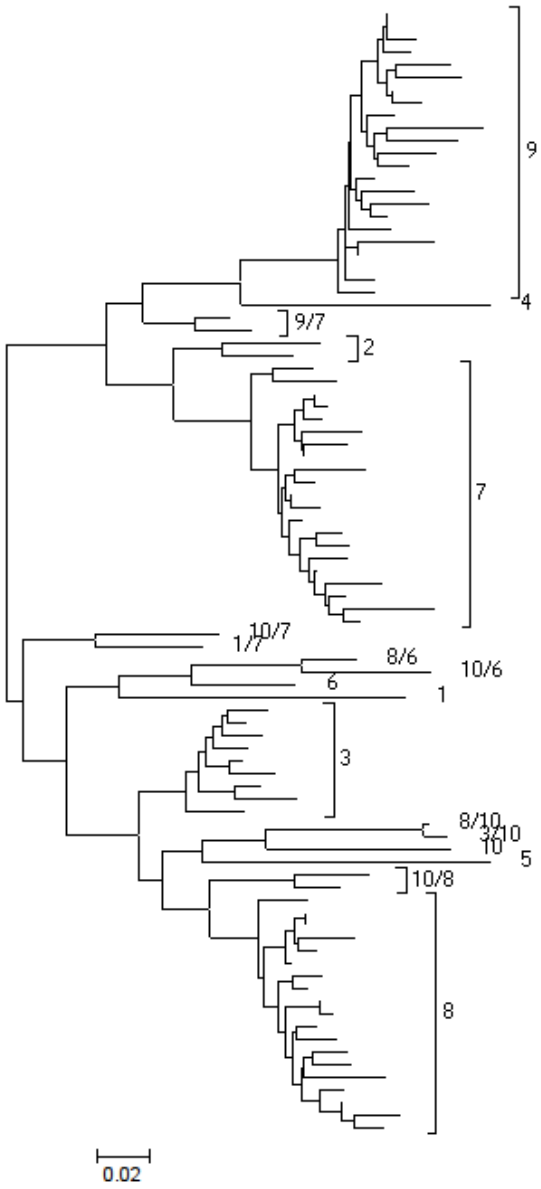
Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	A	A	A	B	A	B	A
Class	R2	J2	J1	R1	J1	R2	J2	J1	J2	J1
Num	1	2	3	4	5	6	7	8	9	10

Note: (1) PERCON misclassification of monomer 4 shown as R1 type A instead of type B.

Structural variants of HOR S1C3H2 in GJ211866.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10	250
2	1 2 S1C3H3.3 4 5 6 7 8 9 10	8

Full map and stats

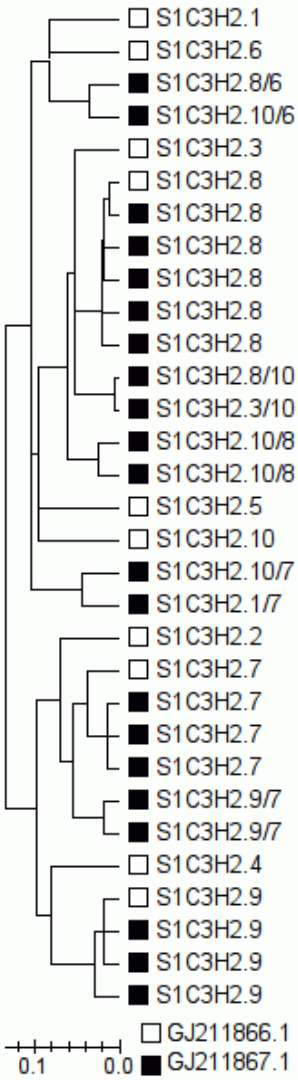


Structural variants of HOR S1C3H2 in GJ211867.1

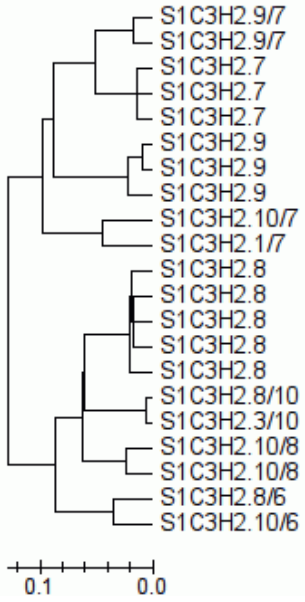
Var #	Order of monomers	Number of copies
1	9/7 8	15
2	9 10/8	7
3	9/7 8/6 7 8	2
4	7 8	1
5	9	1
6	9 10/6 7 8	1
7	9 10/6 7 8 S1C3H3d.4 8	1
8	9 10/7 8/6 7 8	1
9	9/7 3/10 1/7 8	1
10	9/7 8/10 1/7 8	1
11	9/7 8/6 S1C3H3d.2 10/7 8	1

Full map and stats

Comparison of monomers in GJ211866.1 and GJ211867.1



Monomers in GJ211867.1



Note: (2) RM GJ211867.1 has only monomers 6, 7, 8, 9, 10, 1 or their hybrids. Monomers 10/7 and 1/7 are A/B hybrids.

HOR S1C3H3d in chromosome 3

Variant #1 of HOR S1C3H3d in ABBA01004655.1

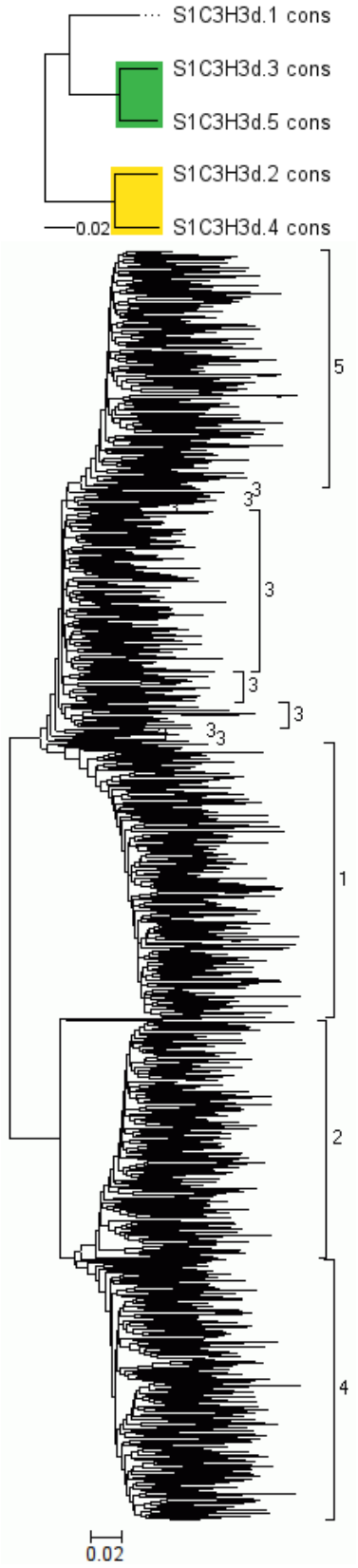
Mon	1	2	3	4	5
Type	A	B	A	B	A
Class	R2	R1	J1	R1	J1
Num	1	2	3	4	5

Variant #2 of HOR S1C3H3d in ABBA01004655.1

Mon	1	2	3
Type	A	B	A
Class	R2	Um	J1
Num	1	2	5

Variant #3 of HOR S1C3H3d in ABBA01004655.1

Mon	1	2	3
Type	A	B	A
Class	R2	R1	J1
Num	1	4	5



Structural variants of HOR S1C3H3d in ABBA01004655.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5	61
2	1 2 5	12
3	1 4 5	10

Full map and stats

Notes: (1) In divergent HORs, the statistics of structural variants shown here is not representative due to their ruined structure. View the full map via the link provided.

(2) Forward strand monomer order is shown instead of reverse strand order.

(3) Unstable PERCON classification in various genomic contigs: mon2 - J2/R2/Um, mon4 - J2/R1/Um, mon5 - J1/Um.

HOR S1CMH1d in chromosome 3

Variant #1 of HOR S1CMH1d in ABBA01004652.1

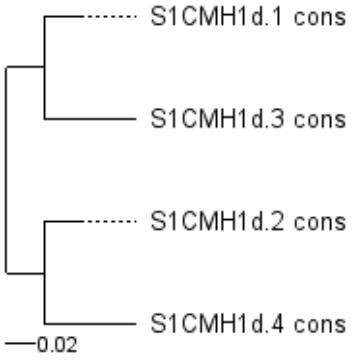
Mon	1	2	3	4
Type	A	B	A	B
Class	R2	Um	J1	R1
Num	1	2	3	4

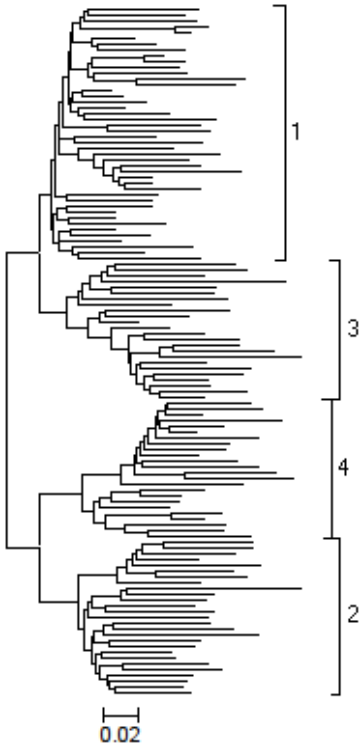
Variant #3 of HOR S1CMH1d in ABBA01004652.1

Mon	1	2
Type	A	B
Class	R2	J2
Num	1	2

Variant #2 of HOR S1CMH1d in ABBA01004652.1

Mon	1	2	3
Type	A	X	A
Class	R2	R1	J1
Num	1	2	3





Structural variants of HOR S1CMH1d in ABBA01004652.1

Var #	Order of monomers	Number of copies
1	1 2 3 4	7
2	1 2	7
3	1 2 3	5

Full map and stats

Note: (1) In divergent HORs, the statistics of structural variants shown here is not representative due to their ruined structure. View the full map via the link provided.

(2) Forward strand monomer order is shown instead of reverse strand order.

Chromosome 6

Variant #2 of HOR S1CMH1d in FP325349.3

Mon	1	2	3
Type	A	U	A
Class	R2	J2	J1
Num	1	2	3

Structural variants of HOR S1CMH1d in FP325349.3

Var #	Order of monomers	Number of copies
2	1 2 3	6

Full map and stats

Chromosome 7

Variant #1 of HOR S1CMH1d in AC019063.4

Mon	1	2	3	4
Type	A	B	A	X
Class	R2	J2	J1	R1
Num	1	2	3	4

Structural variants of HOR S1CMH1d in AC019063.4

Var #	Order of monomers	Number of copies
1	1 2 3 4	2

Full map and stats

Chromosome 8

Variant #2 of HOR S1CMH1d in AC144576.3

Mon	1	2	3
Type	A	B	A
Class	J1	R1	J1
Num	1	2	3

Structural variants of HOR S1CMH1d in AC144576.3

Var #	Order of monomers	Number of copies
2	1 2 3	6
3	1 2	5
4	1 4	3
1	1 2 3 4	2

Full map and stats

Variant #3 of HOR S1CMH1d in AC144576.3

Mon	1	2
Type	A	B
Class	R2	R1
Num	1	2

Variant #1 of HOR S1CMH1d in AC144576.3

Mon	1	2	3	4
Type	A	B	A	A
Class	R2	R1	J1	R2
Num	1	2	3	4

Variant #4 of HOR S1CMH1d in AC144576.3

Mon	1	2
Type	A	B
Class	R2	R1
Num	1	4

Chromosome 10

Variant #2 of HOR S1CMH1d in ABBA01020707.1

Mon	1	2	3
Type	A	X	A
Class	R2	R1	J1
Num	1	2	3

Structural variants of HOR S1CMH1d in ABBA01020707.1

Var #	Order of monomers	Number of copies
2	1 2 3	4

Full map and stats

Chromosome 12

Variant #2 of HOR S1CMH1d in AC144535.4

Mon	1	2	3
Type	A	B	A
Class	R2	R1	J1
Num	1	2	3

Structural variants of HOR S1CMH1d in AC144535.4

Var #	Order of monomers	Number of copies
2	1 2 3	6
1	1 2 3 4	6

Full map and stats

Variant #1 of HOR S1CMH1d in AC144535.4

Mon	1	2	3	4
Type	A	B	A	B
Class	R2	R1	J1	R1
Num	1	2	3	4

Chromosome 20

Variant #1 of HOR S1CMH1d in chr20_AL358116.7

Mon	1	2
Type	A	B
Class	R2	R1
Num	1	2

Structural variants of HOR S1CMH1d in chr20_AL358116.7

Var #	Order of monomers	Number of copies
3	1 2	2

Full map and stats

HOR S1C5pH2 in chromosome 5

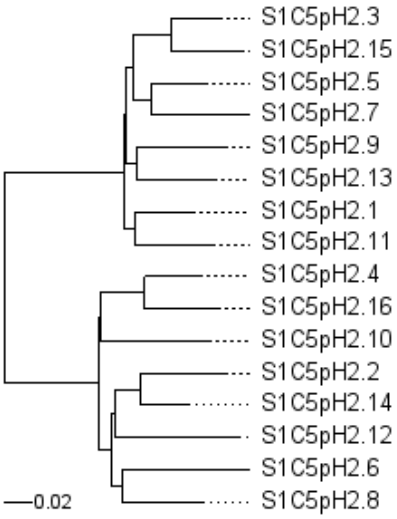
Variant #1 of HOR S1C5pH2 in GJ211887.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Type	B	A	B	X	B	A	B	A	U	A	B	A	B	A	B	A
Class	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1
Num	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Structural variants of HOR S1C5pH2 in GJ211887.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	39
2	1 2 3 4 5 6 7 8 9 12 13 14 15 16	4

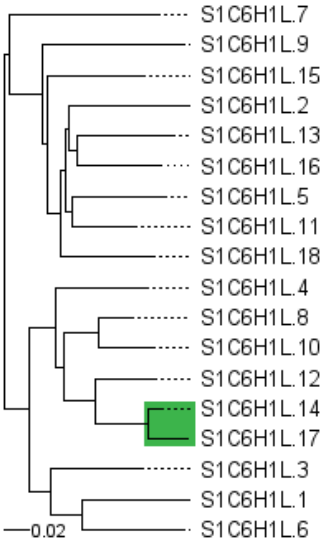
Full map and stats



HOR S1C6H1L in chromosome 6

Variant #1 of HOR S1C6H1L in GJ211907.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Type	A	B	A	A	B	A	B	A	B	A	B	A	B	A	B	B	A	B
Class	J1	J2	J1	J1	J2	J1	J1	J1	J2	J1	J2	J1	J2	J1	J2	J2	J1	J2
Num	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18



Note: On the tree, monomer 7 is in J2 branch, but PERCON classes it J1. It also branches with S1CMH1.4 (J2, B) in Fig. S2a Group1 tree and matches S1CMH1.4 haplotype (Fig. S1). It is likely a PERCON misclassification.

Structural variants of HOR S1C6H1L in GJ211907.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	402
2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 18	3

Full map and stats

HOR S1C7H1L in chromosome 7

Variant #1 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6

Variant #2 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	3	6

Variant #3 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	2	3	4	5	6

Variant #4 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	2	3	4	5	6

Variant #5 of HOR S1C7H1L in GJ211908.1

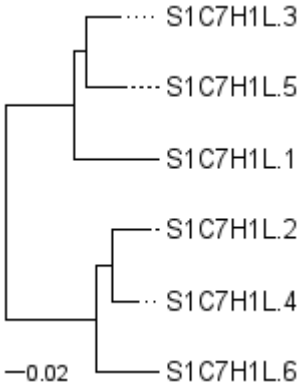
Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	3	4

Variant #6 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	5	6

Variant #7 of HOR S1C7H1L in GJ211908.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	3	2	3	4	5	6



Structural variants of HOR S1C7H1L in GJ211908.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6	2279
2	1 2 3 6	52
3	1 2 3 2 3 4 5 6	45
4	1 2 3 4 5 2 3 4 5 6	35
5	1 2 3 4	32
6	1 2 5 6	15
7	1 2 3 4 3 2 3 4 5 6	13

Full map and stats

HOR S1C10H1L in chromosome 10

Variant #1 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8

Variant #2 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	4/6	7	8

Variant #3 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2/4	5	6	7	8

Variant #4 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5	6	7	8

Variant #5 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	6	7	8

Variant #6 of HOR S1C10H1L in GJ211932.1

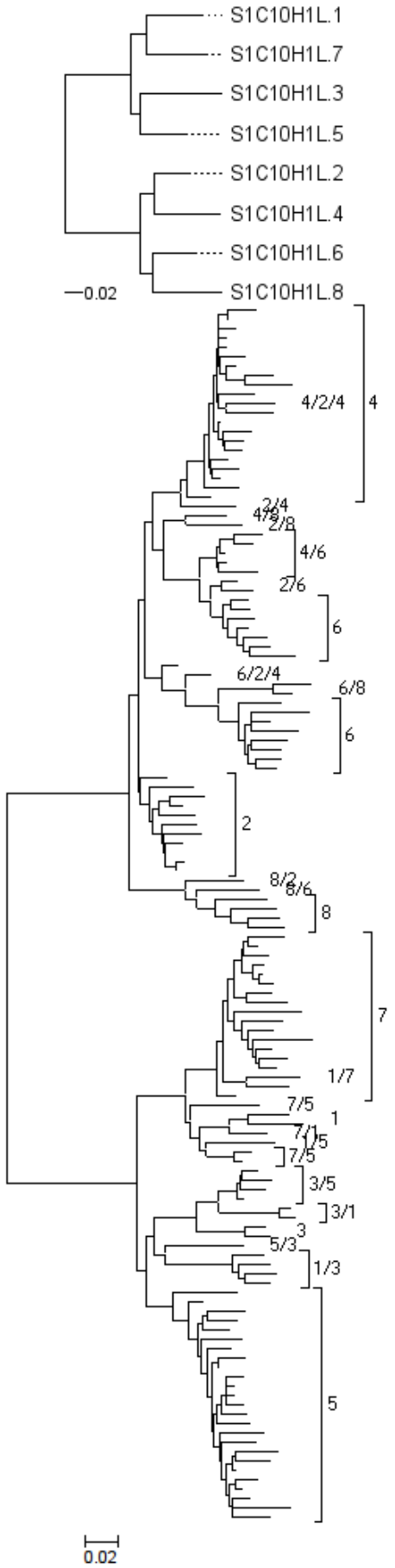
Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	4	5	6	7	8

Variant #7 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	6	7	8

Variant #8 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2/4	5/3	4/6	7	8



Structural variants of HOR S1C10H1L in GJ211932.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8	365
2	1 2 3 4/6 7 8	155
3	1 2/4 5 6 7 8	146
4	1 2 5 6 7 8	140
5	1 2 3/5 6 7 8	123
6	1 4 5 6 7 8	44
7	1 6 7 8	32
8	1 2/4 5/3 4/6 7 8	20
9	1 2 5 6/8	18
10	1 2 5/3 4/6 7 8	16
11	1 2 3/5 6/2/4 5 6 7 8	14
12	1 2 3 4 5/3 4 5 6 7 8	13
13	1 2/6 7 8	12
14	1 2 3 4 5 6 7 8 1/3 4 5 6 7 8	6
15	1 2 3/1 6 7 8	5
16	1 2 3/5 6 7/5 6/8	4
17	1 2 3 4/2/4 5 6 7 8	3
18	1 2 3/5 6/8 1/7 8	3
19	1 2 3 4/8 7 8	2
20	1 2/4 5 6 7 8 1/5 6/2/4 5 6 7 8	2
21	1 2/8	2
22	1 2 3 4 5 6 7/1 2 5 6 7 8	1
23	1 2 3 4 5 6 7 8 1/3 4 5 6 7 8/2 3 4 5 6 7 8	1
24	1 2 3 4 5 6 7 8/6 7 8	1

Full map and stats

Notes: (1) There are two dramatically different variants of monomer 6. (2) Low copy HOR variants are shown to demonstrate identified hybrids.

Variant #9 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	5	6/8

Variant #12 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5/3	4	5	6	7	8

Variant #10 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	5/3	4/6	7	8

Variant #13 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2/6	7	8

Variant #11 of HOR S1C10H1L in GJ211932.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	3/2/4	5	6	7	8

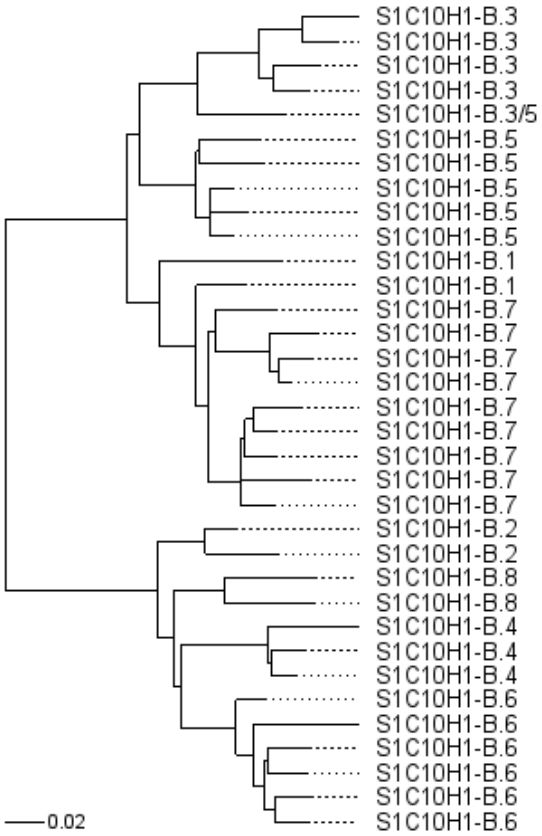
Variant #1 of HOR S1C10H1-B in GJ211933.1

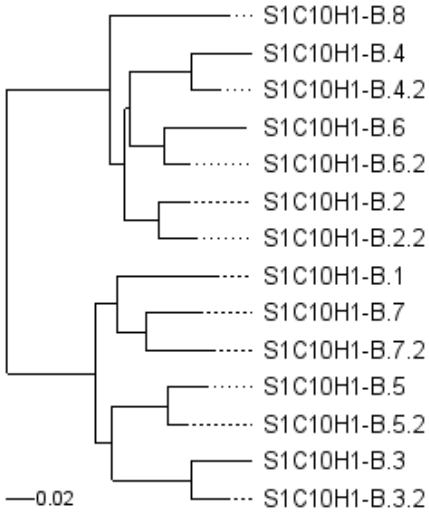
Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	2	3	4	5	6	7	6	7	8

Structural variants of HOR S1C10H1-B in GJ211933.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 2 3 4 5 6 7 6 7 8	10
2	1 2 3 4 5 2 3 4 S1C10H1L.5 6 7 6 7 8	3
3	1 2 3 4 5 2 3 4 5 6 S1C10H1L.7 8	2
4	1 2 3 4 5 S1C10H1-C.2 3 4 5 6 7 6 7 8	2

Full map and stats





Note: In SF1, this is the only case where the straight monomer order in a HOR differs from the basic monomer numbering used for the HOR-track. Hence, there are 2 copies of monomers 2 to 7 in the HOR which is indicated in the first tree.

Variant #1 of HOR S1C10H1-C in GJ211936.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8

Variant #2 of HOR S1C10H1-C in GJ211936.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	IL.6	.7/5	6	7	8

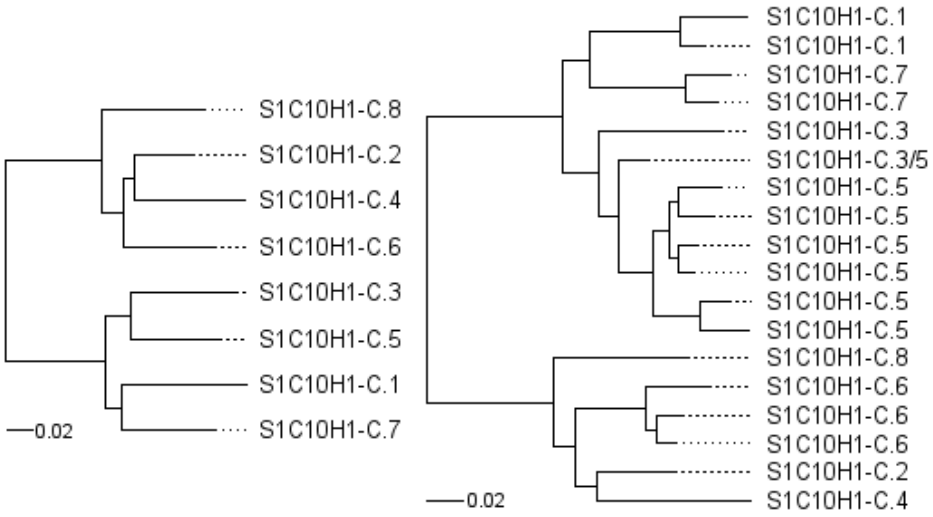
Variant #3 of HOR S1C10H1-C in GJ211936.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3/5	6	7	8

Structural variants of HOR S1C10H1-C in GJ211936.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8	21
2	1 2 3 4 5 S1C10H1L.6 S1C10H1L.7/5 6 7 8	3
3	1 2 3/5 6 7 8	1

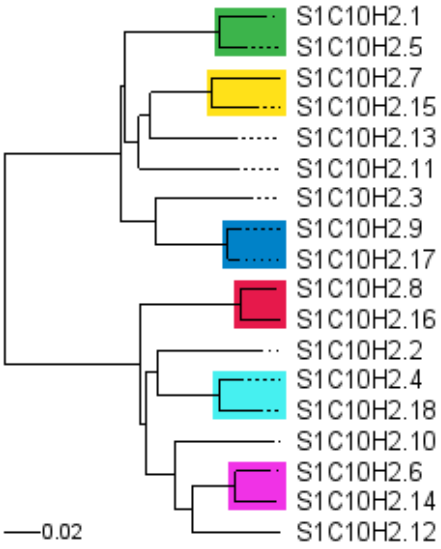
Full map and stats



HOR S1C10H2 in chromosome 10

Variant #1 of HOR S1C10H2 in GJ211930.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Type	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18



Structural variants of HOR S1C10H2 in GJ211930.1

Var#	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	48
2	1 2 3 4 5 6 7 8 17 18	3

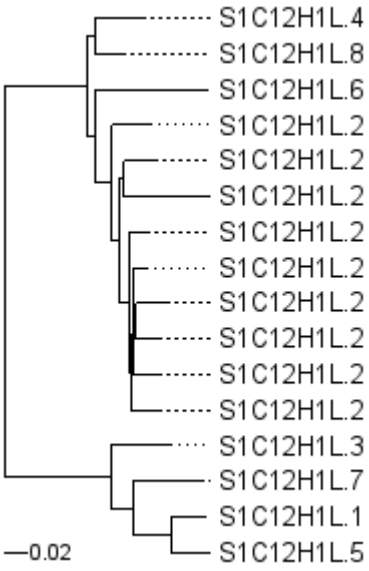
Full map and stats

Note: Monomer 9 is rather close to 17 so they recombine to produce variant #2 where 17 is likely to be a 9/17 hybrid.

HOR S1C12H1L in chromosome 12

Variant #1 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8



Structural variants of HOR S1C12H1L in GJ211954.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8	1360
2	1 6 7 8	91
3	1 2 3 4 5 6 7 2 3 4 5 6 7 8	28
4	1 4 5 6 7 8	28
5	1 2 3 8	20
6	1 2 3 4	18
7	1 8	15
8	1 2 3 2 3 4 5 6 7 8	13
9	1 2 3 4 5 6 7 6 7 8	11
10	1 2 3 4 5 6 5 6 7 8	10

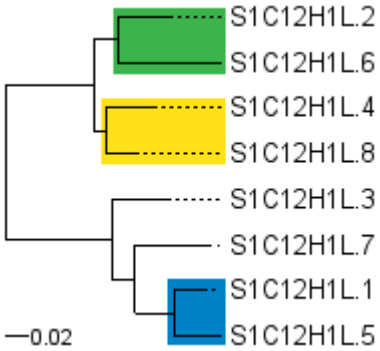
Full map and stats

Variant #2 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	6	7	8

Variant #3 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	2	3	4	5	6	7	8



Variant #4 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	4	5	6	7	8

Variant #5 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	3	8

Variant #6 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4
Type	A	B	A	B
Class	J1	J2	J1	J2
Num	1	2	3	4

Variant #7 of HOR S1C12H1L in GJ211954.1

Mon	1	2
Type	A	B
Class	J1	J2
Num	1	8

Variant #8 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	2	3	4	5	6	7	8

Variant #9 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	6	7	8

Variant #10 of HOR S1C12H1L in GJ211954.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	5	6	7	8

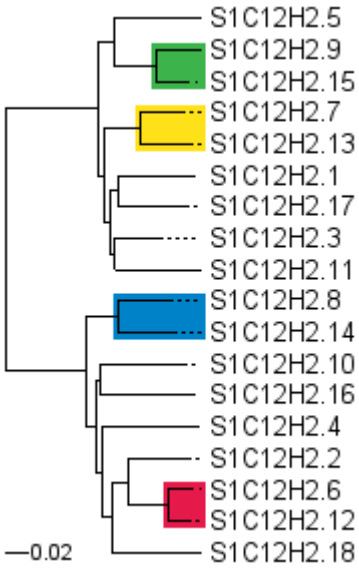
HOR S1C12H2 in chromosome 12

Variant #1 of HOR S1C12H2 in GJ211949.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Type	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	X	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Variant #2 of HOR S1C12H2 in GJ211949.1

Mon	1	2	3	4	5	6
Type	A	B	A	B	X	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	S1C12H3.1	16	17	18



Structural variants of HOR S1C12H2 in GJ211949.1

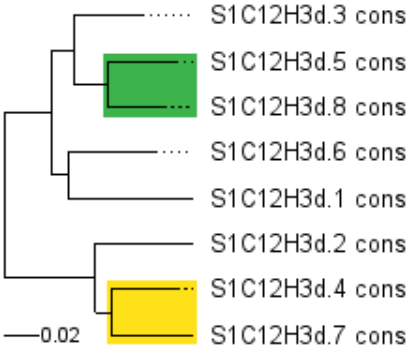
Var#	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	4
2	1 2 S1C12H3.1 16 17 18	2

Full map and stats

HOR S1C12H3d in chromosome 12 q-arm

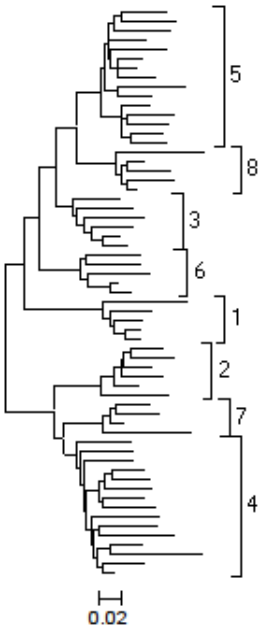
Variant #1 of HOR S1C12H3d in AEKP01211346.1

Mon	1	2	3	4	5	6	7	8
Type	A	B	A	B	X	A	B	A
Class	R2	J2	J1	J2	Um	Um	Um	J1
Num	1	2	3	4	5	6	7	8



Variant #2 of HOR S1C12H3d in AEKP01211346.1

Mon	1	2	3	4	5	6	7	8	9	10	11
Type	A	B	A	A	B	X	B	A	A	X	A
Class	R2	J2	Um	J1	J2	J1	J2	J1	J1	R1	J1
Num	1	2	3	5	4	5	4	5	6	7	8



Chromosome 12 p-arm

Variant #3 of HOR S1C12H3d in AUXG01000432.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	B	A	B	X	A	B	X	B	A
Class	R2	J2	J1	R1	R2	J1	J2	J1	J2	J1
Num	1	2	3	4	5	6	1d.2	1d.3	1d.2	8

Variant #4 of HOR S1C12H3d in AUXG01000432.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type	X	B	A	A	X	X	B	B	X	B	X	X	A	B
Class	R2	J2	J1	J1	J2	Um	J2	Um	J1	R1	J1	R1	J1	J2
Num	1	2	1d.3	3	4	5	4	4	5	4	5	4	3	2

Variant #5 of HOR S1C12H3d in AUXG01000432.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	A	B	A	X	X	X	B	A	B
Class	R2	J1	R1	J1	Um	R1	J1	J2	J1	J2
Num	1	8	7	6	5	4	5	4	3	2

Structural variants of HOR S1C12H3d in AEKP01211346.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8	2
2	1 2 3 5 4 5 4 5 6 7 8	1

Full map and stats

Note: In divergent HORs, the statistics of structural variants shown here is not representative due to their ruined structure. View the full map via the link provided.

Structural variants of HOR S1C12H3d in AUXG01000432.1*

Var #	Order of monomers	Number of copies
3	1 2 3 4 5 6 S1CMH1d.2 S1CMH1d.3 S1CMH1d.2 8	1
4	1 2 S1CMH1d.3 3 4 5 4 4 5 4 5 4 3 2	1
5	1 8 7 6 5 4 5 4 3 2	1

Full map and stats

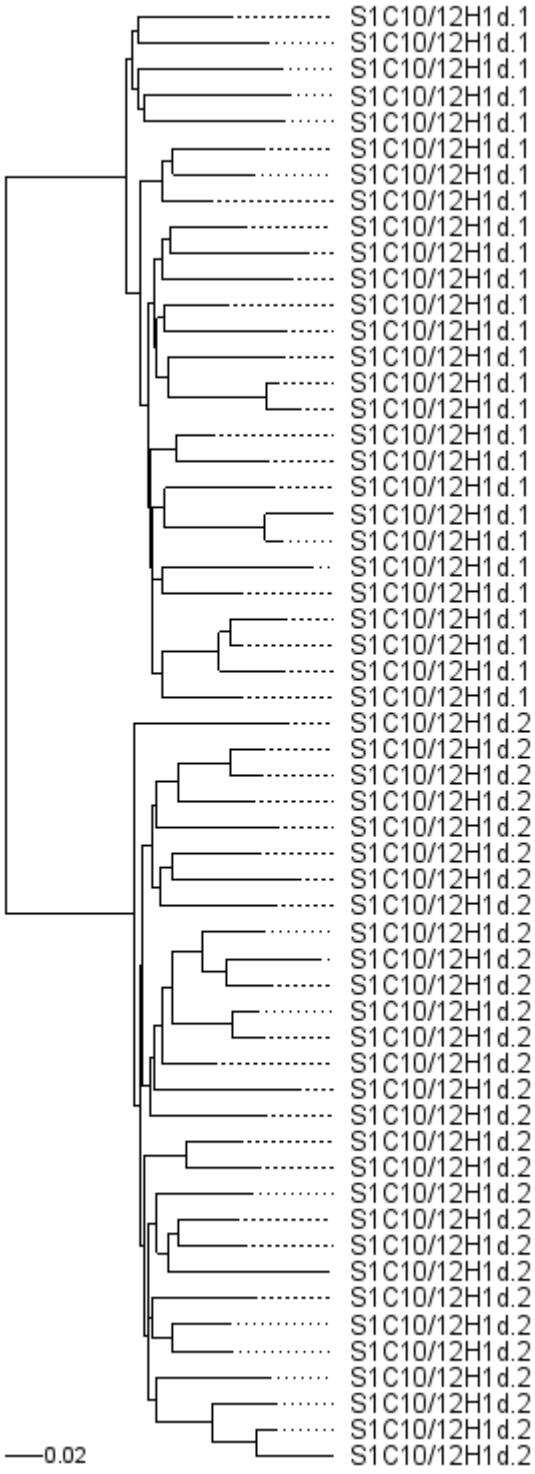
** Part of the sequence of this contig is in reverse complement direction.*

HOR S1C10/12H1d in chromosome 10

Variant #1 of HOR S1C10/12H1d in ABBA01020707.1

Mon	1	2
Type	A	B
Class	J1	J2
Num	1	2

Note: In divergent HORs, the statistics of structural variants shown here is not representative due to their ruined structure. View the full map via the link provided.



Structural variants of HOR S1C10/12H1d in ABBA01020707.1

Var#	Order of monomers	Number of copies
1	1 2	20

Full map and stats

Chromosome 12

Structural variants of HOR S1C10/12H1d in ABBA01049496.1

Var#	Order of monomers	Number of copies
1	1 2	29

Full map and stats

Chromosome 7

Structural variants of HOR S1C10/12H1d in ABBA01032025.1

Var#	Order of monomers	Number of copies
1	1 2	6

Full map and stats

Chromosome 19

Structural variants of HOR S1C10/12H1d in ABBA01017837.1

Var#	Order of monomers	Number of copies
1	1 2	6

Full map and stats

Chromosome 3

Structural variants of HOR S1C10/12H1d in ABBA01000935.1

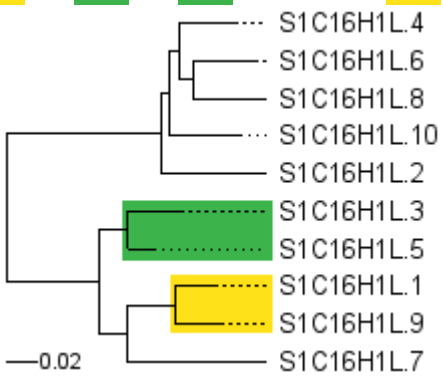
Var#	Order of monomers	Number of copies
1	1 2	3

Full map and stats

HOR S1C16H1L in chromosome 16

Variant #1 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6	7	8	9	10
Type	A	X	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8	9	10



Structural variants of HOR S1C16H1L in GJ212051.1

Var #	Order of monomers	Number of copies
1	1 2 3 4 5 6 7 8 9 10	930
2	1 2 3 4 5 6 9 2 3 4 5 6 7 8 9 10	30
3	1 2 3 8 9 10	28
4	1 2 3 4 5 6 7 8	12
5	1 2 3 4 5 6 9 10	10
6	1 2 3 6 7 8 9 10	10
7	1 2 5 6 7 8 9 10	9
8	1 2 3 4 S1C1/5/19H1L.5 8 9 10	8
9	1 10	6
10	1 2 3 4 5 6 7 8 9 2 3 4 5 6 7 8 9 10	6

Full map and stats

Variant #2 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Type	A	X	A	B	A	B	A	X	A	B	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	9	2	3	4	5	6	7	8	9	10

Variant #3 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6
Type	A	X	A	B	A	B
Class	J1	J2	J1	J2	J1	J2
Num	1	2	3	8	9	10

Variant #4 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6	7	8
Type	A	X	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	7	8

Variant #5 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6	7	8
Type	A	X	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	4	5	6	9	10

Variant #6 of HOR S1C16H1L in GJ212051.1

Mon	1	2	3	4	5	6	7	8
Type	A	X	A	B	A	B	A	B
Class	J1	J2	J1	J2	J1	J2	J1	J2
Num	1	2	3	6	7	8	9	10

Figure S1. The structure of SF1 HORs

The Figure presents the data on HOR structure obtained in this work. It contains the following elements for each HOR: (1) Colored panels which show the structure of a master HOR (variant #1) and of a number of most abundant structural variants (if any). The panel shows each monomer of a HOR with its PERCON class assignment (J1, J1, R1, R2 or Um for unclassed). It also indicates the independent PERCON assignment of A or B type of a monomer [1]. “Mon” indicates the straight numbering of the monomers in this particular variant, and “Num” indicates the numbering according to the basic HOR. In most cases, it is the numbering of variant #1. In S1C10H1, where two sequence variants are present (S1C10H1-B and S1C10H1-C), the basic HOR is variant #1 of S1C10H1L and the monomers in the B and C variants are numbered accordingly; (2) Two kinds of phylogenetic trees of monomers may appear for each HOR. One is the tree of the monomers present in the master HOR which is a copy with a basic HOR structure that was selected as a standard (fist tree). The number of branches in the first tree equals the number of monomers in a HOR. There may also be a tree which shows a larger number of monomers, if any additional HMM profiles were added to the master HOR monomers to ensure complete coverage (second tree). The number of branches in the second tree is greater than the number of monomers in a HOR and some hybrid monomers may be present. For divergent HORs, the tree of consensus HOR monomers is shown as the first tree. In case of S1C3H2, which is represented by two different RMs, additional trees are shown to illustrate the fact (see section 1.1.6 of Supplementary Note 1); (3) If there is a clear inner structure within a HOR, the closely related monomers are shown in a special color panel beneath the panel (1) and respective branches of the first tree are marked with the same color; (4) The statistics Table shows a number of the most abundant variants in respective RM or in selected contigs containing a HOR, if it is not represented by a RM; (5) A link to “Full map and stats” allows to view a full map of a RM (Map page) and a complete statistics of HOR variants in a RM (Stats page) in a separate document. Note that in RMs, AS is always in the forward strand, but if a HOR is not represented by a RM, the sample contigs may have AS in reverse strand. In such case, in a statistics Table, the order of monomers in a variant is shown as it would be in the forward strand, but in the full map, which is constructed automatically, the order of monomers should be read from end to start, and monomer 1 appears at the end. Also, for divergent HORs, the statistics Table does not represent the map adequately, since there may be a large number of different rearranged HORs each present only in few (or even one) copies. Such low copy variants are not shown in the Table, so one has to view the full map to see the composition and the size of the locus.