**Table S2.** *B. burgdorferi vlsE* variant clones with sequences consistent with a single recombination event.

| Clone | Potential *vls* Cassette(s) Used (Longest Max. Recombination) | Nonambiguous (Only One Possible Cassette) | 5' Extension for Max. Recombination (nt) | Minimum recombination (nt) | 3' Extension for Max. Recombination (nt) | Maximum recombination (nt) | NCBI Accession Number |
|---|---|---|---|---|---|---|---|
| D7M4B02 | 7 | Yes | 97 | -6 | 8 | 99 | EU484643 |
| SD14M3B3 (same as D28M1B3b) | 9 | Yes | 25 | 1 | 2 | 28 | EU485400 |
| D7M4J13 | 9 | Yes | 25 | 1 | 9 | 35 | EU484817 |
| D10M11S2 | 5 | Yes | 32 | 1 | 4 | 37 | EU485035 |
| D7M6H03 | 5 | Yes | 32 | 1 | 4 | 37 | EU484726 |
| D7M5J13 | 12 | Yes | 89 | 1 | 15 | 105 | EU484821 |
| SD10M3HX9 | 11 | Yes | 11 | 2 | 10 | 23 | EU485646 |
| D7M3J06 | 13 | Yes | 80 | 3 | 0 | 83 | EU484777 |
| SD14M2JX4 | 13 | Yes | 13 | 3 | 80 | 96 | EU485799 |
| D10M11B1 | 5 | Yes | 32 | 6 | 81 | 119 | EU484853 |
| SD14M4H3 | 9 | Yes | 77 | 7 | 8 | 92 | EU485743 |
| D7M1H03 | 7 | Yes | 6 | 8 | 76 | 90 | EU484689 |
| D7M1H04 | 7 | Yes | 6 | 8 | 76 | 90 | EU484690 |
| D10M9B11 | 13 | Yes | 76 | 8 | 8 | 92 | EU484891 |
| D7M4B03 | 9 | Yes | 86 | 8 | 31 | 125 | EU484644 |
| D7M6J10 | 9 | Yes | 86 | 8 | 31 | 125 | EU484799 |
| D10M11S5 | 4 | Yes | 13 | 10 | 25 | 48 | EU485038 |
| D10M9J5 | 4 | Yes | 13 | 10 | 25 | 48 | EU485019 |
| D7M6J05 | 14 | Yes | 0 | 10 | 76 | 86 | EU484798 |
| D7M2J05 | 10 | Yes | 2 | 11 | 6 | 19 | EU484770 |
| SD14M1HX5 | 3 | Yes | 12 | 11 | 76 | 99 | EU485766 |
| SD28M1S06 | 11 | Yes | 11 | 13 | 17 | 41 | EU485973 |
| D7M1B09 | 15 | Yes | 5 | 13 | 54 | 72 | EU484622 |
| 1395F skin | 8 | Yes | 69 | 13 | 17 | 99 | EU485966 |
| D10M9H4 | 13 | Yes | 0 | 14 | 7 | 21 | EU484957 |
| D10M9H6 | 13 | Yes | 1 | 14 | 7 | 22 | EU484959 |
| D7M2J12 | 5 | Yes | 76 | 14 | 7 | 97 | EU484807 |
| D10M10J3 | 7 | Yes | 7 | 15 | 6 | 28 | EU484967 |
| D7M3B12 | 12 | Yes | 0 | 16 | 9 | 25 | EU484671 |
| D10M11B4 | 9 | Yes | 77 | 16 | 7 | 100 | EU484858 |
| SD10M1EX5 | 8 | Yes | 21 | 16 | 79 | 116 | EU485701 |
| SD14M1BX3 | 10 | Yes | 1 | 17 | 86 | 104 | EU485720 |
| D7M1J08 | 10 | Yes | 21 | 19 | 86 | 126 | EU484763 |
| SD10M1EX11 | 10 | Yes | 21 | 19 | 86 | 126 | EU485697 |
| D10M8J9 | 12 | Yes | 83 | 20 | 7 | 110 | EU485012 |
| D28M3B04 | 4 | Yes | 25 | 21 | 9 | 55 | EU485357 |
| D10M7B6 | 6 | Yes | 39 | 22 | 63 | 124 | EU484877 |
| D10M11H4 | 6 | Yes | 61 | 22 | 83 | 166 | EU484919 |
| D7M6J14 | 6 | Yes | 8 | 23 | 61 | 92 | EU484828 |
| D7M4H03 | 9 | Yes | 40 | 38 | 2 | 80 | EU484710 |
| SD14M2H7 | 5 | Yes | 30 | 38 | 76 | 144 | EU485740 |
| D7M6J16 | 7 | Yes | 6 | 40 | 33 | 79 | EU484830 |
| SD28M4HX8 | 15 | Yes | 17 | 46 | 9 | 72 | EU485941 |

| Clone | Potential *vls* Cassette(s) Used (Longest Max. Recombination) | Nonambiguous (Only One Possible Cassette) | 5' Extension for Max. Recombination (nt) | Minimum recombination (nt) | 3' Extension for Max. Recombination (nt) | Maximum recombination (nt) | NCBI Accession Number |
|---|---|---|---|---|---|---|---|
| 1379D skin | 6 | Yes | 63 | 55 | 61 | 179 | EU485850 |
| D28M3B02 | 6 | Yes | 63 | 55 | 61 | 179 | EU485355 |
| SD28M3BX2 | 6 | Yes | 63 | 55 | 61 | 179 | EU485874 |
| SD10M4BX7 | 7 | Yes | 4 | 82 | 8 | 94 | EU485627 |
| SD28M3JX1 | 9 | Yes | 6 | 89 | 8 | 103 | EU485956 |
| D10M10B2 | 15 | Yes | 54 | 93 | 18 | 165 | EU484845 |
| D10M10J10 | 11 | Yes | 6 | 98 | 7 | 111 | EU484962 |
| D4M5S02 | 3 | Yes | 21 | 102 | 8 | 131 | EU484594 |
| D14M2B1 | 4 | Yes | 62 | 347 | 10 | 419 | EU485089 |
| D10M9J3 | 7,(8) | No | 75 | -3 | 9 | 81 | EU485018 |
| SD7M2HX3 | 3-7,(6),9,11-14,16 | No | 24 | -3 | 63 | 84 | EU485018 |
| SD28M3BX7 | 3-7,9,11,(12),13,14,16 | No | 72 | -3 | 16 | 85 | EU485881 |
| D14M5S9 | (2),5,7,11,13 | No | 3 | 1 | 7 | 11 | EU485247 |
| SD10M3HX16 | (2),5,7,11,13 | No | 3 | 1 | 8 | 12 | EU485634 |
| D7M5B05 | 10,12, (14) | No | 7 | 1 | 7 | 15 | EU484654 |
| D7M2B08 | 2-5,7,9,11,12,13 (14) | No | 11 | 1 | 7 | 19 | EU484631 |
| D7M4J11 | 2-5,7,9,11,12,13 (14) | No | 11 | 1 | 7 | 19 | EU484815 |
| D10M7S8 | 5,7,(8),10,16 | No | 16 | 1 | 13 | 30 | EU485059 |
| D7M3J07 | 5,7,(8),10,16 | No | 16 | 1 | 13 | 30 | EU484778 |
| SD14M3HX5 | 5,7,(9),10 | No | 6 | 1 | 31 | 38 | EU485764 |
| SD28M4HX7 | 2,(4),11,13 | No | 41 | 1 | 4 | 46 | EU485940 |
| SD14M3J11 | 3,4,6,11,12,13,(14),15 | No | 15 | 1 | 48 | 64 | EU485795 |
| D7M3J17 | 9,12,(13),15 | No | 46 | 1 | 20 | 67 | EU484814 |
| D10M7J6 | 3-5,8,9,11,13,(15) | No | 17 | 1 | 54 | 72 | EU484999 |
| SD14M3J6 | 3,4,5,8,9,11,13,(15) | No | 17 | 1 | 54 | 72 | EU485780 |
| D14M5S7 | (4),5,9,10,11,12,14,15,16 | No | 61 | 1 | 22 | 84 | EU485245 |
| D10M10B11 | 3,5,(6),7,9,11,14 | No | 8 | 1 | 79 | 88 | EU484842 |
| SD14M4H2 | (3),11,13 | No | 75 | 1 | 12 | 88 | EU485742 |
| D10M7S6 | (10),14 | No | 6 | 1 | 83 | 90 | EU485057 |
| D7M4H07 | (10), 14 | No | 6 | 1 | 83 | 90 | EU484714 |
| D10M11H12 | 3,5,(6),7,9,11,14 | No | 8 | 1 | 83 | 92 | EU484916 |
| SD14M1HX8 | 4,5,(14) | No | 7 | 1 | 88 | 96 | EU485758 |
| D10M10J1 | 4-7,9,(10),11,14-16 | No | 20 | 1 | 77 | 98 | EU484961 |
| SD14M3HX3 | 4,5,6,7,9,(10),11, 14,16 | No | 20 | 1 | 77 | 98 | EU485763 |
| D10M7B2 | 2-3,(4),5-9,13,15,16 | No | 80 | 1 | 18 | 99 | EU484875 |
| D10M8J10 | 2,3,(4),5-9,13,15,16 | No | 80 | 1 | 18 | 99 | EU485004 |
| D7M1J01 | 2-3,(4),5-9,13,15,16 | No | 80 | 1 | 18 | 99 | EU484759 |

| Clone | Potential *vls* Cassette(s) Used (Longest Max. Recombination) | Nonambiguous (Only One Possible Cassette) | 5' Extension for Max. Recombination (nt) | Minimum recombination (nt) | 3' Extension for Max. Recombination (nt) | Maximum recombination (nt) | NCBI Accession Number |
|---|---|---|---|---|---|---|---|
| SD14M2J12 | 2-9,13,15,16(4) | No | 80 | 1 | 18 | 99 | EU485776 |
| D10M10J23 | 2,3,6,8,11,(12),13,15,16 | No | 89 | 1 | 15 | 105 | EU484966 |
| D7M1B03 | 2-3,6,8,11,(12),13,15,16 | No | 89 | 1 | 15 | 105 | EU484618 |
| D7M1J11 | 2-3,6,8,11,(12),13,15,16 | No | 89 | 1 | 15 | 105 | EU484800 |
| D10M11S3 | (7),9 | No | 10 | 2 | 25 | 37 | EU485036 |
| D10M11J7 | 7,9,10,11,(12) | No | 13 | 2 | 33 | 48 | EU484979 |
| D10M12S3 | 7,9,10,11,(12) | No | 13 | 2 | 33 | 48 | EU485047 |
| SD28M1HX1 | 7,9,10,11,(12) | No | 13 | 2 | 33 | 48 | EU485906 |
| D7M2J08 | 3,8,(11),13-16 | No | 17 | 2 | 32 | 51 | EU484773 |
| SD10M4BX5 | 6,(8),12 | No | 11 | 2 | 73 | 86 | EU485625 |
| SD14M1BX7 | 6,(8),12 | No | 11 | 2 | 73 | 86 | EU485723 |
| SD7M2JX10 | 2,(4),12 | No | 0 | 2 | 88 | 90 | EU485589 |
| D10M7J4 | (8),13 | No | 10 | 2 | 85 | 97 | EU484998 |
| D10M9H11 | (6),9 | No | 63 | 2 | 63 | 128 | EU484951 |
| D10M10S5 | 3,4,(6),13-15 | No | 79 | 3 | 18 | 100 | EU485027 |
| D10M7H4 | 3,4,(6),13,14,15 | No | 79 | 3 | 18 | 100 | EU484939 |
| SD10M2BX10 | 3,4,(6),13,14,15 | No | 79 | 3 | 18 | 100 | EU485603 |
| SD14M2B2 | 3,4,(6),13,14,15 | No | 79 | 3 | 18 | 100 | EU485710 |
| SD28M4BX20 | 3,4,(6),13,14,15 | No | 79 | 3 | 18 | 100 | EU485893 |
| D7M5J07 | 3,4,10,11,(12) | No | 10 | 3 | 88 | 101 | EU484794 |
| SD7M2JX1 | 3,4,10,(12) | No | 10 | 3 | 88 | 101 | EU485575 |
| D10M12B1 | 2,(4),5,9,11,12 | No | 12 | 3 | 88 | 103 | EU484863 |
| D10M12B7 | 2,(4),5,9,11,12 | No | 12 | 3 | 88 | 103 | EU484871 |
| SD10M3HX10 | 2,6,8,(16) | No | 8 | 4 | 16 | 28 | EU485630 |
| D14M2S9 | 3,4,5,(6),8,12,14 | No | 16 | 4 | 86 | 106 | EU485236 |
| SD10M4HX2 | 9,(12) | No | 7 | 5 | 8 | 20 | EU485648 |
| D7M6J12 | (9),11 | No | 31 | 5 | 4 | 40 | EU484826 |
| D10M8J3 | (3),4,5,13 | No | 13 | 5 | 30 | 48 | EU485006 |
| D10M9B22 | (3),4,5,13 | No | 13 | 5 | 30 | 48 | EU484894 |
| SD14M2JX1 | (3),4,5,13 | No | 13 | 5 | 30 | 48 | EU485788 |
| D14M1J2 | 4,5 | No | 2 | 5 | 61 | 68 | EU485171 |
| SD28M2JX7 | 5,9,(11) | No | 6 | 5 | 76 | 87 | EU485954 |
| SD14M1BX10 | 13,(14) | No | 76 | 5 | 11 | 92 | EU485717 |
| SD14M4E2 | 13,(14) | No | 76 | 5 | 11 | 92 | EU485821 |
| D7M1B12 | (3),8,10,13,16 | No | 21 | 6 | 7 | 34 | EU484666 |
| SD7M1JX1 | 2-5,(7),810-14,16 | No | 33 | 6 | 7 | 46 | EU485574 |
| D10M12H2 | 5,9,(11) | No | 6 | 6 | 75 | 87 | EU484927 |
| D10M11S8 | 3,4,(6),11,13,15 | No | 3 | 7 | 61 | 71 | EU485041 |
| D14M1J4 | 4,5 | No | 16 | 8 | 61 | 85 | EU485172 |
| D10M7J8 | 2,3,6,8,13,(15),16 | No | 80 | 10 | 9 | 99 | EU485001 |
| SD28M4HX6 | 2,3,6,8,13,(15),16 | No | 80 | 10 | 9 | 99 | EU485939 |
| SD10M3HX15 | (7),10 | No | 19 | 12 | 33 | 64 | EU485633 |

| Clone | Potential *vls* Cassette(s) Used (Longest Max. Recombination) | Nonambiguous (Only One Silent Cassette) | 5' Extension for Max. Recombination (nt) | Minimum recombination (nt) | 3' Extension for Max. Recombination (nt) | Maximum recombination (nt) | NCBI Accession Number |
|---|---|---|---|---|---|---|---|
| D7M6B02 | (2),7 | No | 83 | 14 | 7 | 104 | EU484658 |
| SD28M1HX2 | (7),10 | No | 19 | 12 | 33 | 64 | EU485912 |
| D10M10S11 | (2),10 | No | 34 | 18 | 9 | 61 | EU485023 |
| D7M1B10 | 3,4,(13) | No | 5 | 19 | 30 | 54 | EU484623 |
| 1395A skin | 3,11,(13) | No | 0 | 20 | 10 | 30 | EU485962 |

a All silent cassettes that could have served as template for the recombination event are listed. If only one silent cassette was identical with the minimum recombination region, the recombination event was considered unambiguous. In ambiguous cases, all silent cassettes listed could have served as the template for the recombination event (i.e. have identical minimum recombination regions). The silent cassette with the longest possible maximum recombination (in parentheses) was selected for calculation of maximum recombination values shown. All values represent the minimum and maximum recombination event lengths in the variant sequence. Negative numbers in the minimum recombination column represent deletions in the variant sequence relative to the parent sequence.