**Table S1. Information of the 116 *L. pneumophila* strains.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Strain Name/ Allele name | Serogroup | Subspecies | Source nature | Geographic location | Collection year | NCBI BioSample No. | Accession No. | *sidJ* location | Reference |
| ***sidJ* alleles that are not recombinants** |  |  |  |  |  |  |  |  |  |
| **Allele 1** |  |  |  |  |  |  |  |  |  |
| ***Lorraine#*** | 1 | *pneumophila* | Clinical | France: Lorraine | 2002 | SAMEA3138425 | FQ958210 | 2311518-2314139 | [1] |
| ERS1211138 | 8 | *pneumophila* | Clinical | N/A | 1987 | SAMEA4040028 | LT906452 | 2443416-2446037 | N/A |
| **Allele 2** |  |  |  |  |  |  |  |  |  |
| ***ATCC35096*** | 8 | *pneumophila* | Clinical | USA: California, Concord | 1981 | SAMN03481609 | HG531940 | 1-2625 | [2] |
| **Allele 3** |  |  |  |  |  |  |  |  |  |
| Birmingham 1 (D-7470) | 1 | *pneumophila* | Clinical | USA: Alabama, Birmingham | 1977 | SAMN06928756 | CP021268 | 2395759-2398383 | [3] |
| ST62 | 1 | *N/A* | Clinical | N/A  | 2004 | SAMEA4535100 | LT632614 | 2456117-2458741 | N/A |
| Pontiac | 1 | *N/A* | Environmental | USA: Pontiac, Michigan | 1968 | SAMN05199028 | CP016029 | 2456510-2459134 | N/A |
| L10-023 | 1 | *N/A* | Clinical | Germany | 2010 | SAMN03379010 | CP011105 | 2440890-2443514 | [4] |
| **Allele 4** |  |  |  |  |  |  |  |  |  |
| ***ERS1305867*** | N/A | *N/A* | Clinical | N/A | N/A | SAMEA4394418 | CP048618 | 2394643-2397267 | N/A |
| Toronto-2005 | N/A | *pneumophila* | Clinical | Canada: Toronto | 2005 | SAMN03839261 | CP012019 | 2410891-2413515 | [5] |
| **Allele 5** |  |  |  |  |  |  |  |  |  |
| ***ST23*** | 1 | *N/A* | Clinical | France | 1994 | SAMEA4535097 | LT632615 | 2440067-2442691 | [6] |
| **Allele 6** |  |  |  |  |  |  |  |  |  |
| ***Chicago2*** | 6 | *pneumophila* | Clinical | N/A | 1980 | N/A | HG531934 | 1-2625 | [2] |
| **Allele 7** |  |  |  |  |  |  |  |  |  |
| SBT211 | N/A | *N/A* | Clinical | Australia | 2016 | SAMN13191634 | CP045974 | 2458506-2461127 | N/A |
| NCTC12180 | 12 | *pneumophila* | Clinical | USA | 1986 | SAMEA3111980 | LR133933 | 2379102-2381723 | [7] |
| Burlington 1 (D-7841) | 1 | *pneumophila* | Clinical | USA: Vermont, Burlington | 1977 | SAMN06928757 | CP021267 | 2371340-2373964 | N/A |
| Philadelphia-1 | 1 | *pneumophila* | Clinical | USA:Philadelphia, Pennsylvania | 1976 | SAMN03988484 | CP013742 | 2418025-2420646 | N/A |
| ST37 | 1 | *N/A* | Clinical | UK | 2003 | SAMEA4535098 | LT632616 | 2484328-2486949 | [8] |
| E9\_O | N/A | *N/A* | Environmental | USA: Illinois | 2012 | SAMN05180041 | CP015956 | 2376831-2379452 | [9] |
| E8\_O | N/A | *N/A* | Environmental | USA: Texas | 2006 | SAMN05180040 | CP015955 | 2408040-2410661 | [9] |
| E7\_O | N/A | *N/A* | Environmental | USA: Georgia | 2009 | SAMN05180039 | CP015954 | 2380050-2382671 | [9] |
| E6\_N | N/A | *N/A* | Environmental | USA: New Jersey | 2011 | SAMN05180038 | CP015953 | 2372312-2374933 | [9] |
| E5\_N  | N/A | *N/A* | Environmental | USA: Arkansas | 2011 | SAMN05180037 | CP015951 | 2373875-2376496 | [9] |
| E4\_N  | N/A | *N/A* | Environmental | USA: Alabama | 2012 | SAMN05180036 | CP015950 | 2372442-2375063 | [9] |
| E3\_N | N/A | *N/A* | Environmental | USA: Texas | 2011 | SAMN05180035 | CP015949 | 2419410-2422031 | [9] |
| C11\_O | N/A | *N/A* | Clinical | USA: Georgia | 2009 | SAMN05180032 | CP015945 | 2370925-2373546 | [9] |
| C10\_S | N/A | *N/A* | Clinical | USA: Nebraska | 1990 | SAMN05180031 | CP015944 | 2378412-2381033 | [9] |
| C9\_S | N/A | *N/A* | Clinical | USA: Indiana | 1982 | SAMN05180030 | CP015941 | 2371944-2374565 | [9] |
| C8\_S  | N/A | *N/A* | Clinical | USA: Colorado | 1993 | SAMN05180029 | CP015939 | 2374058-2376679  | [9] |
| C7\_O | N/A | *N/A* | Clinical | USA: Delaware | 1994 | SAMN05180028 | CP015938 | 2369527-2372148 | [9] |
| C6\_S | N/A | *N/A* | Clinical | USA: New Jersey | 1996 | SAMN05180027 | CP015937 | 2371336-2373957 | [9] |
| C5\_P | N/A | *N/A* | Clinical | USA: Ohio | 1998 | SAMN05180026 | CP015936 | 2373786-2376407 | [9] |
| C4\_S | N/A | *N/A* | Clinical | USA: Georgia | 2000 | SAMN05180025 | CP015935 | 2363430-2366051 | [9] |
| C3\_O | N/A | *N/A* | Clinical | USA: Texas | 2006 | SAMN05180024 | CP015934 | 2405886-2408507  | [9] |
| Philadelphia\_1\_CDC | 1 | *N/A* | Clinical | USA:Pennsylvania | 1977 | SAMN05180044 | CP015928 | 2417444-2420065 | [9] |
| E11\_U | N/A | *N/A* | Environmental | USA: Iowa | 2006 | SAMN05180043 | CP015926 | 2409936-24125577 | [9] |
| E10\_P | N/A | *N/A* | Environmental | USA: Ohio | 2007 | SAMN05180042 | CP015925 | 2369629-2372250 | [9] |
| Lpm7613 | 1 | *N/A* | Clinical | Australia | 2000 | [SAMEA4067783](https://www.ncbi.nlm.nih.gov/biosample/SAMEA4067783/) | LT598657 | 2270058-2272679 | [10] |
| Thunder Bay  | 6 | *pneumophila* | Clinical | Canada | N/A | SAMN02603729 | CP003730 | 2476744-2479365 | [11] |
| LPE509 | 1 | *pneumophila* | Environmental | N/A | N/A | [SAMN02604344](https://www.ncbi.nlm.nih.gov/biosample/SAMN02604344/) | CP003885 | 986266-988887 | [12] |
| ***ATCC43290*** | 12 | *pneumophila* | Clinical | USA:Colorado  | 1986 | SAMN01917404 | CP003192 | 2369540-2372161 | [13] |
| Philadelphia 1 | 1 | *pneumophila* | Clinical | USA:Philadelphia | 1976 | SAMN02603156 | AE017354 | 2407667-2410288 | [14] |
| **Allele 8** |  |  |  |  |  |  |  |  |  |
| ***NMex49*** | N/A | *pneumophila* | Environmental | N/A | N/A | N/A | HG531948 | 1-2625 | [15] |
| **Allele 9** |  |  |  |  |  |  |  |  |  |
| ***C2\_S*** | N/A | *N/A* | Clinical | USA: Illinois | 2007 | SAMN05179997 | CP015933 | 2371333-2373954 | [9] |
| **Allele 10** |  |  |  |  |  |  |  |  |  |
| ***Aco20*** | N/A | *pneumophila* | Environmental | Portugal | 1991 | N/A | HG531937 | 1-2625 | [15] |
| **Allele 11** |  |  |  |  |  |  |  |  |  |
| ***HL06041035*** | 1 | *pneumophila* | Environmental | N/A | N/A | SAMEA3138424 | FQ958211 | 2473122-2475746 | [16] |
| **Allele 12** |  |  |  |  |  |  |  |  |  |
| ***Ice27*** | 1 | *pneumophila* | Environmental | Iceland | 1995 | SAMEA769974 | HG531942 | 1-2625 | [15] |
| **Allele 13** |  |  |  |  |  |  |  |  |  |
| ***Aco13*** | N/A | *pneumophila* | Environmental | Portugal | 1991 | N/A | HG531936 | 1-2625 | [15] |
| **Allele 14** |  |  |  |  |  |  |  |  |  |
| ***D7468*** | 1 | *pneumophila* | Clinical | USA: Tennessee, Knoxville | 1977 | SAMN06928759 | CP021266 | 2369418-2372043 | [3] |
| ERS1211137 | 1 | *N/A* | Clinical | USA | 1980 | SAMEA4040027 | LT906476 | 2369418-2372043 | N/A |
| F4468 | N/A | *N/A* | Clinical | USA: New York | 2015 | SAMN04544730 | CP014759 | 2414562-2417186 | N/A |
| F4469 | N/A | *N/A* | N/A | USA:New York | 2015 | SAMN04544525 | CP014760 | 2414563-2417187 | N/A |
| D7630  | 1 | *N/A* | Clinical | USA: New York | 2012 | SAMN04634513 | CP015344 | 2423504-2426128 | N/A |
| D7631 | 1 | *N/A* | Environmental | USA: New York | 2012 | SAMN04634091 | CP015343 | 2412818-2415442 | N/A |
| D7632 | 1 | *N/A* | Clinical | USA: New York | 2012 | SAMN04633978 | CP015342 | 2412286-2414910 | N/A |
| **Allele 15** |  |  |  |  |  |  |  |  |  |
| ***ATCC35251*** | 15 | *fraseri* | Clinical | N/A | 1981 | SAMN02650973 | HG531945 | 1-2625 | N/A |
| **Allele 16** |  |  |  |  |  |  |  |  |  |
| FDAARGOS\_779 | N/A | *N/A* | N/A | USA:VA | N/A | SAMN11056494 | CP040987 | 1347709-1350333 | N/A |
| NCTC11193 | 1 | *N/A* | N/A | N/A | 1977  | SAMEA3923587 | LR134332 | 2453659-2456283 | N/A |
| D7474 | 1 | *pneumophila* | Clinical | [USA: New Mexico, Albuquerque](https://www.ncbi.nlm.nih.gov/biosample?term=) | 1977 | SAMN06928753 | CP021286 | 2397070-2399694 | [3] |
| D7477 | 1 | *pneumophila* | Clinical | USA: Michigan, Flint | 1977 | SAMN06928758 | CP021281 | 2464638-2467262 | [3] |
| Lansing 3 | 15 | *fraseri* | Clinical | USA: Michigan, Royal Oak | 1981 | SAMN06928770 | CP021257 | 1016251-1018875 | N/A |
| E1\_P | N/A | *N/A* | Environmental | USA: California | 2013 | SAMN05180033 | CP015946 | 2420179-2422803 | [9] |
| C1\_S | N/A | *N/A* | Clinical | USA: North Carolina | 2009 | SAMN05179547 | CP015932 | 2458641-2461265 | [9] |
| Philadelphia\_4 | 1 | *N/A* | Clinical | USA: Pennsylvania | 1977 | SAMN05180047 | CP015931 | 2455923-2458547 | [9] |
| Philadelphia\_3 | 1 | *N/A* | Clinical | USA: Pennsylvania | 1977 | SAMN05180046 | CP015930 | 2418030-2420654 | [9] |
| Philadelphia\_2 | 1 | *N/A* | Clinical | USA: Pennsylvania | 1977 | SAMN05180045 | CP015929 | 2455923-2458547 | [9] |
| Philadelphia\_1\_ATCC | 1 | *N/A* | Clinical | USA: Pennsylvania | 1977 | SAMN05180048 | CP015927 | 2455923-2458547 | [9] |
| OLDA | 1 | *N/A* | Clinical | Unknown | 1947 | SAMN05198688 | CP016030 | 2362727-2365351 | [3] |
| Por3 | 1 | *pneumophila* | Environmental | N/A | N/A | N/A | HG531949 | 1-2625 | [17] |
| ***Paris*** | 1 | *pneumophila* | Clinical | France: Paris | 1987 | SAMEA3138252 | CR628336 | 2378414-2381032 | [18] |
| **Allele 17** |  |  |  |  |  |  |  |  |  |
| NMex1 | 6 | *pneumophila* | Environmental | N/A | N/A | N/A | HG531947 | 1-2628 | [15] |
| **Alcoy**  | 1 | *N/A* | Clinical | Spain: Alcoy | 1999 | SAMN02604292 | CP001828 | 2476952-2479579 | [19] |
| **Allele 18** |  |  |  |  |  |  |  |  |  |
| ***IMC23*** | 1 | *pneumophila* | Environmental | N/A | N/A | N/A | HG531944 | 1-2628 | [15] |
| **Allele 19** |  |  |  |  |  |  |  |  |  |
| Alf18 | N/A | *pneumophila* | Environmental | N/A | N/A | N/A | HG531939 | 1-2628 | [15] |
| ***Corby*** | 1 | *pneumophila* | Clinical | United Kingdom  | N/A | SAMN02603241 | CP000675 | 2490944-2493571 | [20] |
| **Allele 20** |  |  |  |  |  |  |  |  |  |
| ***Felg244*** | N/A | *pneumophila* | Environmental | N/A | N/A | N/A | HG531941 | 1-2628 | [15] |
| **Allele 21** |  |  |  |  |  |  |  |  |  |
| ***Ma36*** | N/A | *pneumophila* | Environmental | N/A | N/A | N/A | HG531946 | 1-2628 | [15] |
| **Allele 22** |  |  |  |  |  |  |  |  |  |
| ***Ice30*** | N/A | *pneumophila* | Environmental | N/A | N/A | N/A | HG531943 | 1-2628 | [15] |
| **Allele 23** |  |  |  |  |  |  |  |  |  |
| ***Agn2*** | 1 | *pneumophila* | Environmental | Italy (Agano) | N/A | N/A | HG531938 | 1-2628 | [15] |
| **Allele 24** |  |  |  |  |  |  |  |  |  |
| F4185 | 1 | *pascullei* | Environmental | USA: Pennsylvania | 2012 | SAMN04438305 | CP014255 | 2349057-2351681 | [21] |
| ***D7119*** | 1 | *pascullei* | Clinical | USA: Pennsylvania | 2012 | SAMN04438273 | CP014257 | 2345263-2347887 | [21] |
| **Allele 25** |  |  |  |  |  |  |  |  |  |
| ***NCTC12273*** | N/A | *pascullei* | Environmental | USA | 1989 | SAMEA44537668 | LR134380 | 2370770-2373388 | N/A |
| NCTC12272 | N/A | *pascullei* | Environmental | USA | 1988 | SAMEA3905390 | LS483412 | 2370767-2373385 | N/A |
| D7160 | 5 | *pascullei* | Environmental | USA:Pennsylvania, Pittsburgh | 1981 | SAMN06928765 | CP021262 | 2370770-2373394 | [3] |
| D7158 | N/A | *pascullei* | Environmental | USA: Pennsylvania | 1982 | SAMN04438278 | CP014256 | 2370770-2373394 | [3] |
| ***sidJ* alleles are recombinants** |  |  |  |  |  |  |  |  |  |
| **Allele 26** |  |  |  |  |  |  |  |  |  |
| ***NCTC11404*** | 1 | *N/A* | Clinical | USA: Bellingham | 1981  | SAMEA3923592 | LS483410 | 2376539-2379163 | N/A |
| D7473 | 1 | *pneumophila* | Clinical | USA: Washington, Bellingham | 1977 | SAMN06928754 | CP021269 | 2383480-2386104 | [3] |
| **Allele 27** |  |  |  |  |  |  |  |  |  |
| ***D7475*** | 1 | *pneumophila* | Clinical | USA:Pennsylvania, Allentown | 1977 | SAMN06928755 | CP021283 | 2284367-2286991 | [3] |
| **Allele 28** |  |  |  |  |  |  |  |  |  |
| ***ST42*** | N/A | *N/A* | Clinical | [Germany](https://www.ncbi.nlm.nih.gov/biosample?term=) | 1999 | SAMEA4535099 | LT632617 | 2236544-2239168 | N/A |
| **Allele 29** |  |  |  |  |  |  |  |  |  |
| ***NCTC12179*** | 11 | *N/A* | Clinical | USA | 1982 | SAMEA3111979 | LR134176 | 1709454-1712078 | N/A |
| **Allele 30** |  |  |  |  |  |  |  |  |  |
| ***80-045*** | 1 | *N/A* | Clinical | Japan:Nagasaki | 1980 | N/A | AB107985 | 8927-11551 | [22] |
| **Allele 31** |  |  |  |  |  |  |  |  |  |
| ***ATCC43130*** | 11 | *pneumophila* | Clinical | USA: Newyork | 1982 | SAMN01917211 | HG531935 | 1-2625 | N/A |
| **Allele 32** |  |  |  |  |  |  |  |  |  |
| FFI337 | N/A | *pneumophila* | Environmental | Norway:Sarpsborg /Fredrikstad | 2008 | SAMN05513581 | CP016876 | 441391-444015 | [23] |
| FFI329 | N/A | *pneumophila* | Environmental | Norway:Sarpsborg /Fredrikstad | 2005 | SAMN05513580 | CP016874 | 2885788-2888409 | [23] |
| FFI105 | N/A | *pneumophila* | Environmental | Norway:Sarpsborg /Fredrikstad | 2008 | SAMN05513579 | CP016873 | 944336-946957 | [23] |
| FFI104 | N/A | *pneumophila* | Clinical | Norway | 2008 | SAMN05513578 | CP016872 | 3239073-3241694 | [23] |
| FFI102  | N/A | *pneumophila* | Clinical | Norway | 2005 | SAMN05513576 | CP016868 | 552329-554950 | [23] |
| ***Lens*** | 1 | *pneumophila* | Clinical | France:Lens | 2003 | SAMEA3138253 | CR628337 | 2351144-2353768 | [24] |
| FFI103 | N/A | *pneumophila* | Environmental | Norway:Sarpsborg /Fredrikstad | 2005 | SAMN05513577 | CP016870 | 1423915-1426538 | [23] |
| **Allele 33** |  |  |  |  |  |  |  |  |  |
| ***D5265*** | 1 | *raphaeli* | Clinical | USA:Pennsylvania, Philadelphia | 2002 | SAMN06928773 | CP021272 | 2424719-2427343 | [3] |
| D7787 | 5 | *raphaeli* | Clinical | USA: Texas, Houston | 2016 | SAMN06928774 | CP021270 | 2348563-2351187 | [3] |
| D4040  | 1 | *raphaeli* | N/A | USA: Delaware, Wilmington | 1994 | SAMN06928772 | CP021274 | 2424790-2427414 | [3] |
| **Allele 34** |  |  |  |  |  |  |  |  |  |
| ***D4954*** | N/A | *raphaeli* | Clinical | USA: Ohio, Hamilton | 2000 | SAMN06928771 | CP021256 | 2531686-2534310 | [3] |
| **Allele 35** |  |  |  |  |  |  |  |  | [3] |
| ***ATCC33737*** | 5 | *pascullei* | Environmental | USA | 1988 | SAMN01918939 | HG531950 | 1-2625 | [15] |
| **Allele 36** |  |  |  |  |  |  |  |  |  |
| ***ATCC33216*** | 5 | *fraseri* | Environmental | USA:Dallas | 1978 | SAMN05439986 | HG531953 | 1-2625 | [15] |
| **Allele 37** |  |  |  |  |  |  |  |  |  |
| ***F4198***  | 1 | *fraseri* | Environmental | USA:Pennsylvania, Pittsburgh | 2012 | SAMN06928761 | CP021279 | 2371913-2374537 | [3] |
| D4058 | 1 | *fraseri* | Clinical | USA: Connecticut, Bridgeport | 1994 | SAMN06928763 | CP021277 | 2447851-2450475 | [3] |
| Los Angeles 1 (D-7696) | 4 | *fraseri* | Clinical | USA: California, Los Angeles | 1978 | SAMN06928760 | CP021265 | 2430719-2433343 | [3] |
| D5387 | 1 | *fraseri* | Clinical | Denmark | 1998 | SAMN06928762 | CP021264 | 2382167-2384791 | [3] |
| D3137 | 1 | *fraseri* | Clinical | USA: California, Richmond | 1991 | SAMN06928764 | CP021263 | 2387096-2389720 | [3] |
| D5744 | 8 | *fraseri* | Clinical | USA: Arizona, Phoenix | 2008 | SAMN06928769 | CP021258 | 2397441-2400065 | [3] |
| D5945 | 1 | *fraseri* | Clinical | USA:New York, New York City | 2009 | SAMN05856000 | CP017602 | 2370751-2373375 | [3] |
| D6026  | 1 | *fraseri* | Clinical | USA: New York, New York City | 2016 | SAMN05856001 | CP017601 | 2369103-2371727 | [3] |
| Dallas 1E | 5 | *fraseri* | Environmental | USA:Dallas | 1978 | SAMN05818649 | CP017458 | 2402533-2405157 | [3] |
| Detroit-1 | 1 | *fraseri* | Clinical | USA:Michigan, Detroit | 1977 | SAMN05818658 | CP017457 | 2320537-2323161 | [25] |
| **Allele 38** |  |  |  |  |  |  |  |  |  |
| ***D7705*** | 1 | *raphaeli* | Clinical | USA: New York | 2007 | SAMN06928766 | CP021261 | 2439384-2442008 | [3] |
| D7706 | 1 | *raphaeli* | Environmental | [USA: New York](https://www.ncbi.nlm.nih.gov/biosample?term=) | 2007 | SAMN06928767 | CP021260 | 2474605-2477229 | [3] |
| **Allele 39** |  |  |  |  |  |  |  |  |  |
| ***D7708*** | 4 | *N/A* | Clinical | USA: Georgia, Atlanta | 2016 | SAMN06928768 | CP021259 | 2414771-2417395 | [3] |

\*N/A indicates not available.

#Strain or sample names marked red indicate representative allele names.

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