**Table S1:** Descriptive information for the 100 bacterial protective antigens (BPAs) used in this study to calculate the recall and fold-enrichment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pathogen** | **Strain** | **Number of known bacterial antigens** | **Uniprot ID of known bacterial antigens** | **References** |
| *Neisseria gonorrhoeae* | ATCC 700825/ FA 1090 | 10 | AniA (Q5F7A4\_NEIG1) TbpA (Q5F574\_NEIG1)TbpB (Q5F6Q3\_NEIG1)MtrE (Q5F726\_NEIG1)PorB (Q5F5V7\_NEIG1)Ompa (Q5F6J5\_NEIG1)LbpA (Q5F6Q4\_NEIG1)TdfJ (Q5F7H3\_NEIG1)Lst (Q5F7T9\_NEIG1)Nspa (Q5FA01\_NEIG1) | Vivona S. et al., 2006Edwards J. et al., 2016 |
| *Staphylococcus aureus* | MW2 | 12 | ClfA (CLFA\_STAAW)MntC (A0A0H3JW04\_STAAW)IsdB (ISDB\_STAAW)ClfB (CLFB\_STAAW)fhuD2 (A0A0H3K1A0\_STAAW) EsxA (ESXA\_STAAW)EsxB (ESXB\_STAAW)Hla (A0A0H3K2R6\_STAAW)Sta011 (Y071\_STAAW)Spa (A0A0H3K1I2\_STAAW)Cna (A0A0H3JZE1\_STAAW)mecA (A0A0H3JUR9\_STAAW) | Yang et al., 2011Giersing et al., 2016Yeaman et al., 2014 |
| *Streptococcus pyogenes* | M1 | 15 | spy0416 (Q9A180\_STRP1)spy0167 (TACY\_STRP1)spy0269 (Q9A1H3\_STRP1)spy0469 (J7M2V9\_STRP1)spy1228 (Q99ZH4\_STRP1)spy1801 (Q99Y99\_STRP1)SpeB (J7M934\_STRP1)SpeA (J7M5V3\_STRP1)SpeC (SPEC\_STRP1)Cpa (J7M2J0\_STRP1)SPy\_0128 (PILIN\_STRP1)SPy\_0130 (Q9A1S0\_STRP1)cell surface protein (J7MBD1\_STRP1)M protein (Q99XV0\_STRP1)Mac (Q7DAM2\_STRP1) | Yang B. et al., 2011Mortensen R. et al., 2016Steer A. et al., 2016Bensi G. et al., 2012 |
| *Helicobacter pylori* | J99 / ATCC 700824 | 11 | Catalase (CATA\_HELPJ) GltA (CISY\_HELPJ)Hsp60 (CH60\_HELPJ)vacA (VACA\_HELPJ)HspA (CH10\_HELPJ)NAP (DPS\_HELPJ)oipA (Q9ZLJ8\_HELPJ)ureB (URE1\_HELPJ)cagA (CAGA\_HELPJ)HpaA (HPAA\_HELPJ) SOD (SODF\_HELPJ) | Yang B. et al., 2011Mirzaei N. et al., 2017Naz A. et al., 2015 |
| *Escherichia coli* | CFT073 / ATCC 700928 / UPEC | 10 | ybcU (A0A0H2V6N9\_ECOL6)c2436 (A0A0H2V8C1\_ECOL6)c2482 (A0A0H2V8J2\_ECOL6)c5174 (A0A0H2VDP0\_ECOL6)iutA (A0A0H2VAM3\_ECOL6)fimH (A0A0H2VDU7\_ECOL6)iroN (A0A0H2V663\_ECOL6)c0393 (A0A0H2V4L3\_ECOL6)upaG (UPAG\_ECOL6)c3389 (A0A0H2VA37\_ECOL6) | Yang B. et al., 2011Svennerholm A. M., Tobias J., 2008Zhang H., 2017Bourgeois A. L., 2016 |
| *Chlamydia pneumoniae* | ATCC VR-2282 | 7 | pmp10 (PMP10\_CHLPN)pmp2 (PMP2\_CHLPN)ArtJ (ARTJ\_CHLPN)Eno (ENO\_CHLPN)HtrA (A0A0F7WNW8\_CHLPN)OmpH (SKPL\_CHLPN)MomP (MOMP\_CHLPN) | Vivona S. et al., 2006Capo S., 2005Finco O., 2005 |
| *Campylobacter jejuni* | ATCC 700819 / NCTC 11168 | 7 | CadF (Q0P8D9\_CAMJE)CjaA (Q0P9S0\_CAMJE)FlaA (FLA1\_CAMJE)FlaC (FLAC\_CAMJE)FspA1 (Q0PA31\_CAMJE)Peb1A (PEB1A\_CAMJE)PorA (PORA\_CAMJE) | Yang B. et al., 2011O’Ryan M., 2015Baqar S., 2008Lee L. H., 1999Buckley A. M., 2010 |
| *Borrelia burgdorferi* | ATCC 35210 / B31 / CIP 102532 / DSM 4680 | 6 | OspA (OSPA\_BORBU)OspC (OSPC\_BORBU)DbpA (DBPA\_BORBU)OspB (OSPB\_BORBU)BBK32 (O50835\_BORBU)Fla (FLA1\_BORBU) | Yang B. et al., 2011Schuijt T. J., 2011 |
| *Treponema pallidum* | Nichols | 4 | GlpQ (GLPQ\_TREPA)TmpB (TMPB\_TREPA)Tp92 (TP326\_TREPA)Tp0821 (R9UVI4\_TREPA) | Yang B. et al., 2011Kubanov A., 2017Lithgow K.V., Cameron C.E., 2017 |
| *Streptococcus pneumoniae* | TIGR4 | 14 | ClpP (CLPP\_STRPN)GltX (SYE\_STRPN)Gnd (A0A0H2UNG6\_STRPN)LplA (A0A0H2UQ30\_STRPN)DnaJ (DNAJ\_STRPN)PsaA (MTSA\_STRPN)Ply (TACY\_STRPN)CbpA (A0A0H2US50\_STRPN)PcpA (A0A0H2USF9\_STRPN)PspA (A0A0H2UMZ8\_STRPN)SP0148 (A0A0H2UN58\_STRPN)SP1912 (A0A0H2URM0\_STRPN)SP2108 (MALX\_STRPN)A0A0H2UN78\_STRPN | Yang B. et al., 2011Entwisle C., 2017Qiu Y., 2017 |
| *Neisseria meningitidis* | MC58 | 4 | Fhbp (Q9JXV4\_NEIMB)NadA (Q9JXK7\_NEIMB)NHBA (Q7DD37\_NEIMB)porA (OMPA\_NEIMB) | Serruto D., 2012Gorringe A. R., 2012 |

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