**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., 2006  Edwards 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., 2011  Giersing et al., 2016  Yeaman 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., 2011  Mortensen R. et al., 2016  Steer A. et al., 2016  Bensi 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., 2011  Mirzaei N. et al., 2017  Naz 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., 2011  Svennerholm A. M., Tobias J., 2008  Zhang H., 2017  Bourgeois 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., 2006  Capo S., 2005  Finco 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., 2011  O’Ryan M., 2015  Baqar S., 2008  Lee L. H., 1999  Buckley 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., 2011  Schuijt T. J., 2011 |
| *Treponema pallidum* | Nichols | 4 | GlpQ (GLPQ\_TREPA)  TmpB (TMPB\_TREPA)  Tp92 (TP326\_TREPA)  Tp0821 (R9UVI4\_TREPA) | Yang B. et al., 2011  Kubanov A., 2017  Lithgow 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., 2011  Entwisle C., 2017  Qiu Y., 2017 |
| *Neisseria meningitidis* | MC58 | 4 | Fhbp (Q9JXV4\_NEIMB)  NadA (Q9JXK7\_NEIMB)  NHBA (Q7DD37\_NEIMB)  porA (OMPA\_NEIMB) | Serruto D., 2012  Gorringe A. R., 2012 |

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