**Supplementary Information:**

**Supplementary Table 2.** Secondary structure (H, alpha-helix; E, beta-sheet; C, coil), solvent accessibility (B, buried; M, medium expose; E, expose), linear and conformational B-cell epitope (E, epitope) prediction of Tis9 protein.

| Residue | Amino acid | Secondary structure | Solvent accessibility | Linear B-cell epitope | Conformational B-cell epitope |
|---------|------------|---------------------|-----------------------|-----------------------|-----------------------------|
| 1       | M          | C                   | E                     | -                     | -                           |
| 2       | L          | C                   | E                     | -                     | -                           |
| 3       | V          | E                   | E                     | -                     | -                           |
| 4       | M          | E                   | E                     | -                     | -                           |
| 5       | S          | E                   | E                     | -                     | -                           |
| 6       | R          | E                   | E                     | -                     | -                           |
| 7       | W          | E                   | M                     | -                     | -                           |
| 8       | I          | E                   | B                     | -                     | -                           |
| 9       | E          | C                   | E                     | -                     | -                           |
| 10      | N          | C                   | E                     | -                     | -                           |
| 11      | T          | C                   | E                     | -                     | -                           |
| 12      | D          | C                   | E                     | -                     | -                           |
| 13      | S          | C                   | E                     | -                     | -                           |
| 14      | V          | E                   | B                     | -                     | -                           |
| 15      | S          | E                   | M                     | -                     | -                           |
| 16      | V          | E                   | B                     | -                     | -                           |
| 17      | I          | E                   | M                     | -                     | -                           |
| 18      | L          | E                   | B                     | -                     | -                           |
| 19      | T          | E                   | M                     | -                     | -                           |
| 20      | E          | E                   | E                     | -                     | -                           |
| 21      | M          | C                   | E                     | -                     | -                           |
**Supplementary Table 2 (Continued)**

| Residue | Amino acid | Secondary structure | Solvent accessibility | Linear B-cell epitope | Conformational B-cell epitope |
|---------|------------|---------------------|-----------------------|-----------------------|-------------------------------|
| 22      | G          | C                   | E                     | -                     | -                             |
| 23      | R          | C                   | E                     | -                     | -                             |
| 24      | S          | C                   | E                     | -                     | -                             |
| 25      | Y          | E                   | M                     | -                     | -                             |
| 26      | V          | E                   | B                     | -                     | -                             |
| 27      | T          | E                   | M                     | -                     | -                             |
| 28      | L          | E                   | B                     | -                     | -                             |
| 29      | C          | E                   | B                     | -                     | -                             |
| 30      | H          | E                   | E                     | -                     | -                             |
| 31      | Y          | C                   | M                     | -                     | -                             |
| 32      | P          | C                   | M                     | -                     | -                             |
| 33      | P          | C                   | E                     | -                     | -                             |
| 34      | W          | C                   | B                     | -                     | -                             |
| 35      | S          | C                   | M                     | -                     | -                             |
| 36      | L          | C                   | B                     | -                     | E                             |
| 37      | C          | C                   | B                     | E                     | E                             |
| 38      | C          | C                   | B                     | E                     | E                             |
| 39      | G          | C                   | E                     | E                     | E                             |
| 40      | G          | C                   | E                     | E                     | E                             |
| 41      | K          | C                   | E                     | E                     | E                             |
| 42      | T          | C                   | E                     | E                     | -                             |
| 43      | S          | C                   | E                     | E                     | -                             |
| 44      | Q          | C                   | E                     | E                     | -                             |
| 45      | P          | C                   | E                     | E                     | -                             |
| 46      | G          | C                   | M                     | E                     | -                             |
### Supplementary Table 2 (Continued)

| Residue | Amino acid | Secondary structure | Solvent accessibility | Linear B-cell epitope | Conformational B-cell epitope |
|---------|------------|----------------------|-----------------------|-----------------------|-------------------------------|
| 47      | Q          | E                    | M                     | -                     | -                             |
| 48      | V          | E                    | B                     | -                     | -                             |
| 49      | W          | E                    | B                     | -                     | -                             |
| 50      | I          | E                    | B                     | -                     | -                             |
| 51      | L          | E                    | B                     | -                     | -                             |
| 52      | D          | E                    | M                     | -                     | -                             |
| 53      | R          | C                    | M                     | -                     | -                             |
| 54      | K          | C                    | E                     | -                     | -                             |
| 55      | H          | E                    | M                     | -                     | -                             |
| 56      | C          | E                    | B                     | -                     | -                             |
| 57      | L          | E                    | B                     | -                     | -                             |
| 58      | E          | E                    | E                     | -                     | -                             |
| 59      | C          | C                    | B                     | -                     | -                             |
| 60      | S          | C                    | E                     | -                     | -                             |
| 61      | E          | C                    | E                     | -                     | -                             |
| 62      | I          | H                    | B                     | -                     | -                             |
| 63      | S          | H                    | M                     | -                     | -                             |
| 64      | E          | H                    | E                     | -                     | E                             |
| 65      | L          | H                    | B                     | -                     | -                             |
| 66      | M          | C                    | M                     | -                     | -                             |
| 67      | T          | C                    | E                     | E                    | E                             |
| 68      | L          | C                    | M                     | E                    | -                             |
| 69      | G          | C                    | E                     | E                    | E                             |
| 70      | Q          | C                    | E                     | E                    | E                             |
| 71      | P          | C                    | E                     | E                    | E                             |
| 72      | T          | C                    | E                     | E                    | E                             |
**Supplementary Table 2 (Continued)**

| Residue | Amino acid | Secondary structure | Solvent accessibility | Linear B-cell epitope | Conformational B-cell epitope |
|---------|------------|---------------------|-----------------------|-----------------------|-----------------------------|
| 73      | W          | H                   | B                     | E                     | -                           |
| 74      | Q          | H                   | E                     | E                     | E                           |
| 75      | E          | H                   | E                     | E                     | E                           |
| 76      | S          | H                   | B                     | -                     | -                           |
| 77      | A          | H                   | B                     | -                     | -                           |
| 78      | M          | H                   | M                     | -                     | -                           |
| 79      | V          | H                   | B                     | -                     | -                           |
| 80      | I          | H                   | B                     | -                     | -                           |
| 81      | G          | H                   | B                     | -                     | -                           |
| 82      | S          | H                   | E                     | -                     | -                           |
| 83      | W          | H                   | B                     | -                     | -                           |
| 84      | V          | H                   | B                     | -                     | -                           |
| 85      | Q          | H                   | M                     | -                     | -                           |
| 86      | V          | H                   | B                     | -                     | -                           |
| 87      | V          | H                   | B                     | -                     | -                           |
| 88      | T          | H                   | M                     | -                     | -                           |
| 89      | E          | C                   | E                     | -                     | E                           |
| 90      | H          | C                   | E                     | -                     | -                           |
| 91      | G          | C                   | B                     | -                     | -                           |
| 92      | I          | E                   | B                     | -                     | -                           |
| 93      | L          | E                   | B                     | E                     | -                           |
| 94      | H          | E                   | M                     | E                     | -                           |
| 95      | T          | C                   | M                     | E                     | E                           |
| 96      | S          | C                   | E                     | E                     | E                           |
| 97      | T          | C                   | E                     | E                     | E                           |
| 98      | S          | C                   | E                     | E                     | E                           |
Supplementary Table 2 (Continued)

| Residue | Amino acid | Secondary structure | Solvent accessibility | Linear B-cell epitope | Conformational B-cell epitope |
|---------|------------|---------------------|-----------------------|-----------------------|--------------------------------|
| 99      | E          | C                   | E                     | E                     | -                              |
| 100     | R          | C                   | E                     | E                     | E                              |
| 101     | Q          | C                   | E                     | E                     | E                              |
| 102     | A          | C                   | E                     | E                     | E                              |
| 103     | P          | C                   | E                     | E                     | E                              |
| 104     | R          | C                   | E                     | E                     | -                              |
| 105     | R          | E                   | E                     | E                     | -                              |
| 106     | V          | E                   | B                     | E                     | -                              |
| 107     | M          | E                   | M                     | -                     | -                              |
| 108     | W          | E                   | B                     | -                     | -                              |
| 109     | R          | E                   | M                     | -                     | -                              |
| 110     | I          | E                   | B                     | -                     | -                              |
| 111     | S          | C                   | M                     | -                     | -                              |
| 112     | D          | C                   | E                     | E                     | -                              |
| 113     | M          | C                   | M                     | E                     | -                              |
| 114     | A          | C                   | E                     | E                     | E                              |
| 115     | G          | C                   | E                     | E                     | E                              |
| 116     | D          | C                   | E                     | E                     | E                              |
| 117     | R          | C                   | E                     | E                     | E                              |
| 118     | T          | C                   | E                     | -                     | -                              |
| 119     | L          | C                   | E                     | -                     | -                              |