**S1 Table. Summarized findings of allelically variable, host-specific transmissibility and FH-binding activity of *B. burgdorferi*, *B. afzelii*, and *B. garinii* and their derived PFam54-IV proteins in this study and the previous study.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Spirochete strains** | **Transmissibility by wild type strainsa** | | **PFam54-IV variants** | **Transmissibility by Δ*cspA* producing PFam54-IVc** | | **FH-binding activityf** | |
| **Mouse** | **Quail** | **Mouse** | **Quail** | **Mouse** | **Quail** |
| ***B. burgdorferi* B31-5A4** | + | + | BBA68 | + | + | + | + |
| BBA69 | n.d.d | n.d. | - | - |
|  | | | | | | | |
| ***B. afzelii***  **CB43,**  **PKo,**  **or MMS** | +b | -b | MMSA67 | n.d. | n.d. | - | - |
| MMSA68 | n.d. | n.d. | - | - |
| MMSA69 | n.d. | n.d. | - | - |
| MMSA70 | n.d. | n.d. | - | - |
| PKoA71 (CspAPKo)  or MMSA71 (CspAMMS) | +e | -e | +g | -g |
|  | | | | | | | |
| ***B. garinii***  **ZQ1** | - | + | ZQA67 | n.d. | n.d. | - | - |
| ZQA68 (CspAZQ1) | - | + | - | + |
| ZSA69 | n.d. | n.d. | - | - |
| ZSA70 | n.d. | n.d. | - | - |
| ZSA71 | n.d. | n.d. | - | - |
| ZSA72 | n.d. | n.d. | - | - |

aSignificant increase or no difference in spirochete burdens in indicated mouse or quail compared to uninfected respective animals is defined as “+” and “-”, respectively. The results were shown in Figure 1A to C and G to I.

bDetermined using *B. afzelii* CB43

cSignificant increase or no difference in spirochete burdens in indicated mouse or quail compared to uninfected respective animals is defined as “+” and “-”, respectively. The results are shown in Figure 3A to C and [1].

dNot determined.

eDetermined using the *B. burgdorferi* strain Δ*cspA* harboring the plasmid producing PKoA71(CspAPKo).

fDetermined by qualitative ELISA in Figure 6A to C and described in [1]. Statistically increasing or no different levels of binding by indicated PFam54-IV compared to that by negative control DbpA proteins are defined as “+” and “-.”

gDetermined using recombinant version of MMSA71 (CspAMMS).

**REFERENCES**

1. Hart T, Nguyen NTT, Nowak NA, Zhang F, Linhardt RJ, Diuk-Wasser M, et al. Polymorphic factor H-binding activity of CspA protects Lyme borreliae from the host complement in feeding ticks to facilitate tick-to-host transmission. PLoS pathogens. 2018;14(5):e1007106.