**Supplementary File 1.** *Bacillus subtilis* strains used in this study.

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| Name | Genotype |  Source |
| PY79 | Prototrophic derivative of *B. subtilis* 168 |  (1) |
| KP73 | ∆*spoIVA::neo* |  (2) |
| KR394 | ∆*spoIVA::neo thrC::spoIVA spec* |  (3) |
| NG7 | ∆*spoIVA::neo thrC::spoIVAS189K spec* |  This study |
| NG13 | ∆*spoIVA::neo thrC::spoIVAR191D spec* |  This study |
| NG8 | ∆*spoIVA::neo thrC::spoIVAS189K, R191D spec* |  This study |
| TU209 | ∆*spoIVA::neo thrC::spoIVAS189K, R191D, S216A, E218A spec* |  This study |
| TU210 | ∆*spoIVA::neo thrC::spoIVAS189K, S216A, E218A spec* |  This study |
| TU211  | ∆*spoIVA::neo thrC::spoIVAS216A, E218A spec* |  This study |
| TU212  | ∆*spoIVA::neo thrC::spoIVAS216A spec* |  This study |
| TU213  | ∆*spoIVA::neo thrC::spoIVAE218A spec* |  This study |
| TU223 | ∆*spoIVA::neo thrC::spoIVAR191D, E218A spec* |  This study |
| SL55 | ∆*spoIVA::neo thrC::GFP-spoIVA spec* ∆*amyE::spoIVA cat* |  This study |
| JH19 | ∆*spoIVA::neo thrC::GFP-spoIVAS189K spec* ∆*amyE::spoIVAS189K cat* |  This study |
| JH20 | ∆*spoIVA::neo thrC::GFP-spoIVAR191D spec* ∆*amyE::spoIVAR191D cat* |  This study |
| JH1 | ∆*spoIVA::neo thrC::GFP-spoIVAS189K, R191D spec* ∆*amyE::spoIVAS189K, R191D cat* |  This study |
| TU200 | ∆*spoIVA::neo thrC::GFP-spoIVAS189K, R191D, S216A, E128A spec* ∆*amyE::spoIVAS189K, R191D, S216A, E218A cat* |  This study |
| TU201 | ∆*spoIVA::neo thrC::GFP-spoIVAS216A, E218A spec* ∆*amyE::spoIVAS216A, E218A cat* |  This study |
| TU202 | ∆*spoIVA::neo thrC::GFP-spoIVAS216A spec* ∆*amyE::spoIVAS216A cat* |  This study |
| TU203 | ∆*spoIVA::neo thrC::GFP-spoIVAE218A spec* ∆*amyE::spoIVAE218A cat* |  This study |
| TU227 | ∆*spoIVA::neo thrC::GFP-spoIVAR191D, E218A spec* ∆*amyE::spoIVAR191D, E218A cat* |  This study |
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2. Price KD, Losick R. A four-dimensional view of assembly of a morphogenetic protein during sporulation in *Bacillus subtilis*. *J Bacteriol*. 1999;181: 781-790.
3. Ramamurthi KS, Losick R. ATP-driven self-assembly of a morphogenetic protein in *Bacillus subtilis*. *Mol Cell*. 2008:31: 406-414.