

1 **Description of additional supplementary files**

2 **File name:** Supplementary Data

3 **Description:** Contains source data for Fig. 5b in main body of manuscript.

4

5 **File name:** Supplementary Movie 1

6 **Description:** Time-lapse movie of BW25113 in the presence of Fos.

7 Time-lapse movie of the interconversion process between walled cells and L-form cells.

8 BW25113 cells were grown in NB/MSM medium containing Fos under anaerobic conditions.

9 After 12h, Fos was removed from NB/MSM medium. Images were taken every 10 min. Scale
10 bar: 5 μ m.

11

12 **File name:** Supplementary Movie 2

13 **Description:** Time-lapse movie of Δ *ftsZ* cells in the presence of Fos.

14 Time-lapse movie of the interconversion process between walled cells and L-form cells.

15 RU2055 cells (Δ *ftsZ::kan*) were grown in NB/MSM medium containing Fos in the absence of

16 NaSal under anaerobic conditions. After 12h, Fos was removed from NB/MSM medium.

17 Images were taken every 10 min. Scale bar: 5 μ m.

18

19 **File name:** Supplementary Movie 3

20 **Description:** Time-lapse movie of BW25113 in the presence of PenG.

21 Time-lapse movie of the interconversion process between walled cells and L-form cells.

22 BW25113 cells were grown in NB/MSM medium containing PenG under anaerobic conditions.

23 After 12h, PenG was removed from NB/MSM medium. Images were taken every 10 min. Scale
24 bar: 5 μ m.

25

26 **File name:** Supplementary Movie 4

27 **Description: Time-lapse movie of Δ ftsZ cells in the presence of PenG.**

28 Time-lapse movie of the interconversion process between walled cells and L-form cells.
29 RU2055 cells (Δ ftsZ::kan) were grown in NB/MSM medium containing PenG in the absence of
30 NaSal under anaerobic conditions. After 12h, PenG was removed from NB/MSM medium.
31 Images were taken every 10 min. Scale bar: 5 μ m.

32

33 **File name: Supplementary Movie 5**

34 **Description: Time-lapse movie of BW25113 and in the presence of Cef.**

35 Time-lapse movie of the interconversion process between walled cells and L-form cells.
36 BW25113 cells were grown in NB/MSM medium containing Cef under anaerobic conditions.
37 After 12h, Cef was removed from NB/MSM medium. Images were taken every 10 min. Scale
38 bar: 5 μ m.

39

40 **File name: Supplementary Movie 6**

41 **Description: Time-lapse movie of Δ ftsZ cells and in the presence of Cef.**

42 Time-lapse movie of the interconversion process between walled cells and L-form cells.
43 RU2055 cells (Δ ftsZ::kan) were grown in NB/MSM medium containing Cef in the absence of
44 NaSal under anaerobic conditions. After 12h, Cef was removed from NB/MSM medium.
45 Images were taken every 10 min. Scale bar: 5 μ m.

46

47 **File name: Supplementary Movie 7**

48 **Description: Time-lapse movie of cell division of L-form cells without medium flow rate**
49 **in the presence of Fos.**

50 Time-lapse movie of the cell division process in L-form cells without medium flow rate.
51 RU1125 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Fos under
52 anaerobic conditions. After cell loading using NB/MSM medium containing Fos, the flow rate
53 was set to 0 μ L/hr. Images were taken every 10 min. Red arrows indicated cells that divided
54 independently of medium flow. Scale bar: 5 μ m.

55

56 **File name: Supplementary Movie 8**

57 **Description: Time-lapse movie of ZapA-GFP cells in the presence of Fos.**

58 Time-lapse movie of the interconversion process between walled cells and L-form cells.
59 RU1125 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Fos under
60 anaerobic conditions. After 12h, Fos was removed from NB/MSM medium. Images were taken
61 every 10 min. Scale bar: 5 μ m.

62

63 **File name: Supplementary Movie 9**

64 **Description: Time-lapse movie of Δ ftsZ ZapA-GFP cells in the presence of Fos.**

65 Time-lapse movie of Z-ring reconstruction process in L-form cells. RU2057 cells (Δ ftsZ::*kan*
66 *zapA-sfGFP*) were grown in NB/MSM medium containing Fos under anaerobic conditions.
67 After 12h, 10 μ M NaSal was added in NB/MSM medium. Images were taken every 10 min.
68 Scale bar: 5 μ m.

69

70 **File name: Supplementary Movie 10**

71 **Description: ZapA-GFP in L-forms.**

72 The z-stacks of deconvolved images of ZapA-GFP in L-forms.

73

74 **File name: Supplementary Movie 11**

75 **Description: Time-lapse movie of ZapA-GFP cells in the presence of Mec or Azt.**

76 Time-lapse movie of the morphological change process containing only Mec or Azt. RU1125
77 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Mec (left panel) or Azt
78 (right panel) under anaerobic conditions. Images were taken every 10 min. Scale bar: 5 μ m.

79

80 **File name: Supplementary Movie 12**

81 **Description: Time-lapse movie of ZapA-GFP cells in the presence of Fos, Mec and Azt.**

82 Time-lapse movie of the interconversion process between walled cells and L-form cells.
83 RU1125 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Fos, Mec and
84 Azt under anaerobic conditions. After 12h, Fos (left panel), Mec (center panel) and Azt (right
85 panel) was removed from NB/MSM medium. Images were taken every 10 min. Scale bar: 5 μ m.

86

87 **File name: Supplementary Movie 13**

88 **Description: Time-lapse movie of ZapA-GFP cells conversion to SWE cells from L-form**
89 **cells.**

90 Time-lapse movie showing the process of conversion to L-form cells and SWE cells. RU1125
91 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Fos, Mec and Azt under
92 anaerobic conditions. After 12h, Fos and Mec were removed from NB/MSM medium. Images
93 were taken every 10 min. Scale bar: 5 μ m.

94

95 **File name: Supplementary Movie 14**

96 **Description: Time-lapse movie of ZapA-GFP cells conversion to SWD cells from L-form**
97 **cells.**

98 Time-lapse movie showing the process of conversion to L-form cells and SWD cells. RU1125
99 cells (*zapA-sfGFP::cat*) were grown in NB/MSM medium containing Fos, Mec and Azt under
100 anaerobic conditions. After 12h, Fos and Azt were removed from NB/MSM medium. Images
101 were taken every 10 min. Scale bar: 5 μ m.

102

103 **File name: Supplementary Movie 15**

104 **Description: Time-lapse movie of GFP-FtsN^{SPOR} expressed cells conversion to SWD cells**
105 **from L-form cells.**

106 Time-lapse movie showing the process of conversion to L-form cells and SWD cells.

107 RU2452 (*zapA-mCherry*) cells producing GFP-FtsN^{SPOR} grown in NB/MSM medium containing
108 Fos, Mec and Azt. After 12 h, Fos and Azt were removed from the NB/MSM medium. After

109 16h, the growth conditions were changed from anaerobic to aerobic. Images were taken every
110 10 min. Scale bar: 5 μ m

111

112 **File name: Supplementary Movie 16**

113 **Description: Time-lapse movie of Δ minC Δ slmA cells in the presence of Mec.**

114 Time-lapse movie of the interconversion process between walled cells and L-form cells.
115 RU2409 cells (*zapA-sfGFP hupB-mCherry Δ minC Δ slmA::kan*) were grown in NB/MSM
116 medium under anaerobic conditions containing Fos, Mec and Azt. After 12h, Fos and Azt were
117 removed from NB/MSM medium. Images were taken every 10 min. Scale bar: 5 μ m.

118

119 **File name: Supplementary Movie 17**

120 **Description: Time-lapse movie of Δ minC Δ slmA cells conversion to walled cells from L-**
121 **form cells.**

122 Time-lapse movie showing the process of conversion to L-form cells and SWD cells. RU2409
123 cells (*zapA-sfGFP hupB-mCherry Δ minC Δ slmA::kan*) were grown in NB/MSM medium under
124 anaerobic conditions containing Fos, Mec and Azt. After 12h, Fos, Mec and Azt were removed
125 from NB/MSM medium. Images were taken every 10 min. Scale bar: 5 μ m.

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