**Supplementary Figures:**

**Supplementary Fig. S1:**  *Separate red, green and merged images RIM20*-GFP *prIME1-*mCherry *colony section.* Colony image shown in left panel of Fig 1D are shown with mCherry image (left), Rim20-GFP image (center), and merged images (right).

**Supplementary Fig. S2:**  Summary of individual experiments in this study, with the corresponding figures indicated. The straight arrow symbol (blue) represents activation, the T-bar symbol (red) represents repression, and the wavy arrow symbol (black) represents no effect. Autonomous or nonautonomous regulation is represented respectively by an “A” or an “NA” adjacent to the symbol.

**Supplementary Fig. S3:** Effect of pH on the fraction of cells in colony that activate *IME1* transcription and the fraction that form Rim20 foci. A strain containing both *RIM20-*GFPand *prIME1-*mCherry (SH5252) was incubated as spot colonies on Sp6 (pH 6.0) medium (blue) or Sp6 (pH 8.0) medium (black) for 4 days, colonies were resuspended and examined by microscope to determine the fraction that form Rim20-GFP foci (left two columns) and the fraction that express *prIME1*-mCherry (right two columns).

**Supplementary Fig. S4:** Effect of pH on UASRlm1-LacZ expression in *RIM101* and *rim101*strains. *RIM101 ime1* pUASRlm1-LacZ (SH5408, left two bars) and *rim101 ime1* pUASRlm1-LacZ (SH5487, right two bars) strains were inoculated at 1 X 108 cells/ ml into Sp6 buffered to either pH 7.0 (blue) or pH 9 (black) with100 mM Tris-HCl. Suspended cultures were incubated for 14 hours at 30°, then 100 l samples were stained with FDG (see Methods) and examined by microscope for green fluorescence (n=3). Columns 1 and 2 are significantly different ( P = 0.02, paired t-test).

**Supplementary Fig. S5:** Chimeric colony assay measuring effect of *RIM101* on *ime2-*GFP expression. Pure colonies of *ime2-*GFP that were *RIM101 (WT)* (blue, SH5420) or *rim101* black, SH5765) and chimeric colonies containing a *rim101 ime2-*GFP response strain mixed with either a *WT* (magenta, SH3884) or an *rim101* orange, SH4379) signal strain.