



FIGURE S4. Association of poor fit to gamma distribution of cell size values with large cell size

(A, B) or reduced growth fitness (C). A, Only a subset of large cell size mutants (*lge*) have distributions that deviate from a gamma pattern. The 253 deletion mutants analyzed by (Jorgensen et al. 2002), which had a median cell volume in the top 5% of all strains that were examined, were grouped in two groups: In the 'Gamma deviant' group were the 49 deletion mutants whose distribution deviated the most from gamma (see File S1), and they were all in the large size mutant group, with many of them being the largest ones. The 'Other' group had the remaining large size mutants. On the y-axis is the median cell size values (in bins) for each of these strains in both groups, while the red line indicates the median value for the wild type samples. The difference in size between the two groups, 'Other' vs. 'Gamma deviant', was

highly significant ($p < 2.2\text{E-}16$; based on the Wilcoxon rank sum test with continuity correction).

B, Heatmap showing the unsupervised hierarchical clustering of cell size density frequencies from the same mutants as in A. The heatmap was generated and displayed as in Figure 4. **C**, The 557 homozygous diploid deletion mutants identified by (Giaever et al. 2002), which had scores indicative of reduced growth fitness, were grouped in two groups: In the 'Gamma deviant' group were the corresponding 31 haploid deletion mutants, which were among the 557 gene deletions identified by (Giaever et al. 2002) to be associated with reduced fitness, and also had size distributions that deviated the most from gamma (see File S1). The 'Other' group had the remaining 526 poor fitness mutants. On the y-axis is the fitness score values (as defined by (Giaever et al. 2002)) for each of these strains in both groups, while the red line indicates the fitness score for the wild type. The difference in fitness between the two groups, 'Other' vs. 'Gamma deviant', was significant ($p = 6.163\text{E-}06$; based on the Wilcoxon rank sum test with continuity correction).