



**FIGURE 23.17.** An experiment with *Escherichia coli* showed no systematic positive or negative epistasis. (A) The base population had adapted for 10,000 generations to glucose-limited minimal medium (Fig. 17.32). Transposable elements were inserted at random into one, two, or three sites, giving 225 mutated strains. The log mean fitness fell linearly with the number of mutations, which shows that the effects of each additional mutation are independent of the number of mutations already present. (B) In a separate experiment, combinations of pairs of individual mutations were constructed and the fitness of the pairs was compared with the fitness expected by multiplying their individual effects. There were significant deviations (indicating significant epistasis), but these showed no tendency to be systematically positive or negative.

23.17A,B, modified from Elena S.F. et al., *Nature* **390**: 395–398, © 1997 Macmillan, www.nature.com