



**FIGURE 8.9.** Organelle to nuclear gene transfer. Multiple steps in the transfer of DNA from an organelle genome to that of the nucleus are shown. First, an endosymbiosis forms. Next the endosymbiont replicates itself. Then some symbionts lyse and their DNA migrates to the nucleus where it is integrated into the nuclear genome. Genes that were integrated acquire targeting and translocation signals allowing the gene product to be sent to the symbiont. This allows the symbiont version of this gene to be deleted without functional consequences. Many consider this the point at which the symbiont becomes an organelle.

8.9, adapted from Dyall S.D. et al., *Science* **304**: 253, © 2004 American Association for the Advancement of Science