Evidence

Two scientists Meselsohn and Stahl designed a sophisticated experiment that provided evidence for semi-conservative replication. They designed their experiment on three main facts. It was that all bases of DNA contain Nitrogen, that Nitrogen has two forms: the lighter N14 and the heavier N15 and that bacteria will incorporate nitrogen from their growing medium into any new DNA that they make.

The scientists used E.coli and isotopes of Nitrogen. They cultured bacteria in a N15 medium. N15 is a heavy isotope of nitrogen so the DNA synthesized is of a heavy density. They then shifted the bacteria to an N14 medium, the DNA was isolated at different times corresponding to replication cycles 0, 1 and 2. After one replication cycle, the DNA was all of middle density. This rules out the conservative replication model, which predicted that both heavy density DNA and light density DNA would be present, but none of middle density will be present. This result is consistent with the semi-conservative replication model, which predicts that all DNA molecules will consist of one N15 DNA strand and one N14 DNA strand.

After two replication cycles, two bands of DNA were seen, one of middle density and one of light density. This result is exactly what the semi-conservative model predicts: half should be N15-N14 middle density DNA and half should be N14 light density DNA.