

Protocol: 30S & 50S Ribosomal Subunit Preparation (SJ Lab)

IMPORTANT: Everything should be done at 4 °C! Use ice-cold Buffers, French Press, Rotors, etc. Use RNase free lab wares and reagents.

1. Inoculate FOUR 5 ml LB with MRE600 glycerol stock. Grow overnight at 37 °C in shaker.
2. Inoculate THREE 500 ml LB with 2 ml of saturated, overnight MRE600 culture. Grow at 37 °C in a shaker until A650 is 0.5. (Takes approximately 4 hours)
3. Place cultures on ice for 30 minutes. Transfer to 500 ml centrifuge bottles.
4. Spin at 8000 RPM for 15 min at 4 °C in BECKMAN 10.500 rotor.
5. Resuspend each cell pellet in 15 ml of buffer A.
6. Pool all the resuspended cells in one centrifuge bottle. Spin at 8000 RPM for 15 min at 4 C in BECKMAN 10.500 rotor. You can store the cell pellets at this stage at -80 °C.
7. Resuspend the cell pellet in 45 ml of buffer A on ice.
8. Lyse the cells using a French Press at 18000 psi. Two passes through the press is usually sufficient.
9. Add 50 µl of RQI RNase Free, DNase I (Promega).
10. Spin at 15,000 RPM (=30,000 g) at 4 °C for 30 min in BECKMAN JA 17 rotor.
11. Transfer supernatant (S30) to new tubes and repeat spin (step 10).
12. Adjust the ammonium chloride conc in the S30 to 0.5 M.
13. Transfer the S30 supernatant to FOUR clean “Red-capped” 25 ml Ultra Centrifuge bottles (BECKMAN Cat# 355618).
14. Spin at 40,000 RPM for 4 hours at 4 °C in BECKMAN Ti-70 rotor.
15. Prepare SIX 10% to 40% sucrose gradients in buffer B*. Each gradients is made using 18 mls of 10% sucrose + 18 mls of 40% sucrose in BECKMAN Ultra-Clear centrifuge tubes (Cat# 344058). Store the gradients at 4 °C for atleast 2 hours before use.
16. Wash the crude ribosome pellet with 5 ml of buffer B*. This can be accomplished by adding the buffer to the centrifuge bottles and gently twirling the bottles. Remove the buffer by decanting carefully.

17. Resuspend the crude ribosome pellets in 1.5 ml buffer B* on ice using a small magnetic stir-bar. Do not resuspend the brown “junk” at the bottom of the pellet.
18. Load 1 ml of resuspended ribosomes per gradient.
19. Spin gradients at 25,000 RPM for 16 hours at 4 °C in BECKMAN SW-28 rotor.
20. Set-up the ISCO/BRANDEL gradient fractionator. Warm it up for 30 min before use. Use ice-cold 50% sucrose to pump the gradients.
21. Monitor the gradient at A254 using the UA-6 detector and chart recorder. Collect the 30S and 50S peaks separately into clean 15 ml FALCON tubes on ice.
22. Pool 30S peaks and 50S peaks. Raise the Magnesium chloride conc. to 10 mM final. Add buffer C to final 60 ml total volume. (This helps to dilute the sucrose percentage)
23. Spin at 40,000 RPM for 13 hours at 4 °C in Ti-70 rotor. Use clean “Red-capped” 25 ml Ultra Centrifuge bottles (BECKMAN Cat# 355618).
24. Wash the subunits with 5 ml of buffer C. This can be accomplished by adding the buffer to the centrifuge bottles and gently twirling the bottles. Remove the buffer by decanting carefully.
25. Resuspend the subunits in a total volume of 1.0 ml of buffer C.
26. Make 10 ul aliquotes and quick-freeze in liquid nitrogen. Store at –80 °C.

BUFFERS FOR 30S & 50S Subunit PREP

Make buffers a day in advance and store them at 4 °C. Add 2-mercaptoethanol to the buffers just before use.

Buffer A:

50 mM Tris-HCl pH 7.6
10 mM MgCl₂
100 mM NH₄Cl
6 mM 2-mercaptoethanol
0.5 mM EDTA

Buffer B* (1 mM Mg²⁺):

50 mM Tris-HCl pH 7.6
1 mM MgCl₂
100 mM NH₄Cl
6 mM 2-mercaptoethanol

Buffer C:

50 mM Tris-HCl pH 7.6
10 mM MgCl₂
100 mM NH₄Cl
6 mM 2-mercaptoethanol

40% Sucrose in Buffer B*:

70.6 Grams BRL sucrose in final vol 150 ml of buffer B.

10% Sucrose in Buffer B*:

15.6 Grams BRL sucrose in final vol 150 ml of buffer B.

50% Sucrose in water for Syringe Pump:

92 Grams BRL sucrose in final vol 150 ml of water.