PCL:PEG Electrospinning

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ABSTRACT

This protocol details how to electrospin a PCL:PEG copolymer onto glass cover slip.

PROTOCOL STATUS

Working

We use this protocol in our group and it is working

GUIDELINES

Lab coat and gloves must be worn at all times.

MATERIALS TEXT

Materials:

- 70% ethanol solution
- Syringe pump
- 10 mL syringe with 23 gauge needle tip
- 15 kV power source
- Glass cover slip (1 cm × 1 cm)
- Aluminum foil
- Tape
- Copper plate adhered to stand
- Non-conducting material (i.e. pipette tip, inoculating loop)
- Blade
- Laboratory wax film (Parafilm®)

Reagents

- Polycaprolactone (PCL)
- Polyethylene glycol (PEG)
- Trichloromethane (Chloroform)
- Acetone

Make polymer solution

1 In 50 mL tube, add **14 ml** chloroform and **6 ml** acetone. This is your solvent solution.

The solvent solution should be 70% chloroform and 30% acetone. You can adjust volumes accordingly.

SAFETY INFORMATION

Always work with these solvents in chemical fume hood.

2 In 15 mL tube dissolve **1 g** PCL in **10 ml** solvent solution to make a **[M]10 Mass/Volume Percent** solution of PCL in solvent.

3 In a second 15 mL tube dissolve **500 mg** PEG in **10 ml** solvent solution to make a **[M]5 Mass/Volume Percent** solution of PEG in solvent.

4 Place the solvent solutions on a rocker overnight to fully dissolve.

5 Combine the polymer solutions at a rate of 3 parts PCL solution to 1 part PEG solution.

Load the dock

6 Fold a 10 cm × 10 cm piece of aluminum foil.

7 Attach foil square to copper plate.

8 Using double-sided tape, attach cover slips onto aluminum foil.

9 Face the copper plate normal to the syringe pump within the enclosure, and move until the plate is approximately 9 cm away from the needle.

Increasing the distance will decrease fiber diameter.

10 Vortex the PCL:PEG solution for 3 minutes

11 Pour PCL:PEG solution onto petri dish and draw solutin into a 10 mL syringe with 23 ga. tip.

12 Purge any bubbles from the syringe by holding the syringe with the tip facing upward and depressing the plunger.

13 Load syringe onto syringe pump, and secure.

Electrospin

Clip the ground (black) wire to the leads coming from the copper plate.

14 Clip positive (red) wire to the syringe needle.

15 Set syringe pump rate to 20 µL/min, and begin pumping.

16 Turn on power source set to 15,000 V.

> **SAFETY INFORMATION**
> Do not touch any of the power source leads. Turn off power source to make any adjustments to the setup.

17 If necessary, "aim" the needle/syringe pump to obtain a uniform layer on all coverslips.

18 If clumping occurs at the needle, use a non-conducting material to clear.

Harvest material

19 Once a desired thickness has been spun, turn off power supply and allow to cool for 2-3 min.

20 Detach power supply leads.

21 Use a blade to cut the fibers between the cover slips. Use caution not to disturb the fibers on the cover slips.

22 Remove cover slips carefully.