**OVERVIEW**

This stepwise polymerization protocol is designed for Oligomer-PD and associated polymerization reagents and formularies found within the Standardized Oligomer Polymerization Kit. This procedure supports user-customization and preparation of highly reproducible collagen-fibril matrices and cellularized tissue constructs, thereby facilitating within and between laboratory comparisons.

**Reagents and Equipment**

* Standardized Oligomer Polymerization Kit Reagents (OPK1001): Oligomer-PD (CM1001), 10X Polymerization Buffer PLUS (PB0001), 0.01M Hydrochloric Acid (PB0002), 0.1M Sodium Hydroxide (PB0003), Polymerization Supplement (PB0004), and Customizable Polymerization Formulary
* Biological Safety Cabinet
* 37oC or Tissue Culture Incubator
* Tubes, Sterile
* Culture Plate or other Container, Sterile
* Micropipettes\* and Micropipette Tips, Sterile
* Ice
* Cells (Optional)

\*Note: Positive displacement micropipettes and wide orifice tips work best for handling viscous oligomer solutions

**PROCEDURE**

1. All work should be performed in biological safety cabinet. Apply aseptic practices to maintain sterility of reagents.
2. Place Oligomer-PD solution and polymerization reagents on ice. All reagents and solutions should be maintained on ice prior to induction of polymerization.
3. Using the Customizable Polymerization Formulary (specific for product lot), determine the volumes of each reagent for creating desired matrix or tissue construct.
4. Transfer the predetermined volume of Oligomer-PD into a sterile tube.
5. Add to the Oligomer-PD solution, the predetermined volumes of 0.01M Hydrochloric Acid, 10X Polymerization Buffer PLUS, 0.1M Sodium Hydroxide, and Polymerization Supplement. Invert tube several times to mix after each addition.
6. For adding cells, spin down predetermined volume of cell suspension to create a cell pellet containing the desired number of cells. Very carefully remove the medium from the cell pellet. Agitate the tube to dislodge and disrupt pellet for uniform mixture. Add neutralized Oligomer-PD solution to cell pellet. Mix thoroughly by inverting tube several times.
7. Aliquot neutralized Oligomer-PD solution or Oligomer-cell suspension into well plate.
8. Place well plate in 37°C incubator# for 10 minutes to induce polymerization. Immediately following polymerization, further process collagen-fibril matrix as desired or add desired medium to cellularized tissue construct and culture as usual.

#Note: Tissue culture incubator may be used