**Supporting information**

**For**

**Fabrication of Tri-polymers Composite Film with High Cyclic Stability and Rapid Degradation for Cardiac Tissue Engineering**

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1. **Materials and methods**

**Cell Culture**

According to the previous publication, a cell culture test was performed using cardiomyocytes cells that were isolated from 3-days Sqague Dawley rats [1]. Briefly, the isolated cardiomyocytes were pre-plated for 2 h in 2 mM l-Glutamine, 10% FBS and 100 U/mg/ml Pen/Strep in DMEM/F12 medium and subsequently immersed in media (DMEM high glucose, Invitrogen) supplemented with 10% Fetal Bovine Serum (FBS) and 4% Penicillin-Streptomycin (reduced to 1% after 24h) and incubated at 37°C with 5% CO2. An outgrowth of cardiomyocytes was observed after 5-7 days. All in vitro experiments were conducted using cells from passage 4 to 6. After that, films (about 5 mm disc) were sterilised by UV radiation for 30 minutes on both sides. Films were placed in Petri dishes and seeded with 5,000 cardiomyocytes in 20 µL of culture media. Cells were allowed to attach for 2 h, and films were then transferred into 48 well-plates containing 500 µL of media. The culture medium was changed every 24 h.

After 1day of culture on three samples per group, a Live / Dead ® assay was conducted by staining cells with fluorescein diacetate (FDA- green channel for living cells) or propidium iodide (PI- red channel for dead cells). The films were washed twice in PBS and then incubated under 5 % of CO2 with FDA (0.8 U/ mL) and PI (5μg / mL) in PBS at 37oC for 10 min. Then the films were rinsed in PBS twice and then captured shortly. The cells were visualised under a Confocal Microscope (Nikon, Eclipse- Ti, U.S.A) at excitation/emission wavelength 488/530 nm for FDA and 530/ 620 nm for PI. At selected times (Day 1; n=4), the SEM visualised cell morphology and attachment on the various films. The composite films were washed twice with PBS. The samples were then fixed for 4 hours in 2.5% glutaraldehyde solution. Graded ethanol solutions, 10, 30, 50, 80, 96 and 100% (each step 10 min), were used to dehydrate the samples. Finally, the samples were gold-coated and evaluated by the SEM.

For cell growth and proliferation assessments, MTT metabolic assay was conducted according to our previous publications. 100 µL of fresh DMEM and 100 µL of 3-(4,5- dimethylthiazol-2-yl)-2,5-dipheyltetrazolium bromide (MTT) were added to each well directly on the composite films. After incubation for 4 hours, the medium was removed from each well and 100 µL isopropanol solution was added. After 15 minutes, the absorbance was measured at 450 nm wavelnegth (BioTek ELx808, USA).

[1] F.B. Engel, L. Hauck, M.C. Cardoso, H. Leonhardt, R. Dietz, R.d. Von Harsdorf, A mammalian myocardial cell-free system to study cell cycle reentry in terminally differentiated cardiomyocytes, Circulation research 85(3) (1999) 294-301.