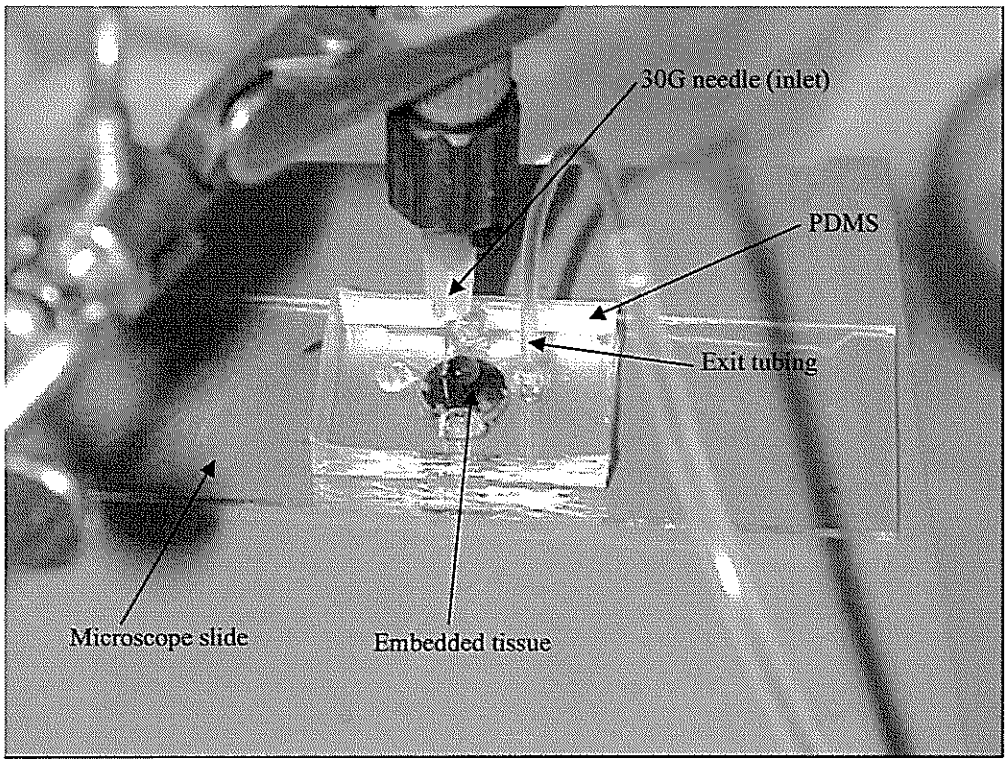

30G needle (inlet)
PDMS
Exit tubing
Microscope slide
Embedded tissue

Fig. 1

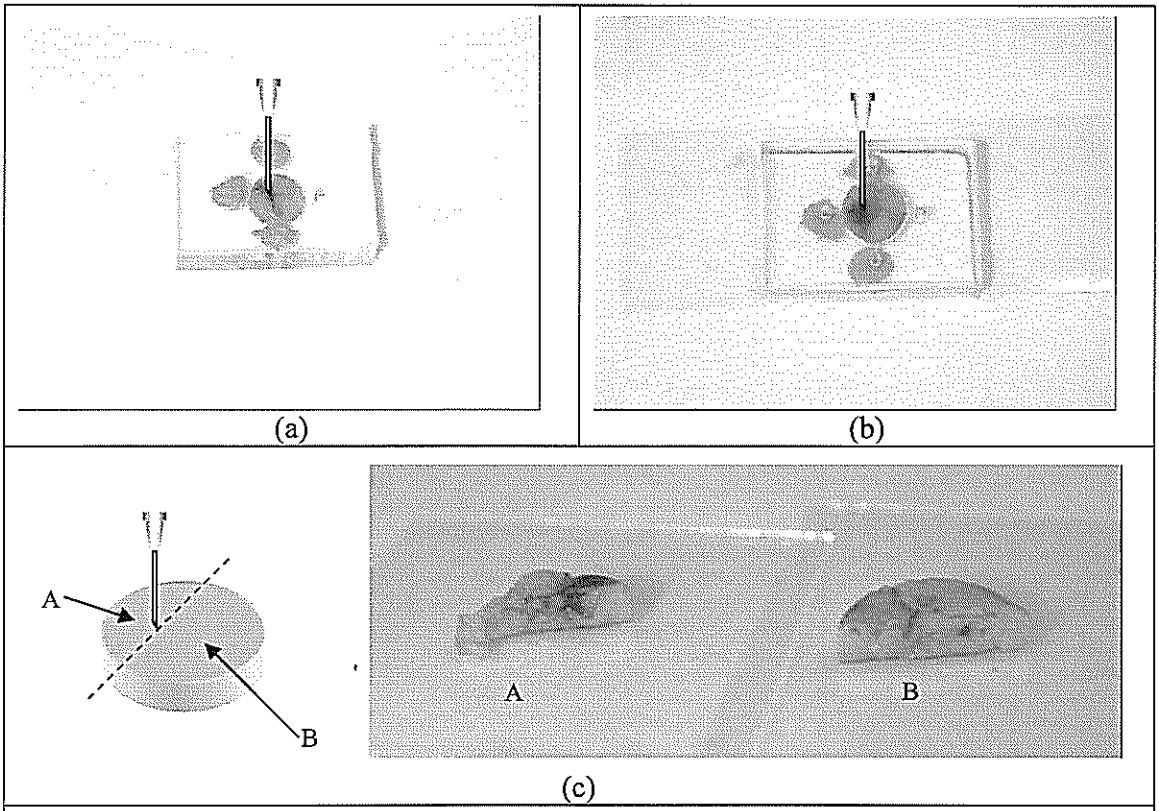


Fig. 2: 2mm thick tissue slice perfused with 10% Trypan Blue for 5 minutes using a single 30G needle. (a) Top of the tissue, (b) bottom of the tissue and (c) cross-sections of the tissue at the needle puncture point.

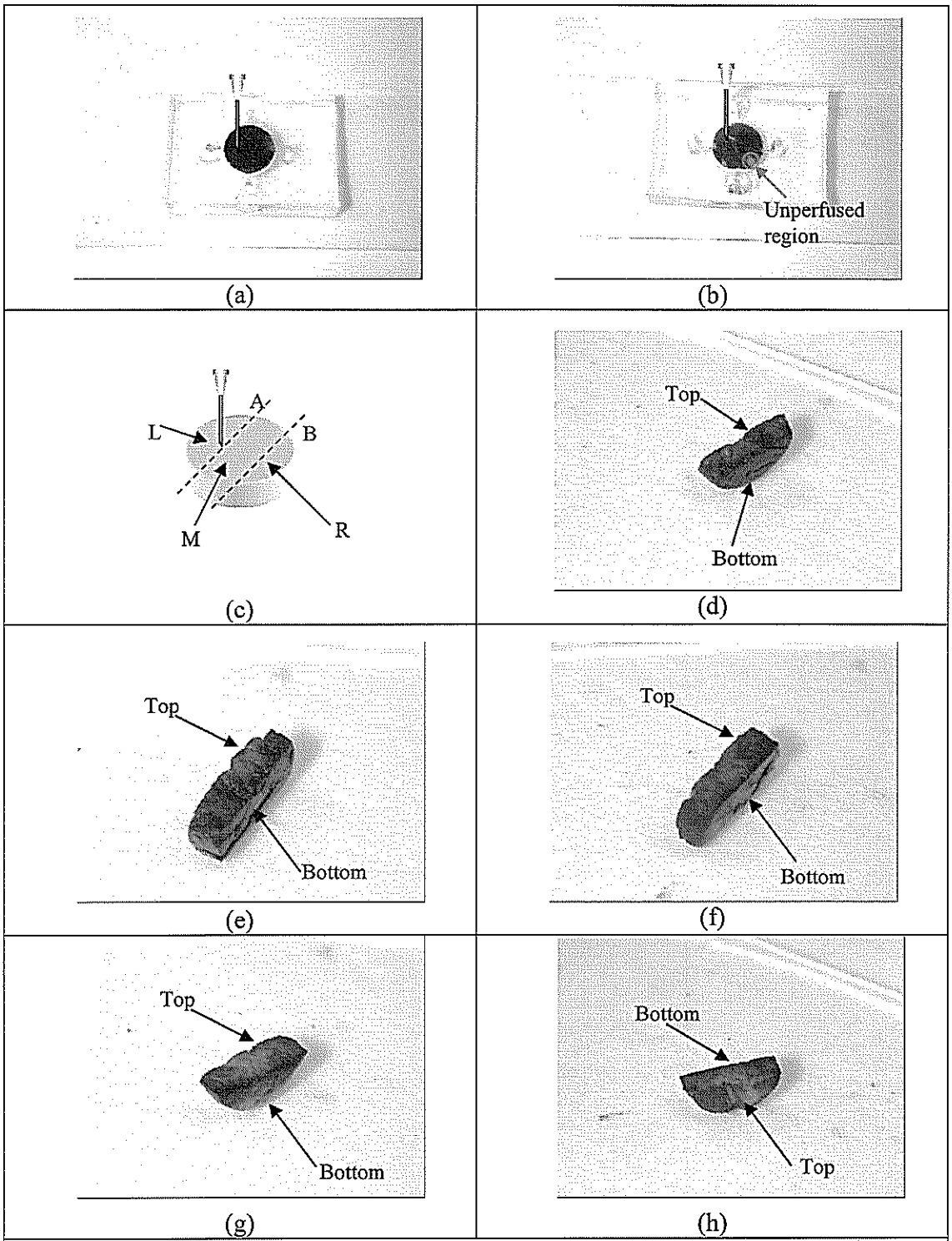


Figure 3: 2mm thick tissue slice perfused with 10% Trypan Blue for 5 minutes using a single 30G needle. (a) Bottom of the tissue (completely perfused), (b) Top of the tissue, (c) schematic of cross section, (d) Cross section A (L), (e) Cross section A (M), (f) Cross section B (M) and (g-h) Cross section B (R).

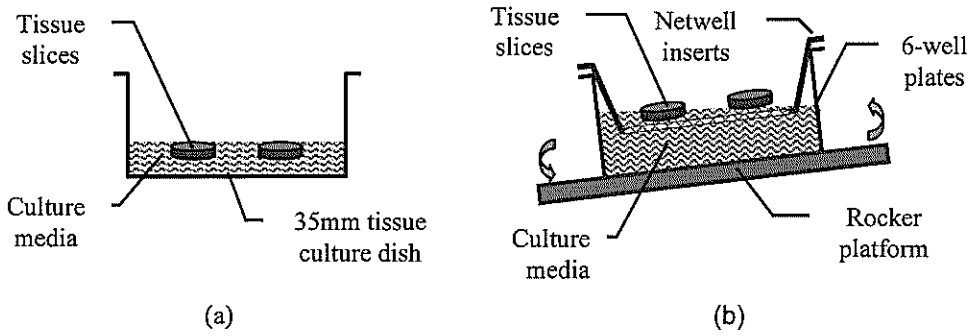


Figure 4: Incubation systems; (a) stationary system, (b) rocker dynamic organ culture.

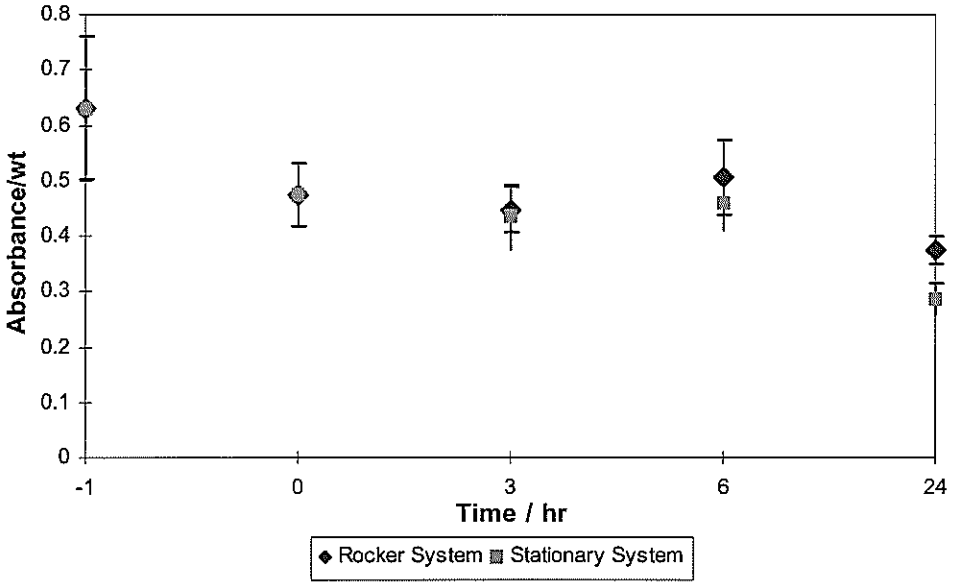


Figure 5: Effect of different incubation systems (stationary system and rocker system) using MTT assay. Slices were perfused with UW solution, precision-cut to 300μm using Krumdieck slicer and pre-incubated for 1hr.

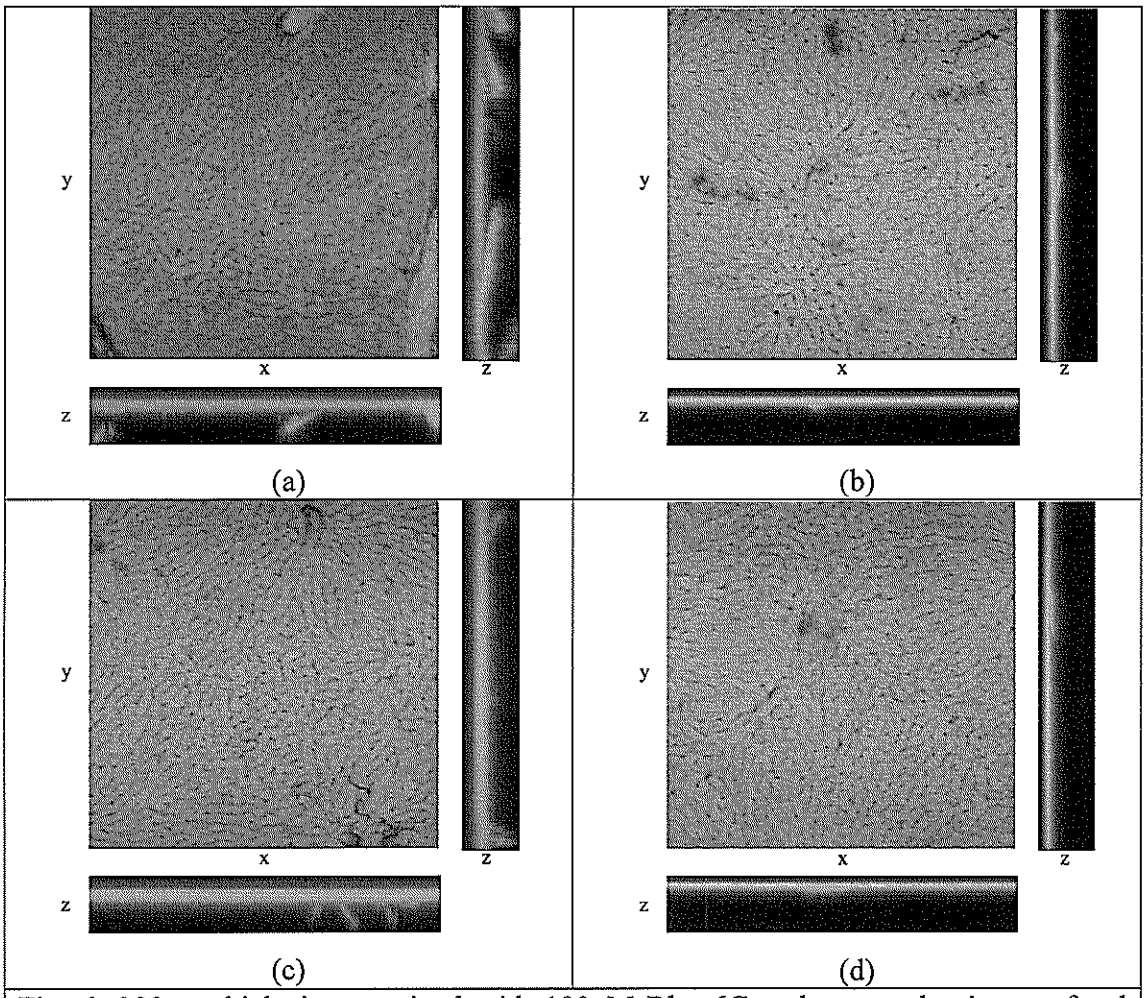


Fig. 6: 300um thick tissue stained with 100uM Rho 6G and captured using confocal microscopy (excitation: 543nm and emission: 560nm). Each stack is 150μm with optical sections captured every 2μm. (a) and (c) were stained under rocking conditions and (b) and (d) were stained under static diffusion condition. (a-b) Images obtained from the bottom layer of the tissue and (c-d) Images obtained from the top layer of the tissue.

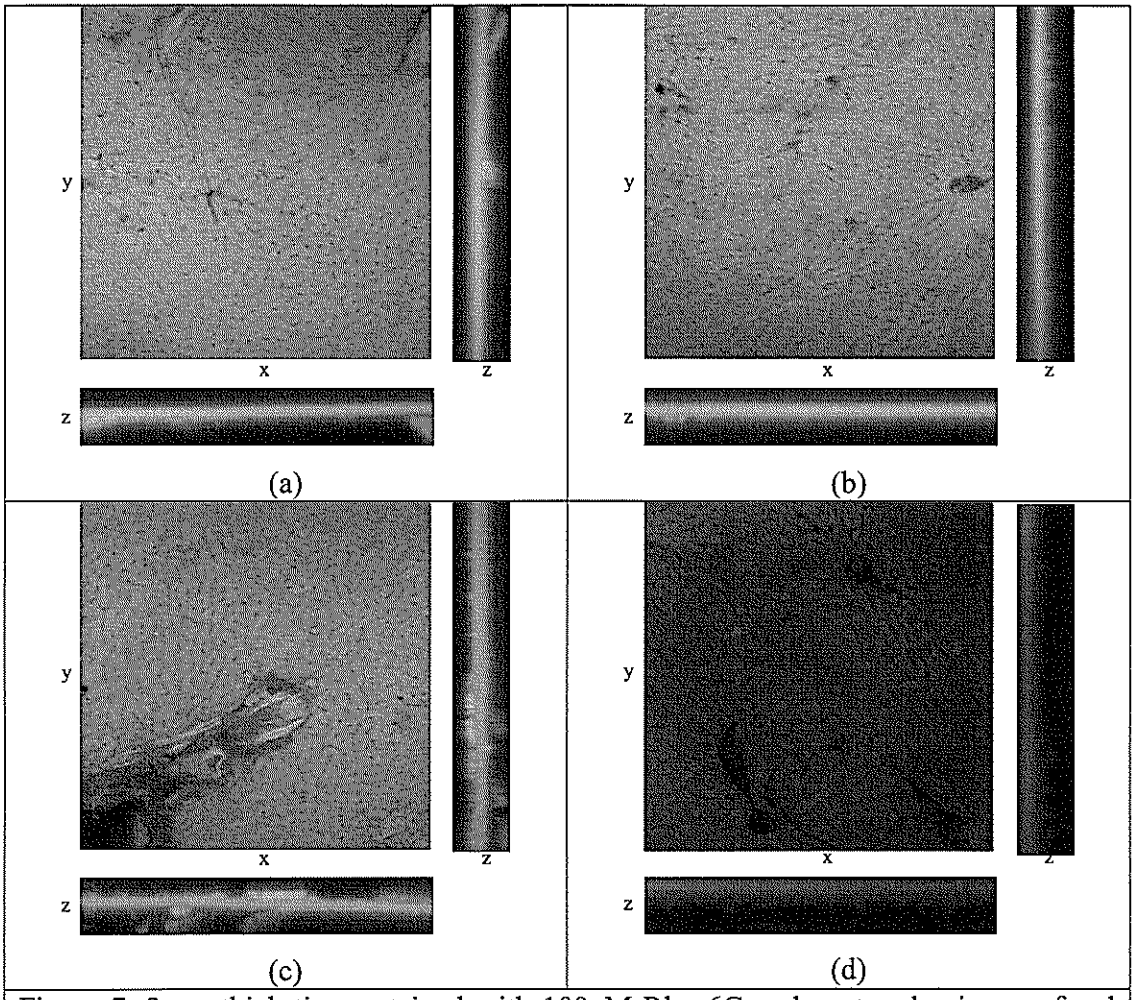
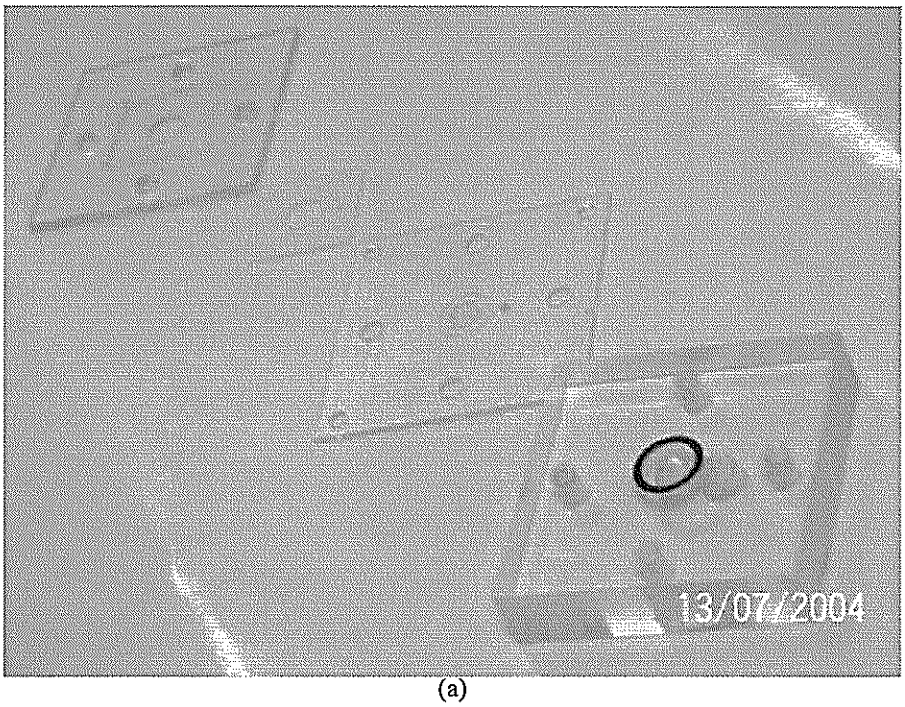
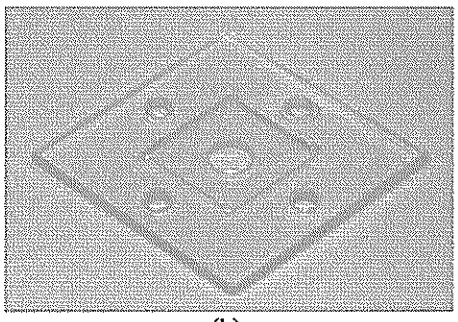


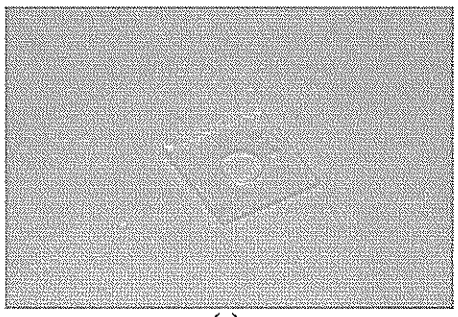
Figure 7: 2mm thick tissue stained with 100uM Rho 6G and captured using confocal microscopy (excitation: 543nm and emission: 560nm). Each stack is 150μm with optical sections captured every 2μm. (a) and (c) were stained using single needle perfusion and (b) and (d) were stained under rocking conditions. (a-b) Images obtained from the bottom layer of the tissue and (c-d) Images obtained from the top layer of the tissue.



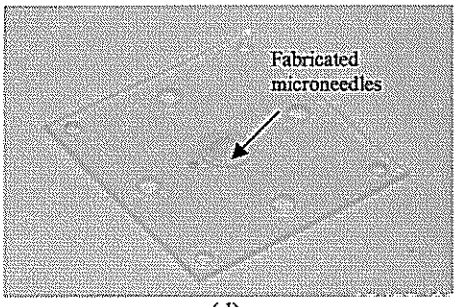
(a)



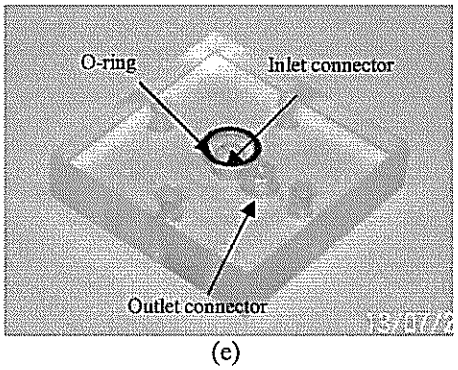
(b)



(c)



(d)



(e)

Figure 8: a) Microneedle chamber components; b) Part 1 – Base; c) Part 2 – PDMS membrane; d) Part 3 – microneedle platform; e) Part 4 – Top cover

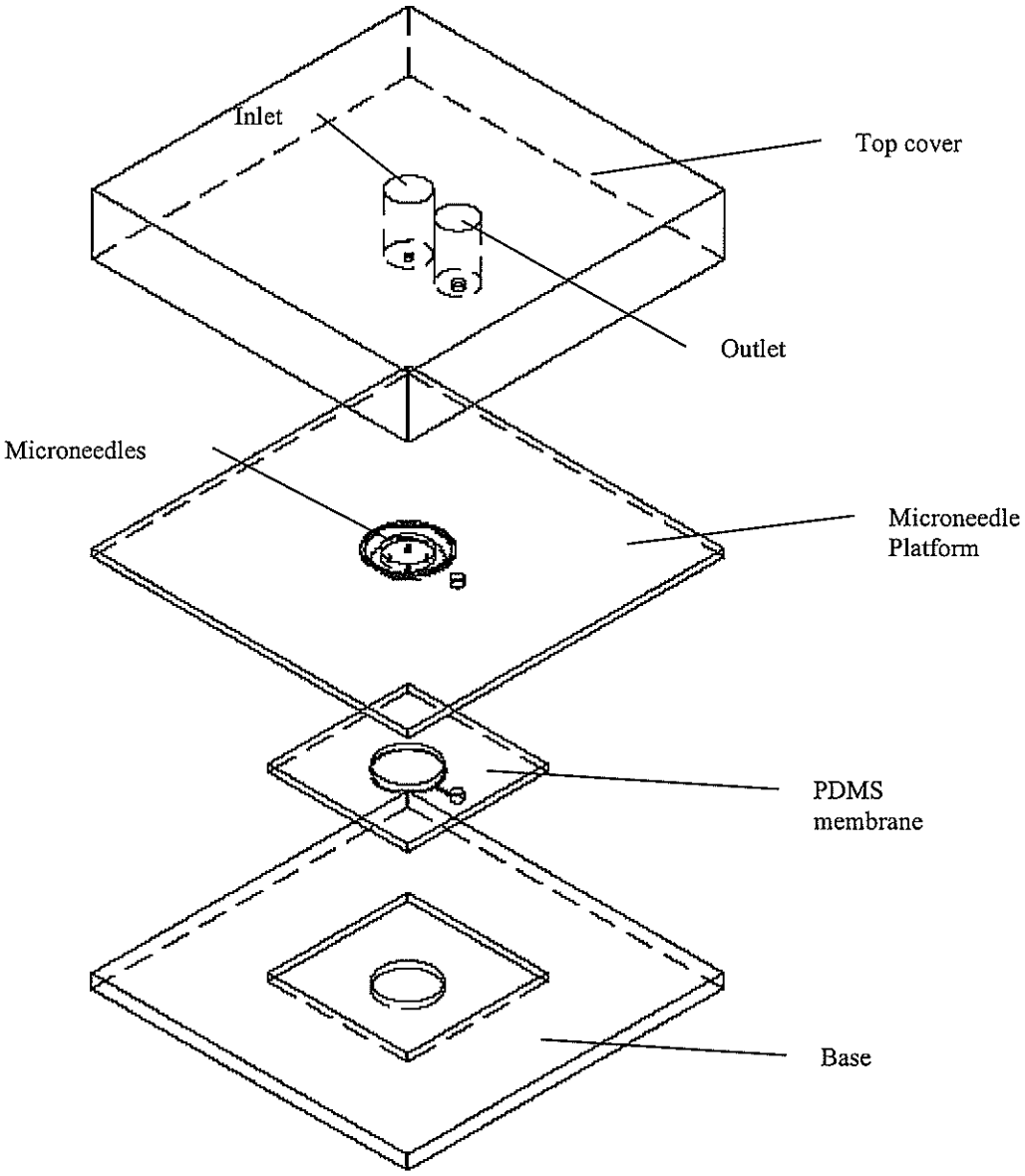


Figure 9: Schematic representation and assembly diagram of the Microneedle Chamber.

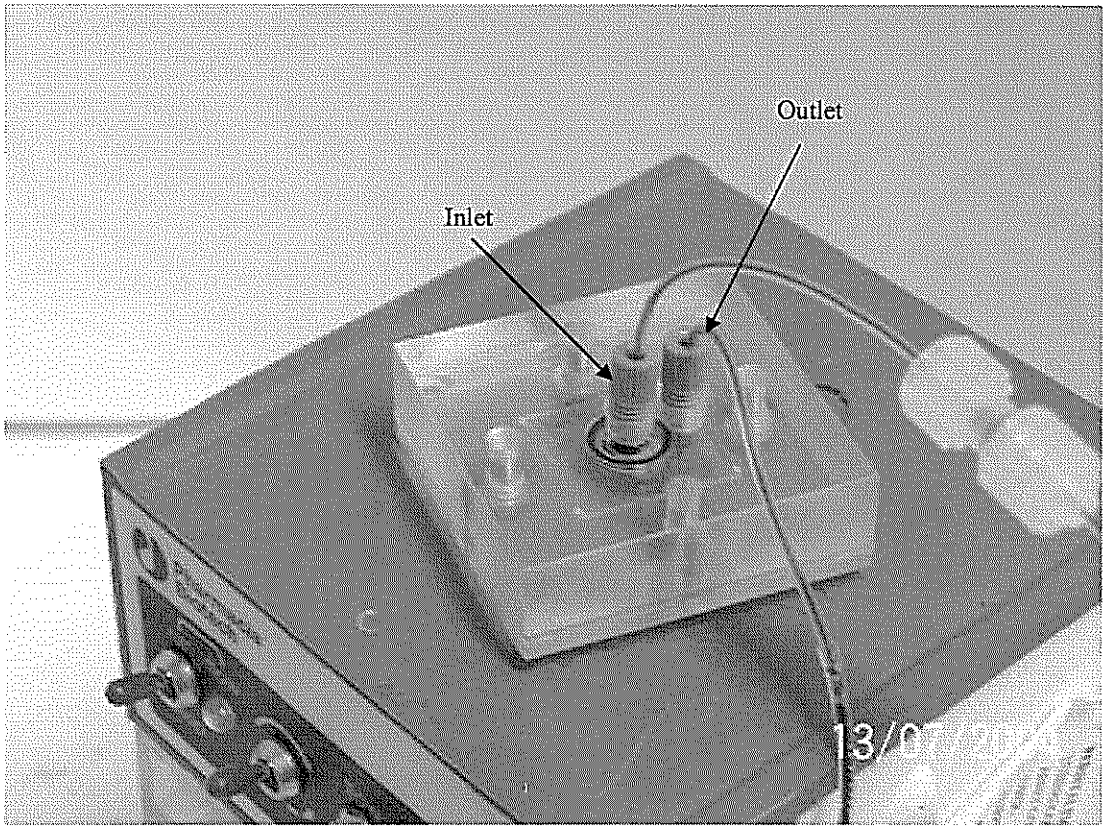


Figure 10: Microneedle chamber set-up.

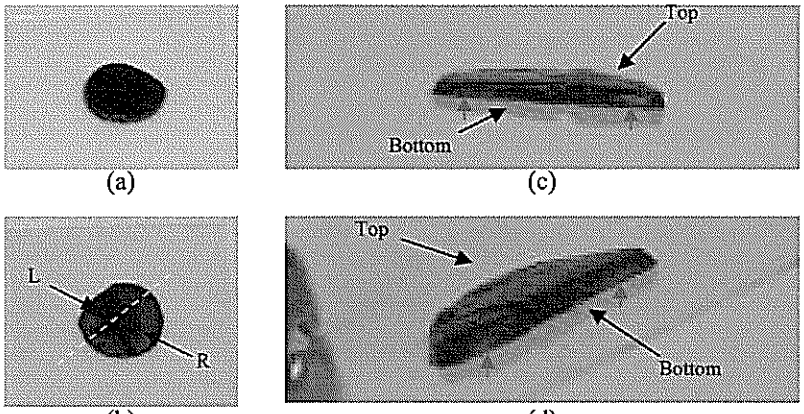


Figure 11: 900μm liver slices perfused with 10% Trypan Blue; (a) Top of the liver slice; (b) Bottom of the liver slice, showing the cutting line of the cross section; (c) Left side of the liver slice (L); (d) Right side of the liver slice (R). Small arrows show regions that remain to be perfused.

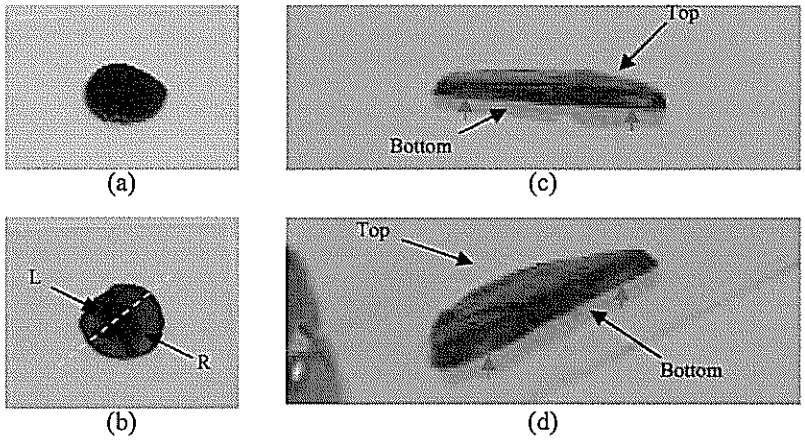


Figure 12: 900μm liver slices perfused with 10% Trypan Blue; (a) Top of the liver slice; (b) Bottom of the liver slice, showing the cutting line of the cross section; (c) Left side of the liver slice (L); (d) Right side of the liver slice (R). Small arrows show regions that remain to be perfused.