Figure 1

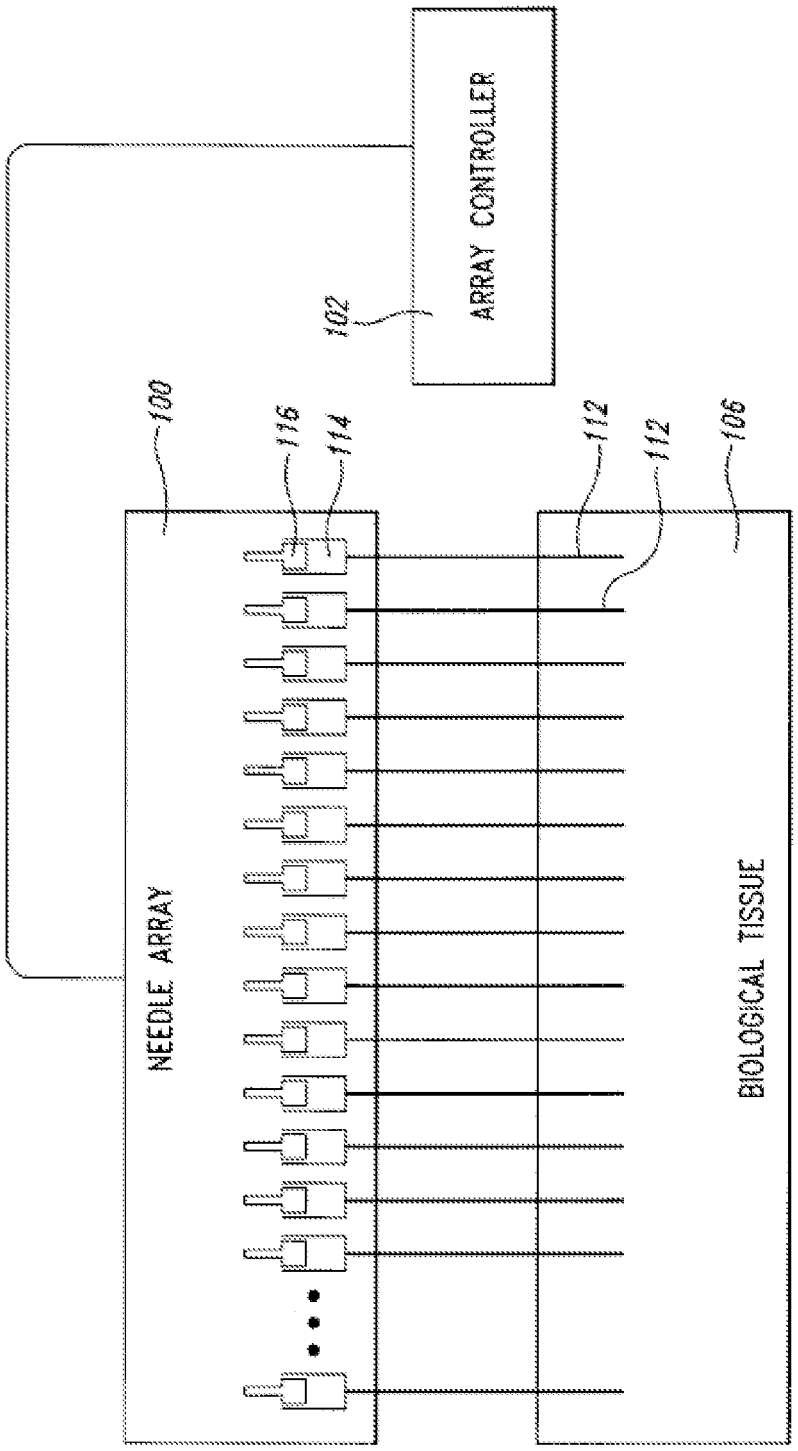

ARRAY CONTROLLER
102
100
116
114
112
112
106
NEEDLE ARRAY
BIOLOGICAL TISSUE

Figure 2

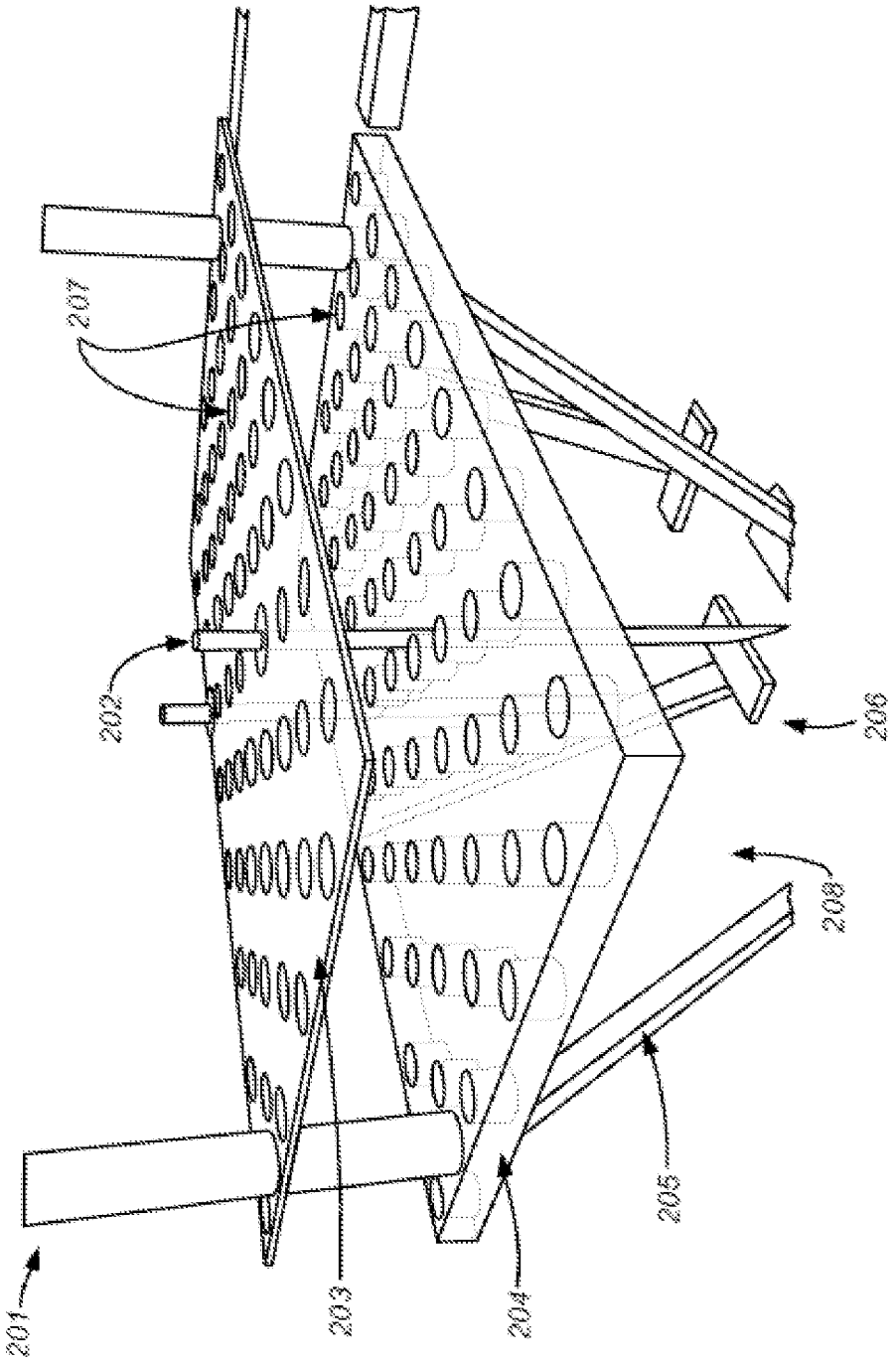


Figure 3

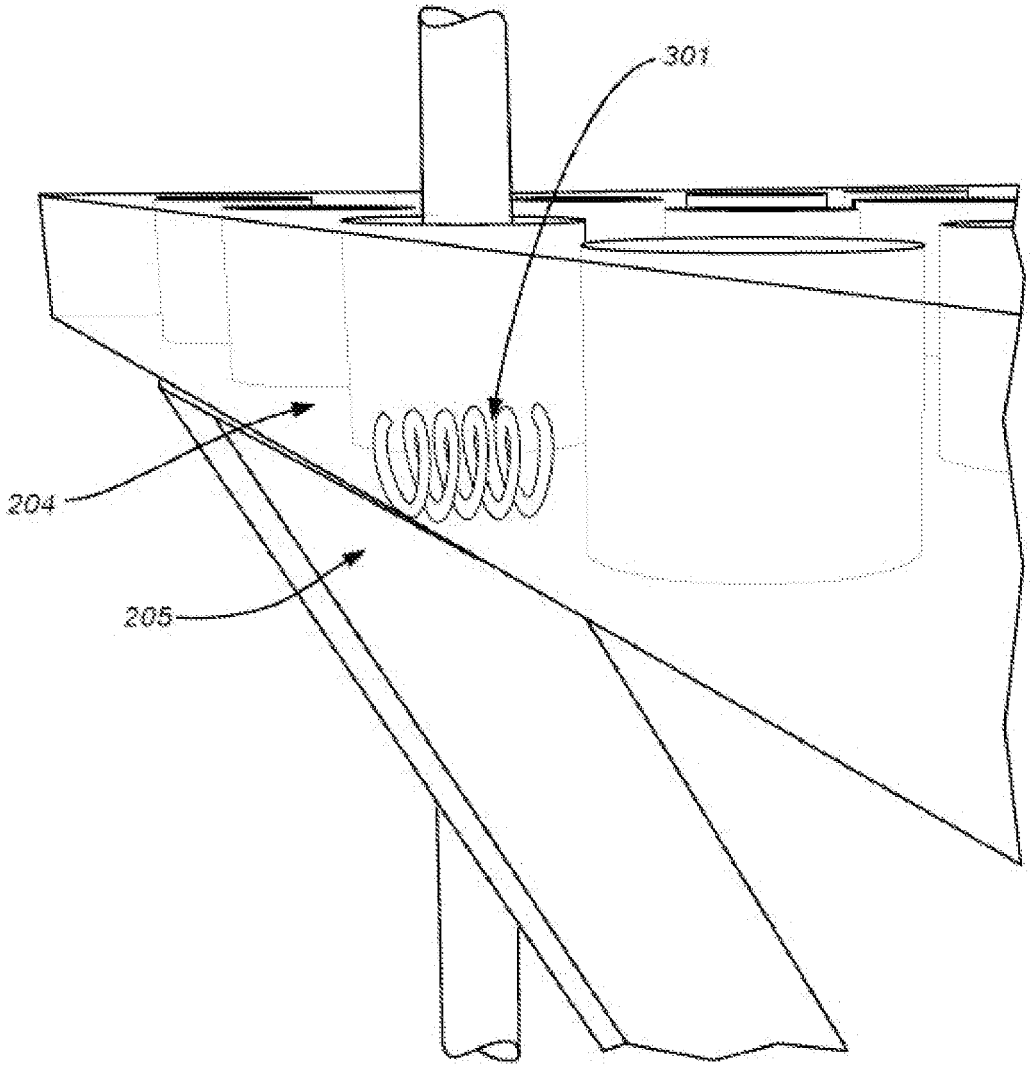


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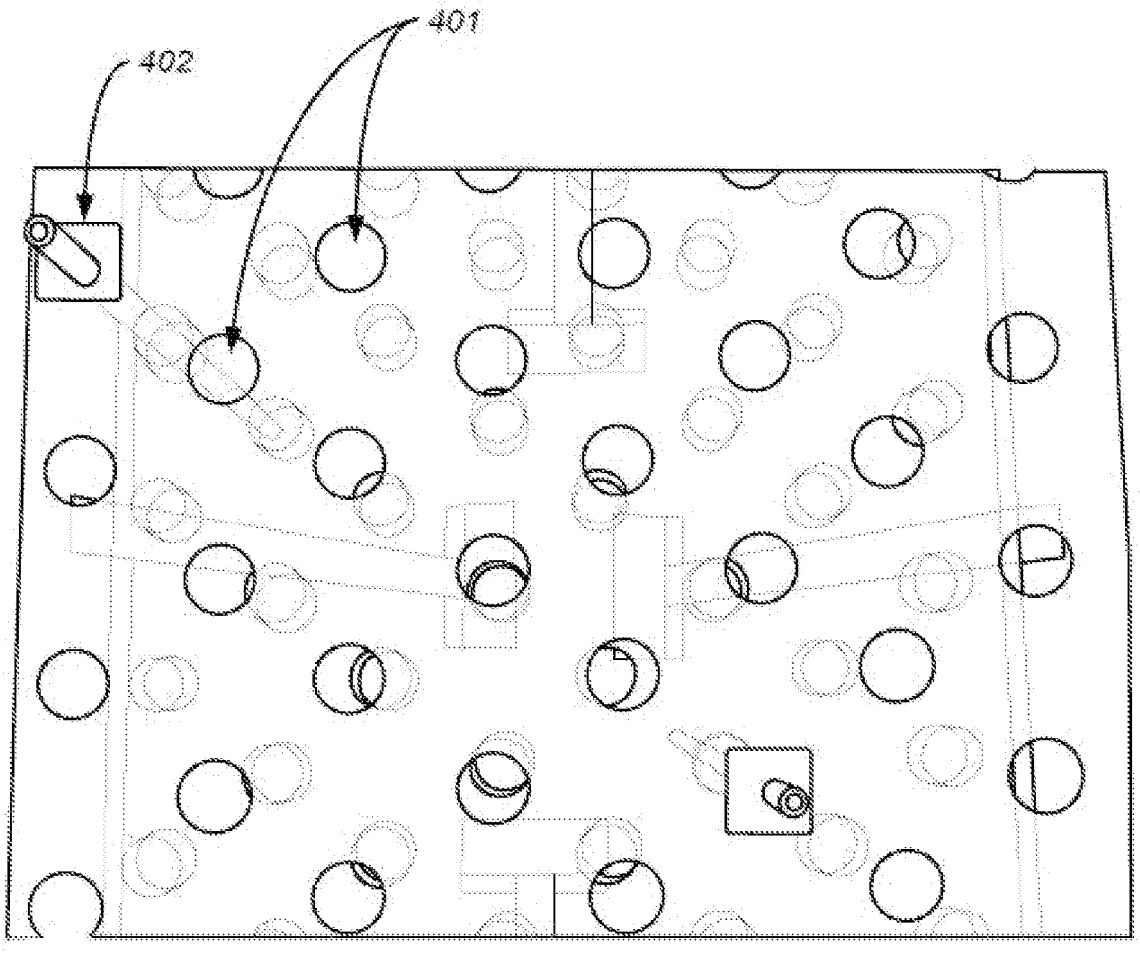


Figure 5

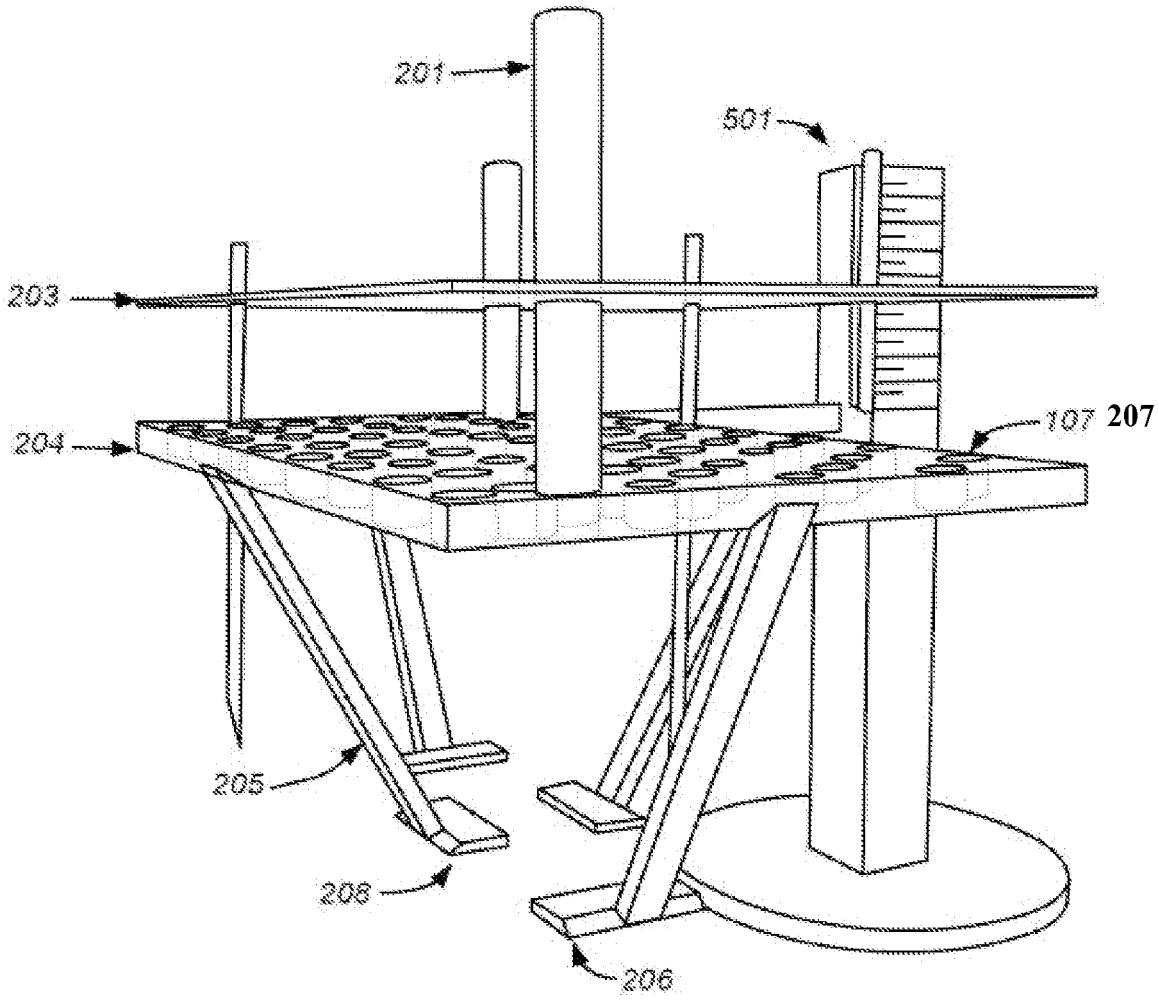


Figure 6

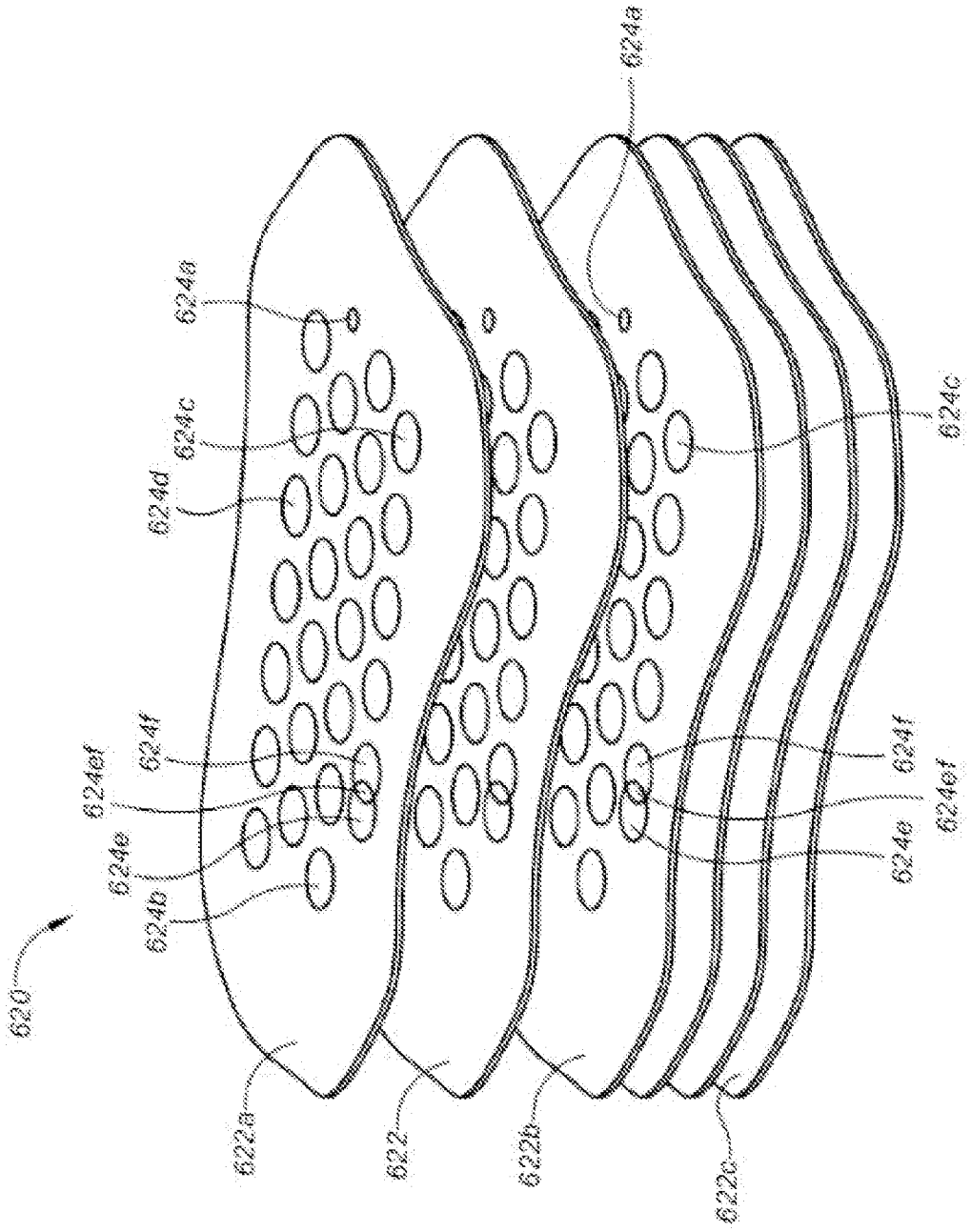

624a
624e
624c
624d
624f
624ef
624e
624b
620
622a
622
622b
622c

Figure 7

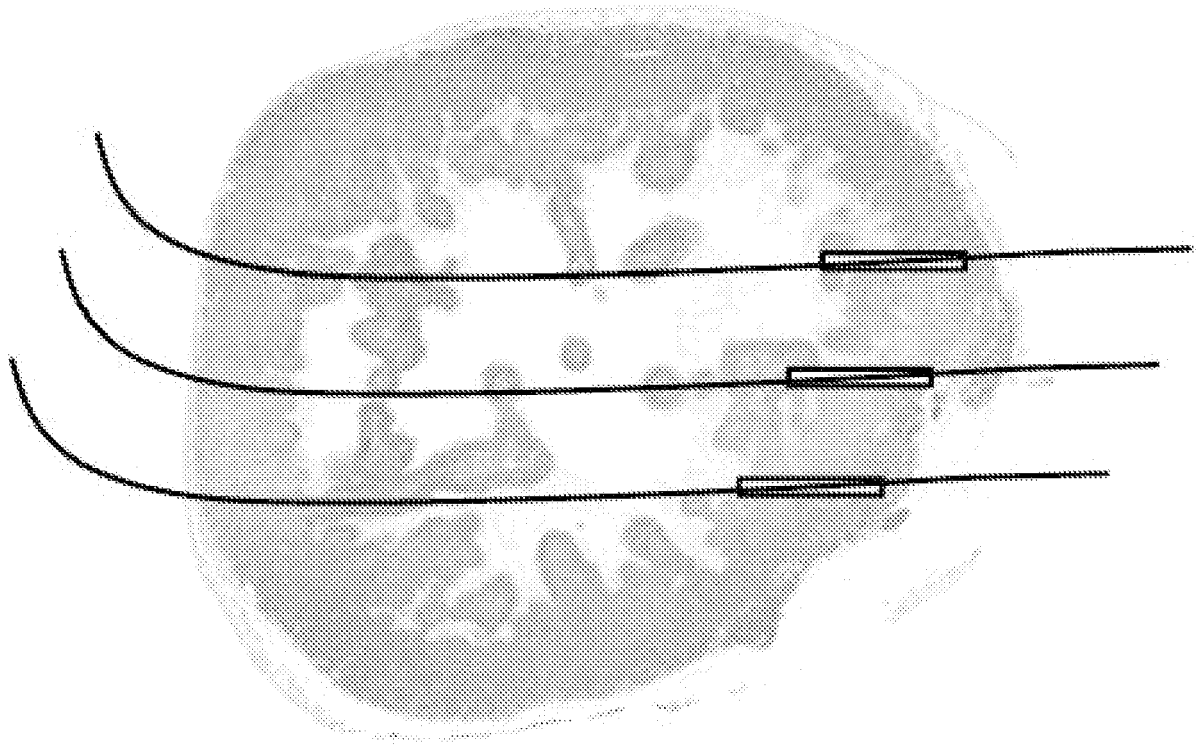


Figure 8

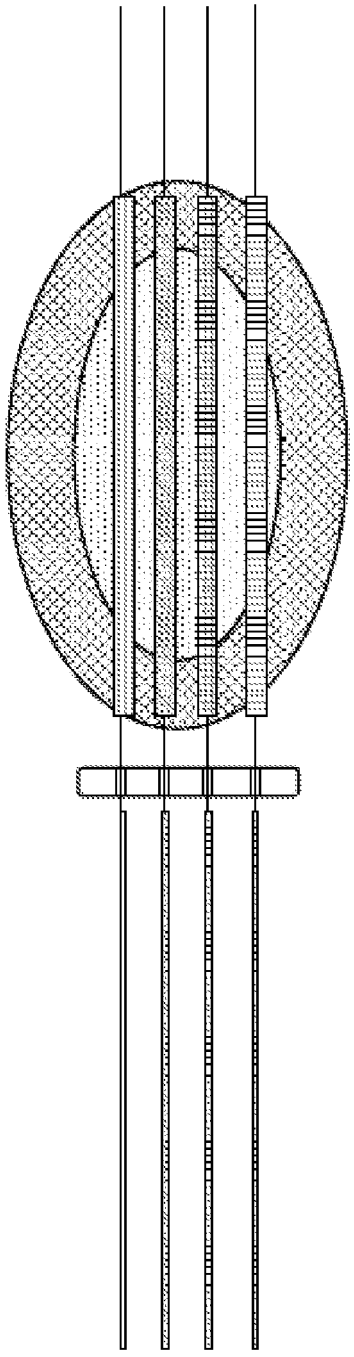


Figure 9

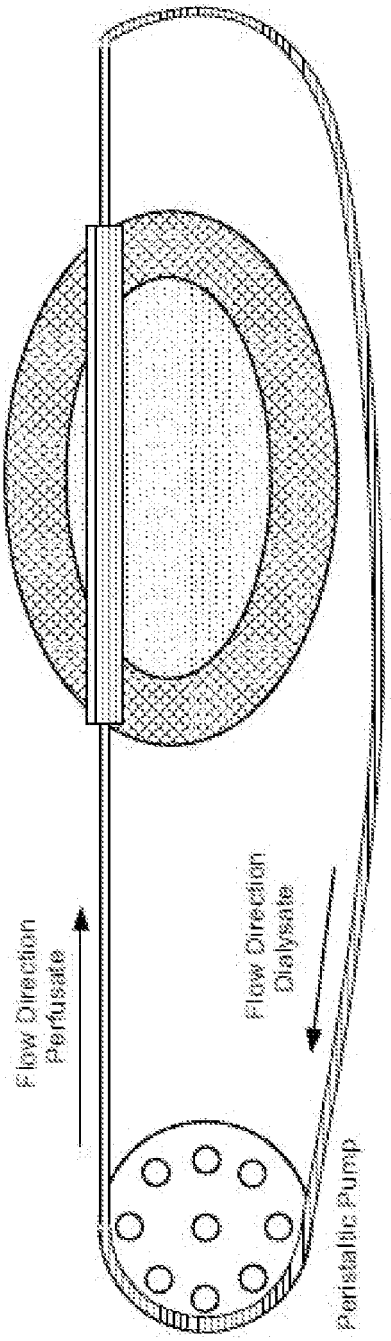

Flow Direction
Ultrafiltrate
Flow Direction
Dialysate
Peristaltic Pump

Figure 10

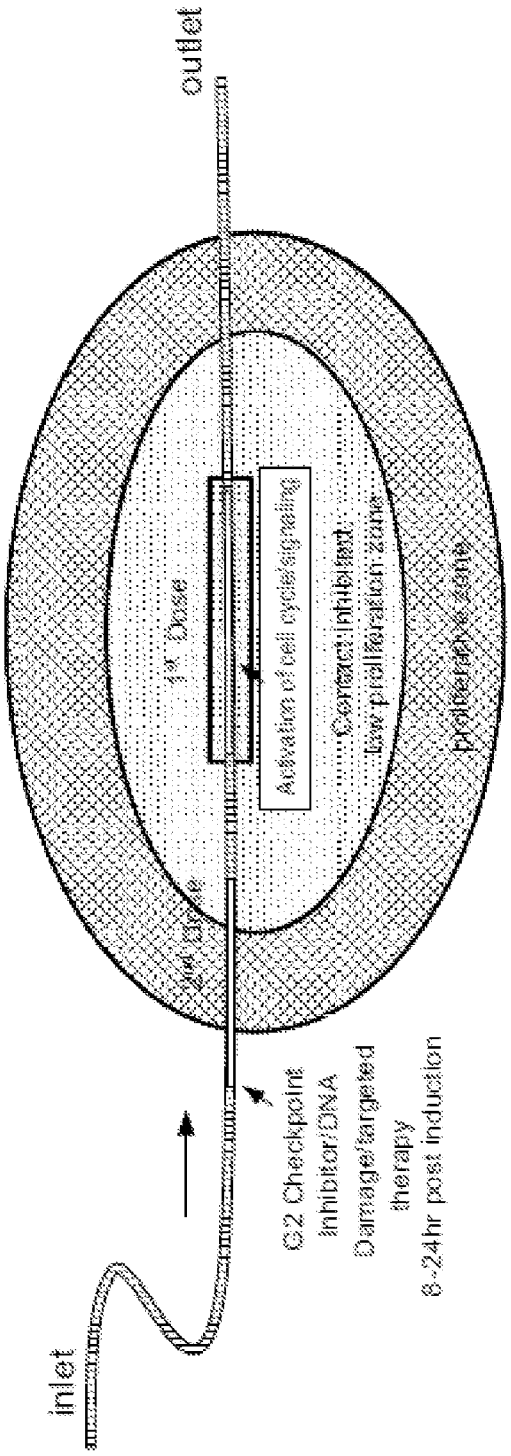

outlet
1st Dose
Activation of cell cycle signaling
Cancer cell inhibited
Low proliferation zone
proliferative zone
2nd Dose
G2 Checkpoint
inhibitor/DNA
Damage targeted
therapy
6-24hr post induction
inlet

Figure 11

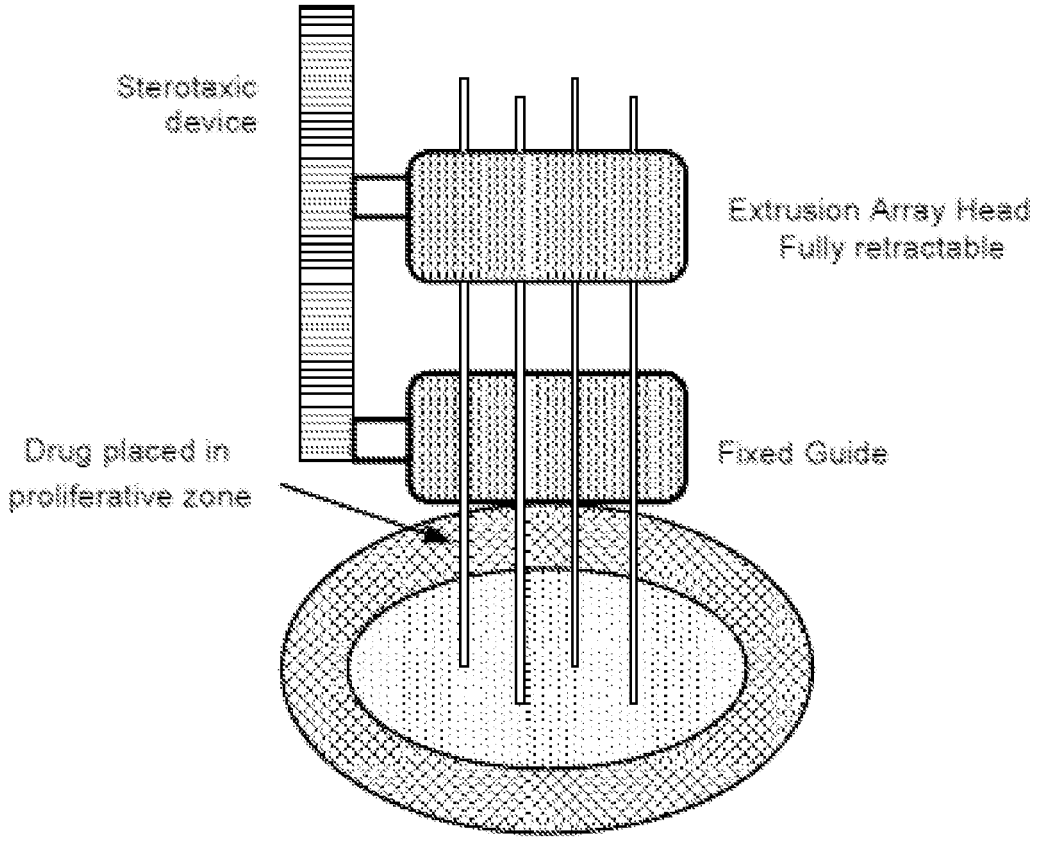

Sterotaxic device
Extrusion Array Head Fully retractable
Drug placed in proliferative zone
Fixed Guide

Figure 12

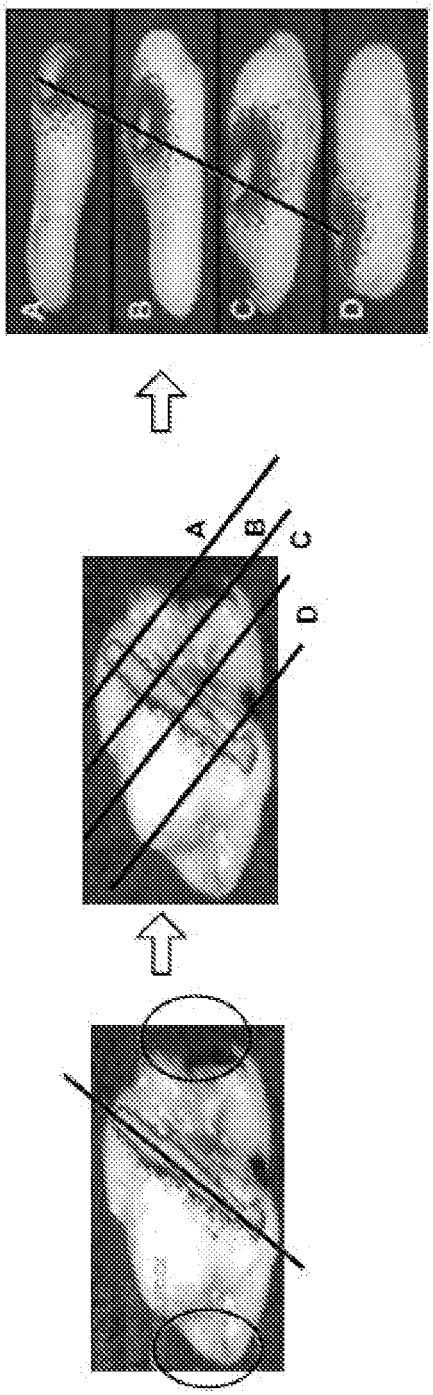
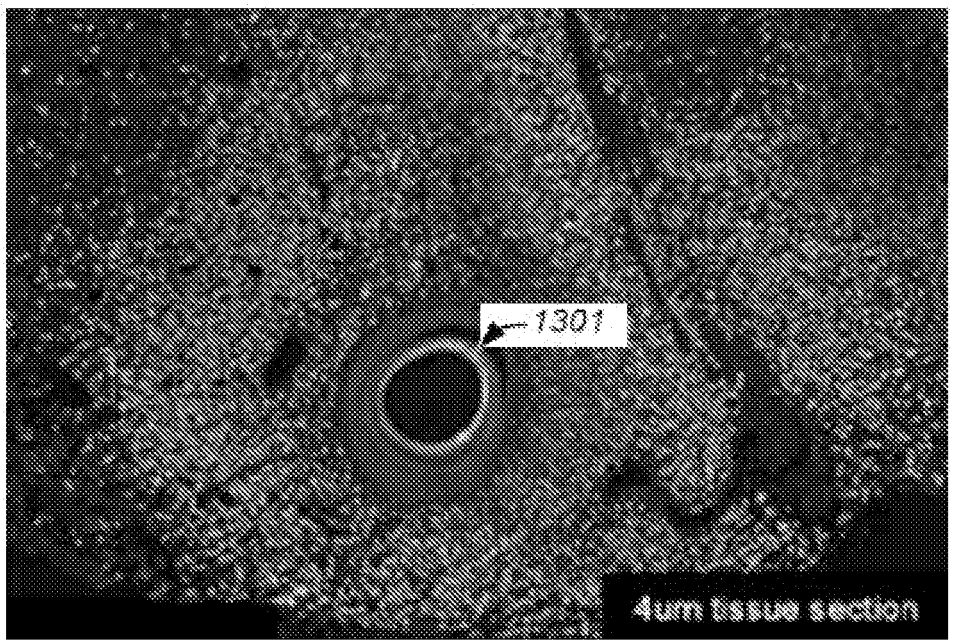
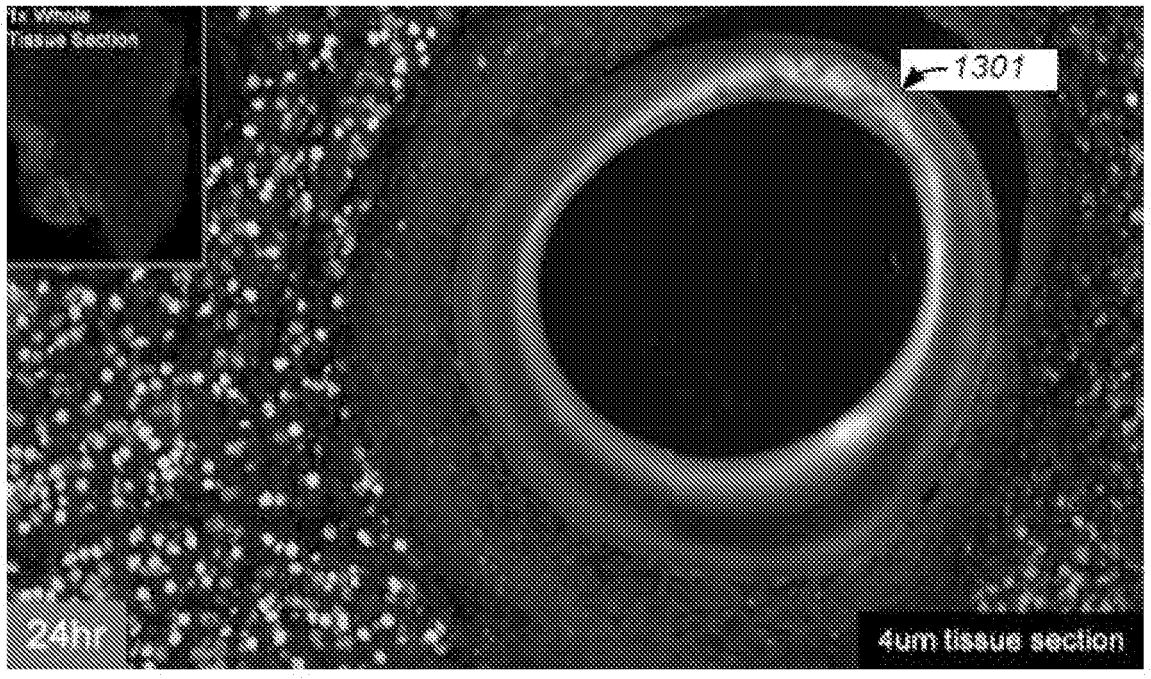


Figure 13

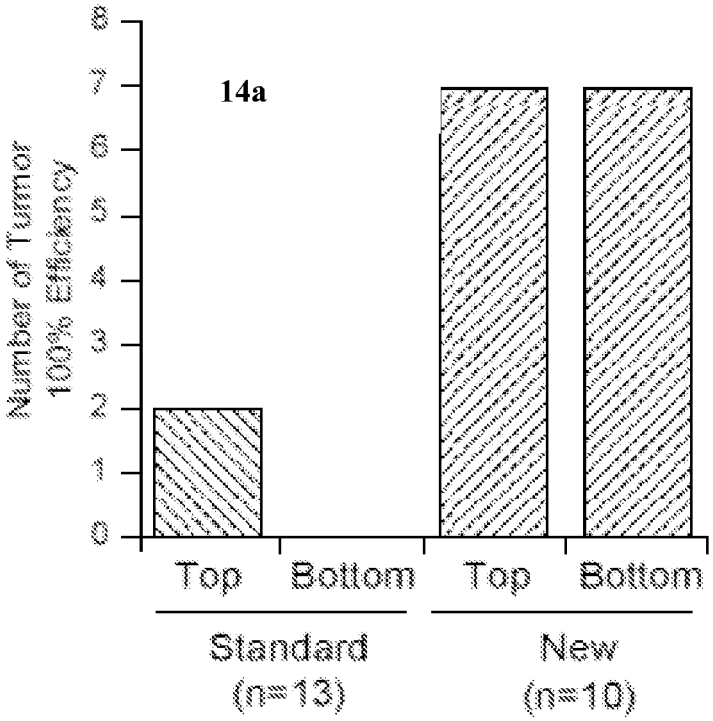


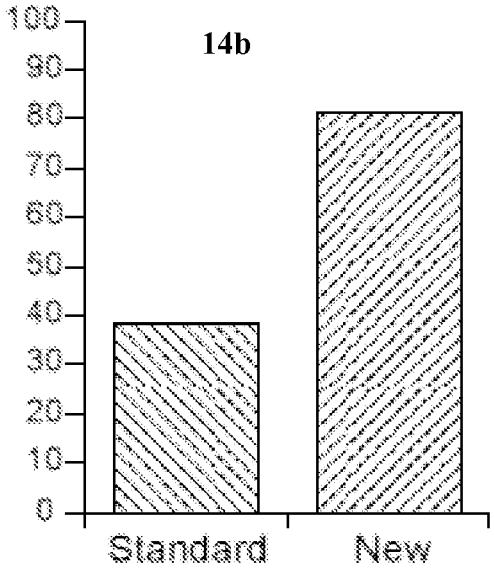
13a



13b

Figure 14


14a
Number of Tumor 100% Efficiency
0
1
2
3
4
5
6
7
8
Top
Bottom
Top
Bottom
Standard (n=13)
New (n=10)


14b
100
90
80
70
60
50
40
30
20
10
0
Standard
New

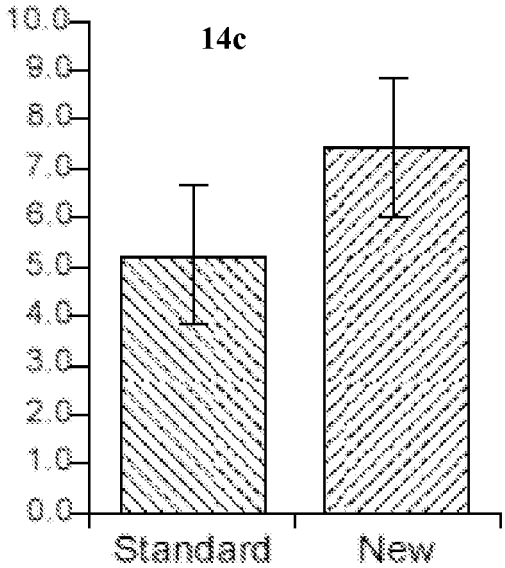

14c
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Standard
New

Figure 15

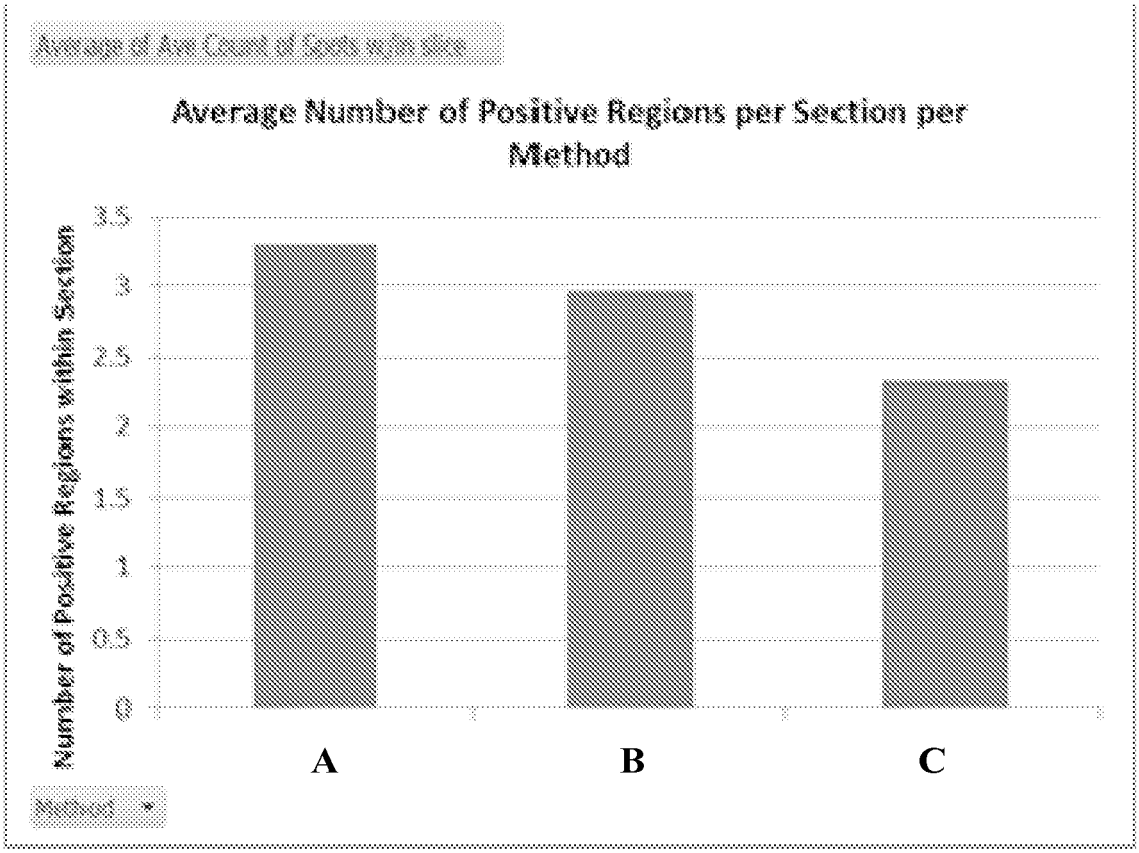
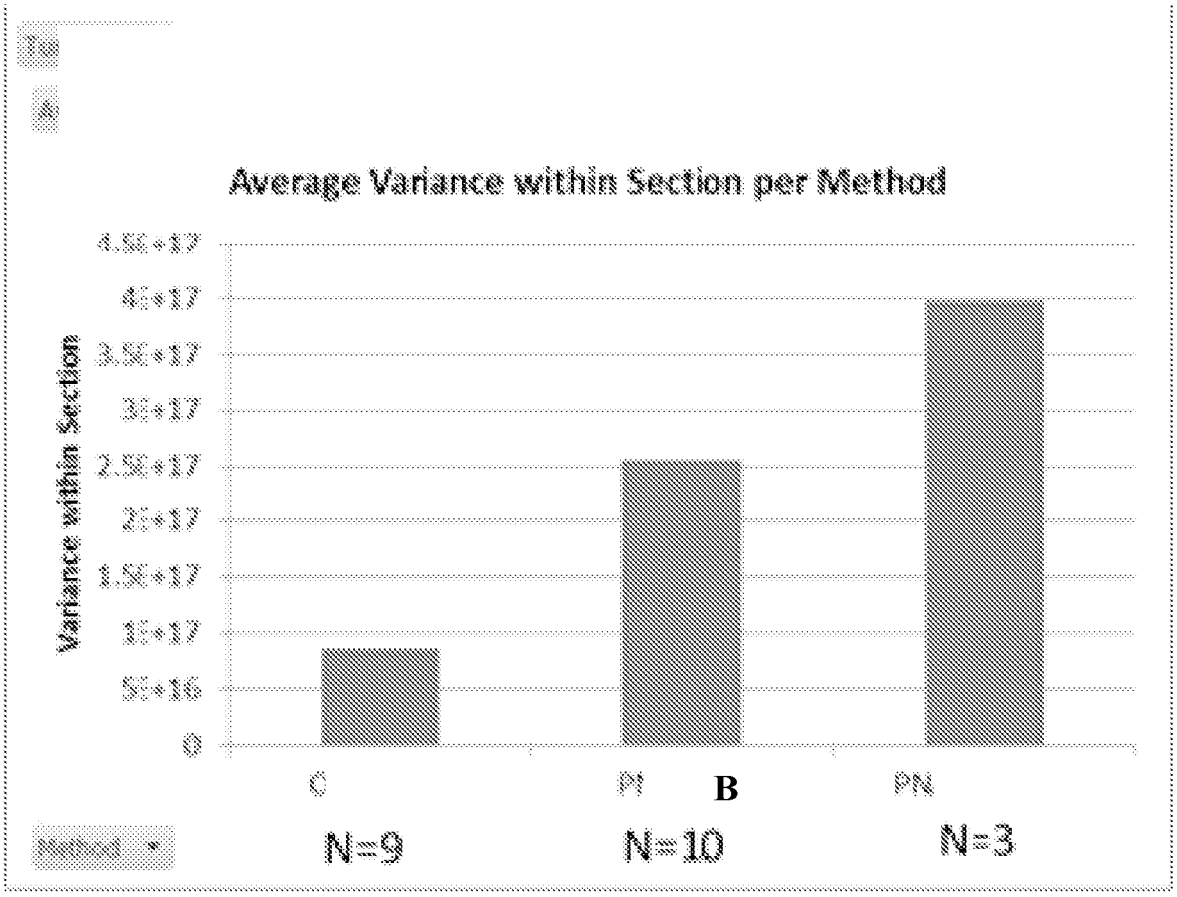

Average Number of Positive Regions per Section per Method
Number of Positive Regions within Section
3.5
3
2.5
2
1.5
1
0.5
0
A
B
C

Figure 16


Average Variance within Section per Method
Variance within Section
4.5E+17
4E+17
3.5E+17
3E+17
2.5E+17
2E+17
1.5E+17
1E+17
5E+16
0
C
PI
PN
N=9
N=10
N=3
Method

B

Figure 17

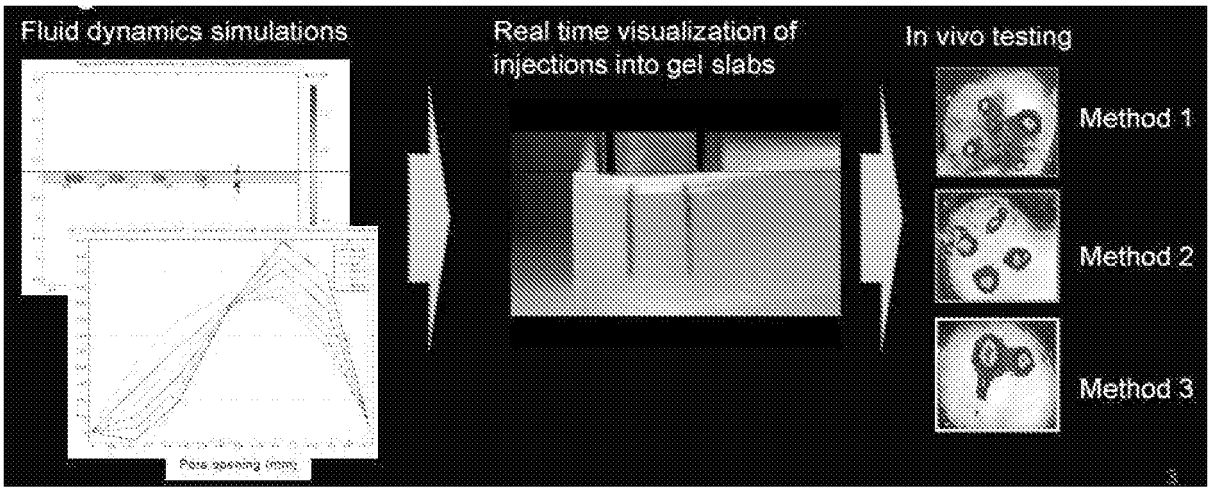
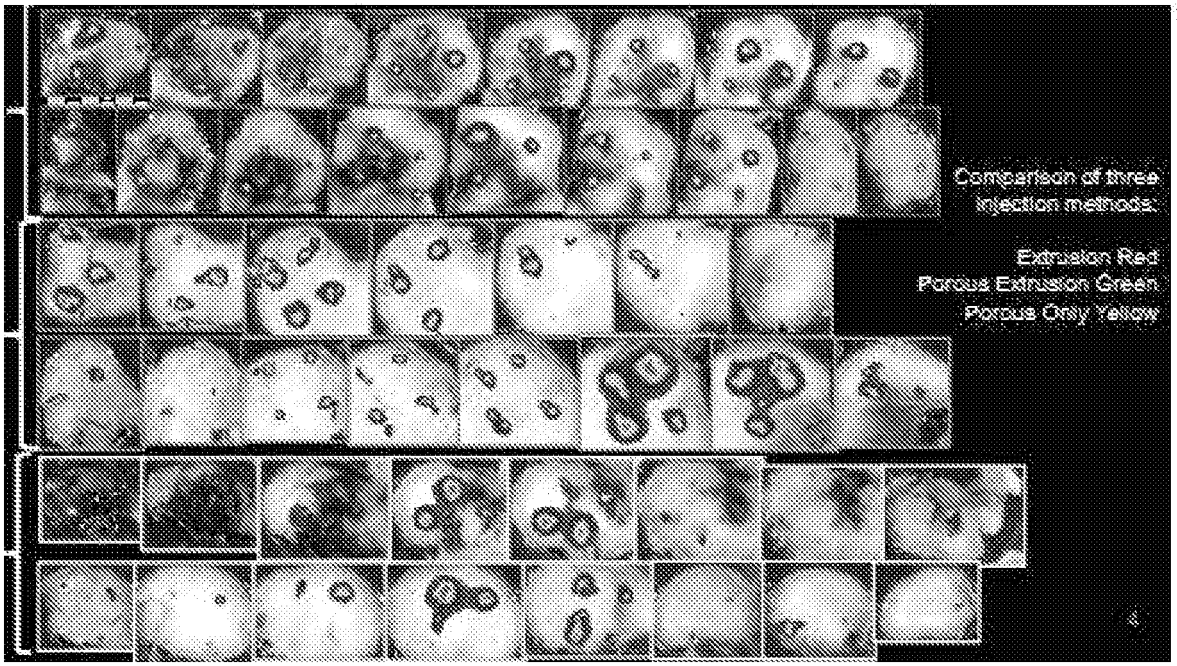

Fluid dynamics simulations
Real time visualization of injections into gel slabs
In vivo testing
Method 1
Method 2
Method 3

Figure 18


Comparison of three injection methods:
Extrusion Red
Porous Extrusion Green
Porous Only Yellow