

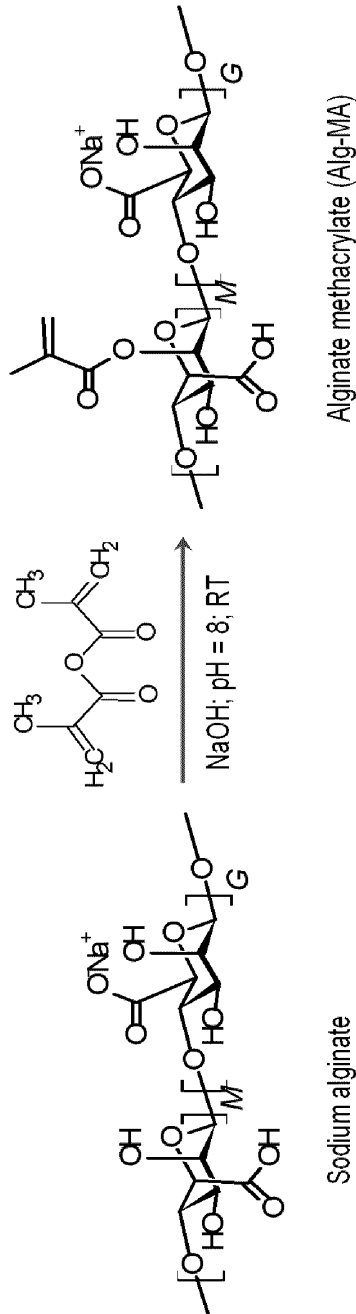


Fig. 1

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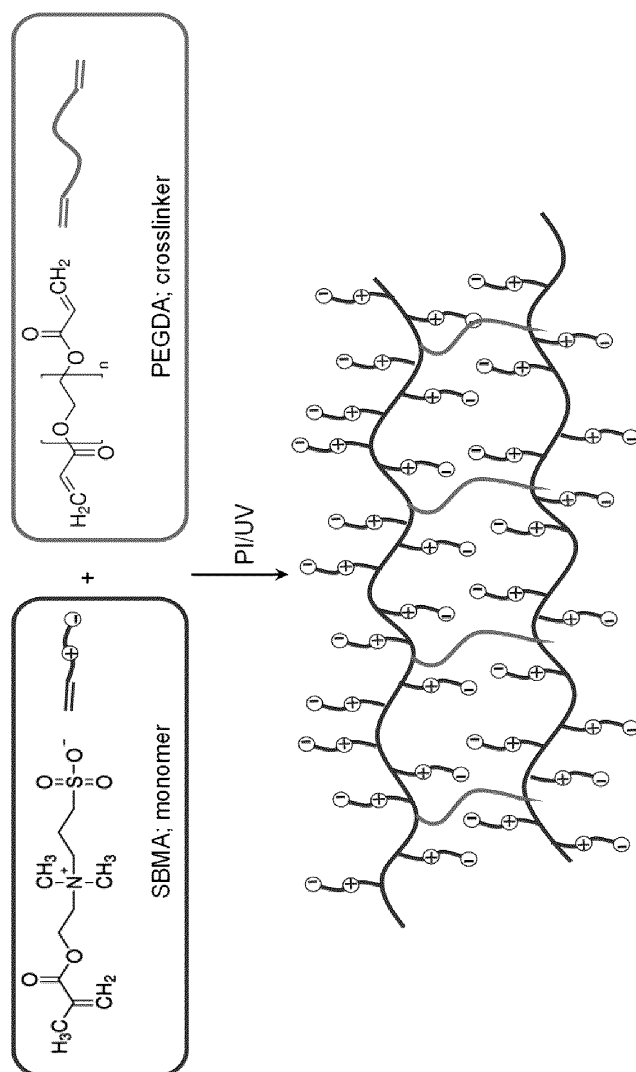


Fig. 2

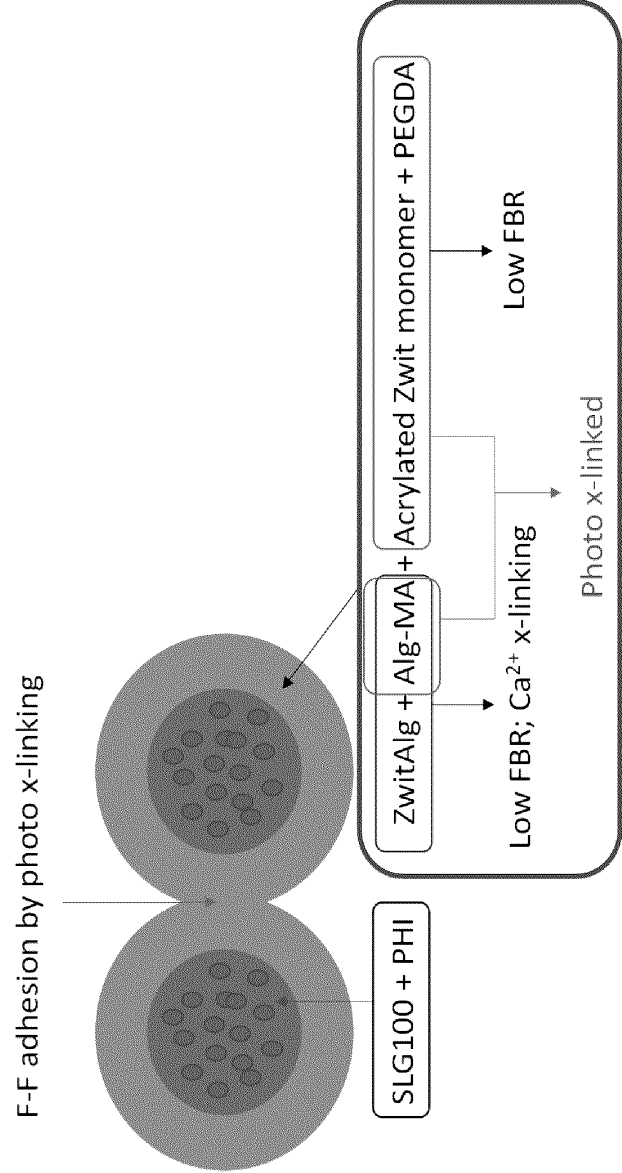


Fig. 3

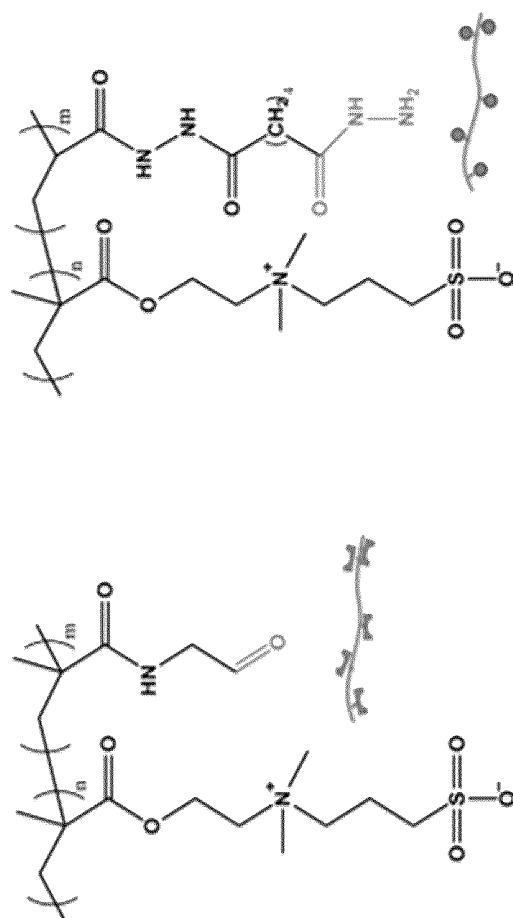


Fig. 4

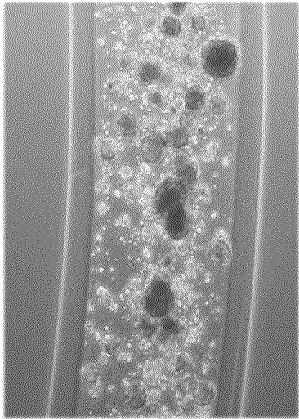


Fig. 5A

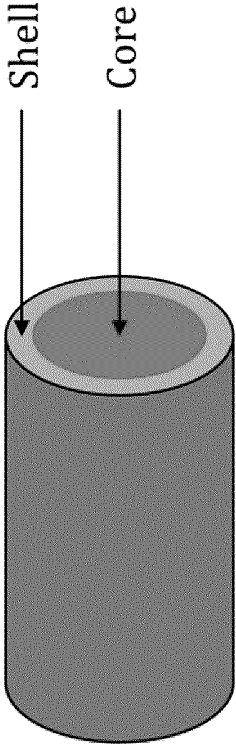


Fig. 5B

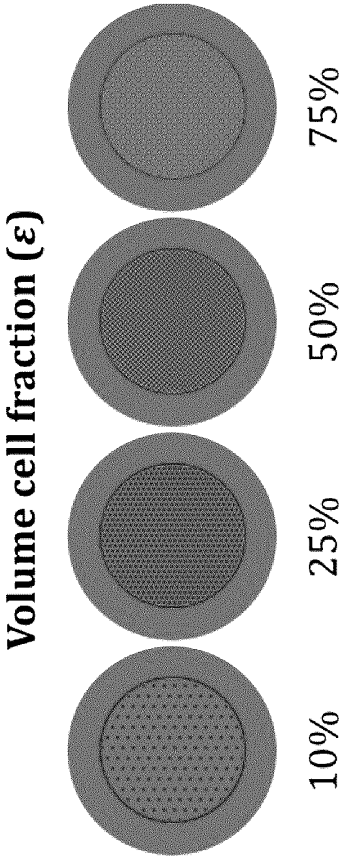


Fig. 5C



Fig. 5D

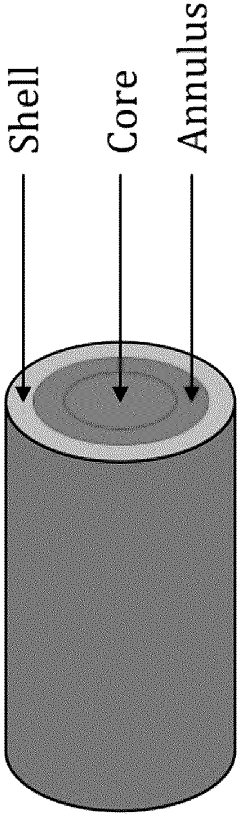


Fig. 5E

Volume cell fraction (ϵ)

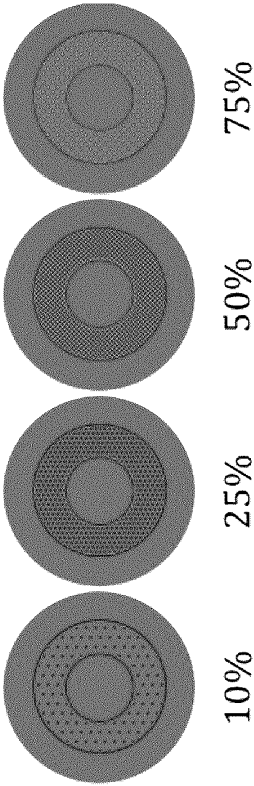


Fig. 5F

Fig. 6A

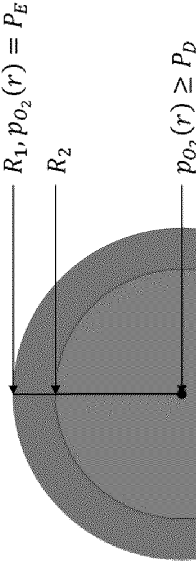


Fig. 6B

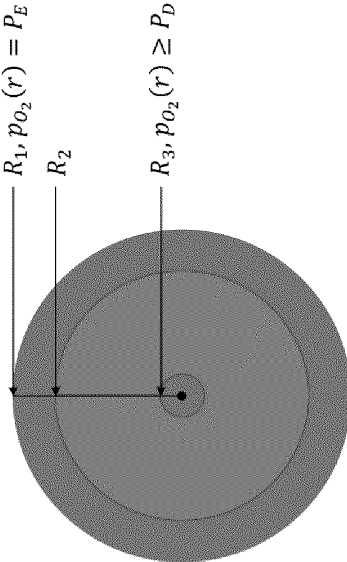


Fig. 6C

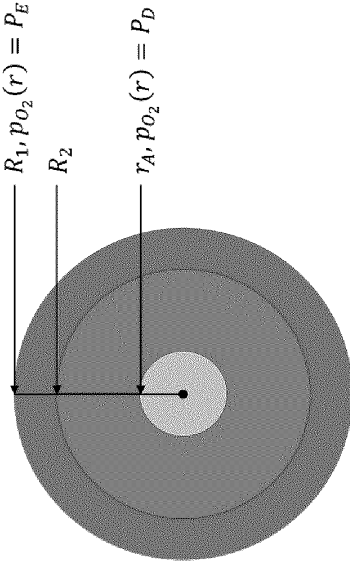


Fig. 6D

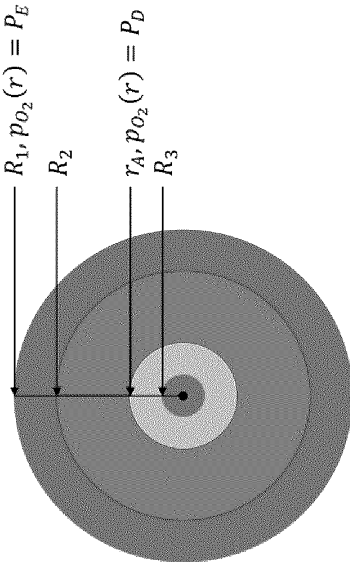


Fig. 7A

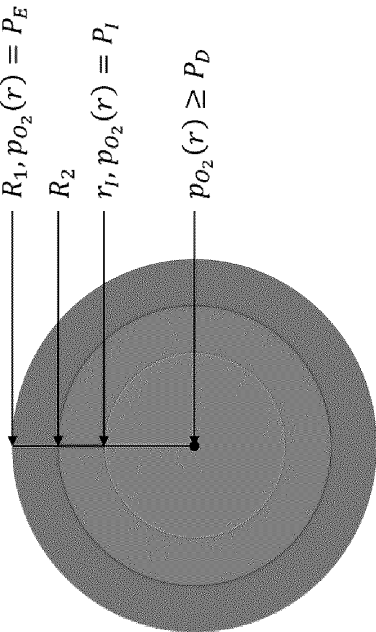


Fig. 7B

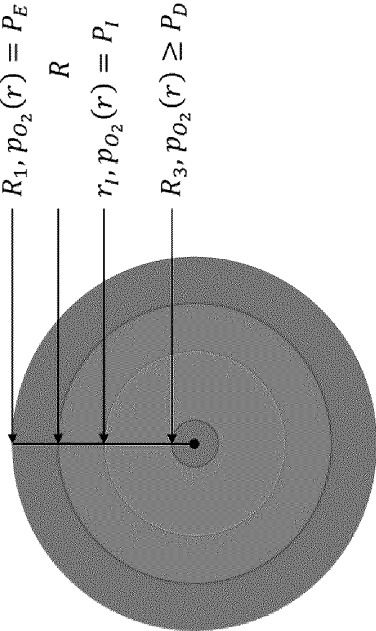


Fig. 7C

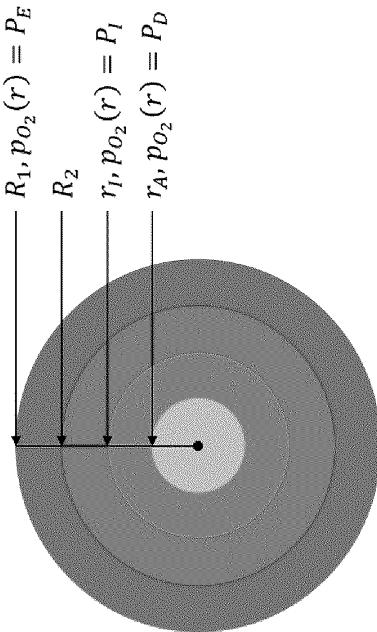
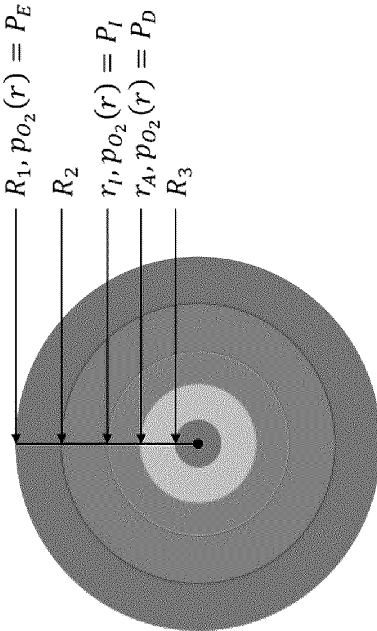
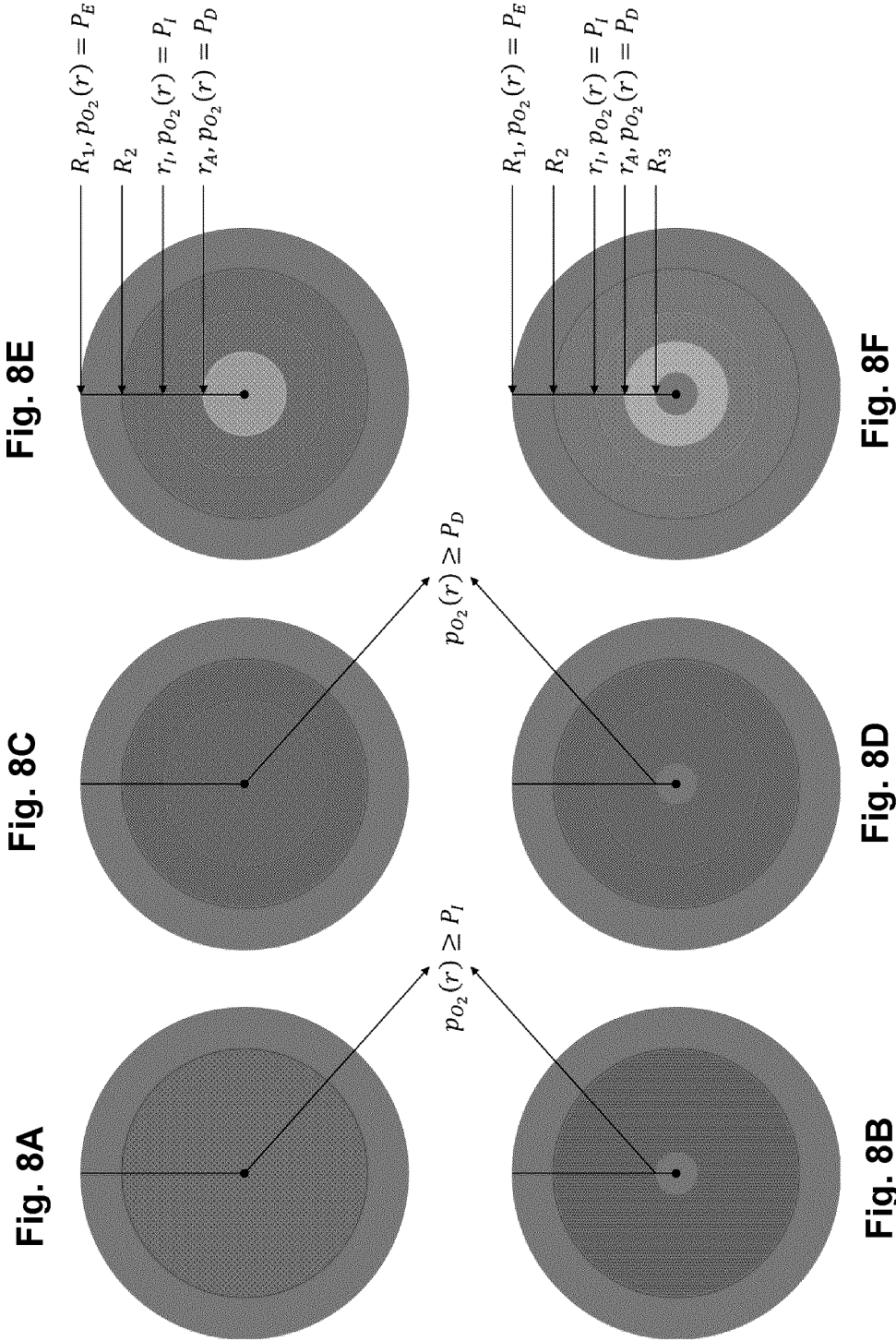


Fig. 7D





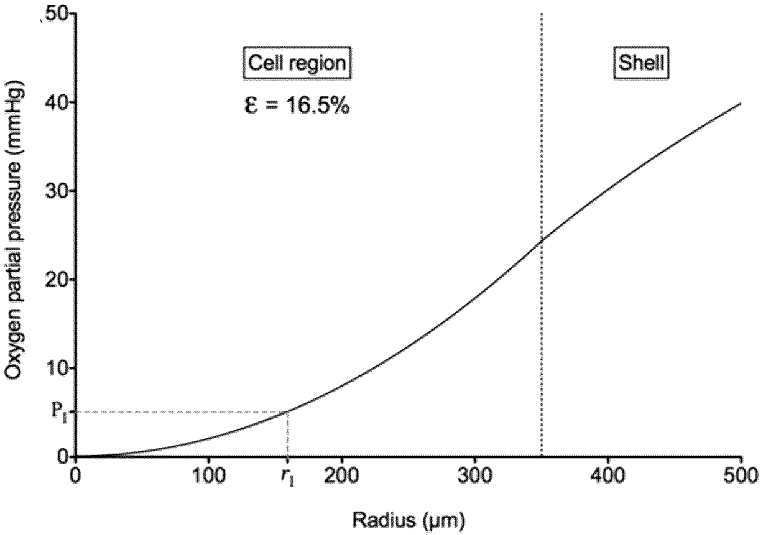


Fig. 9A

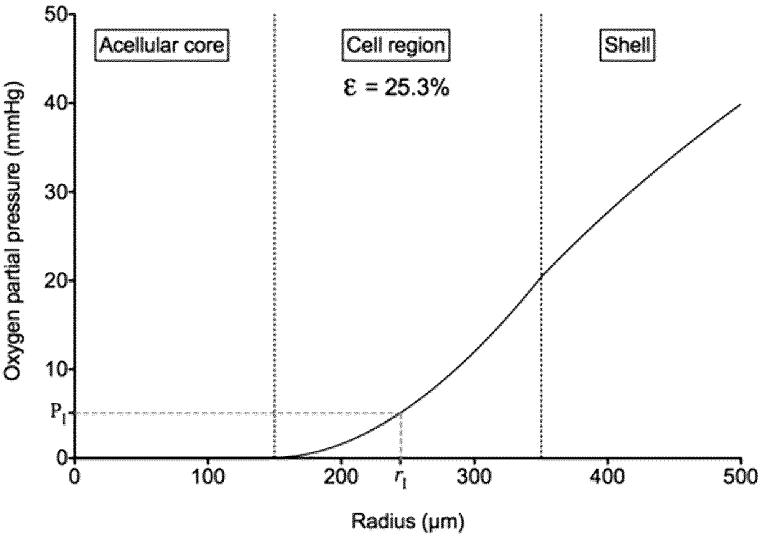


Fig. 9B

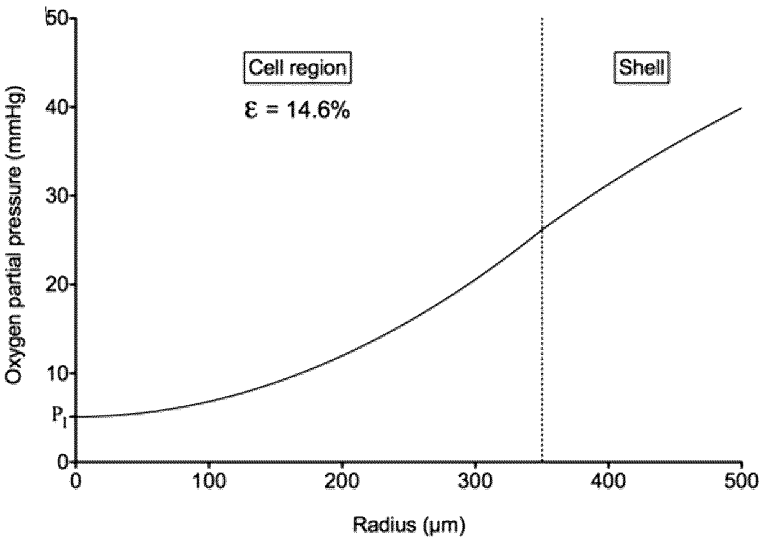


Fig. 9C

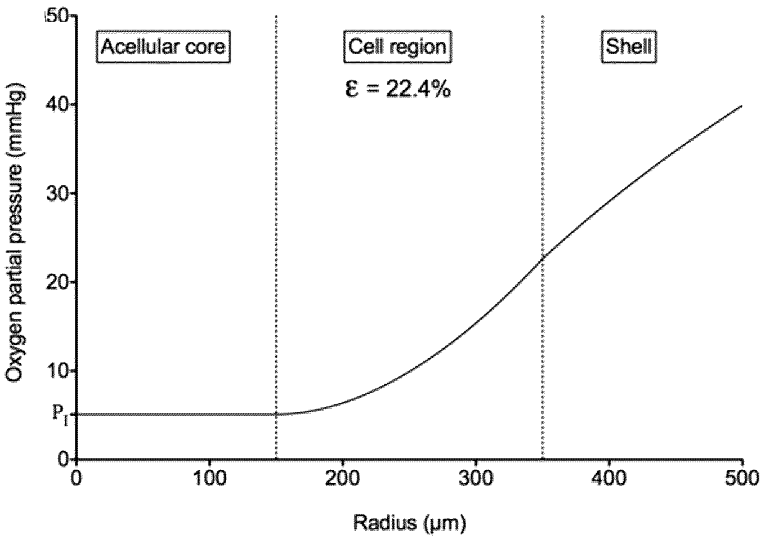


Fig. 9D

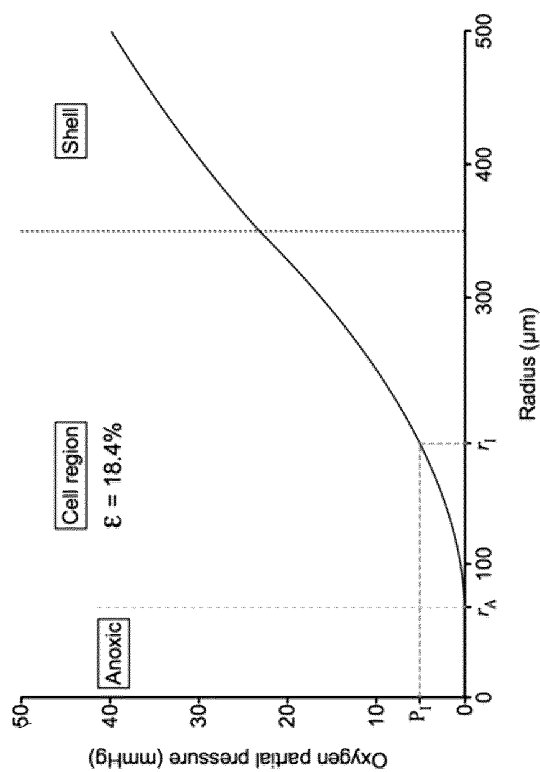


Fig. 9E

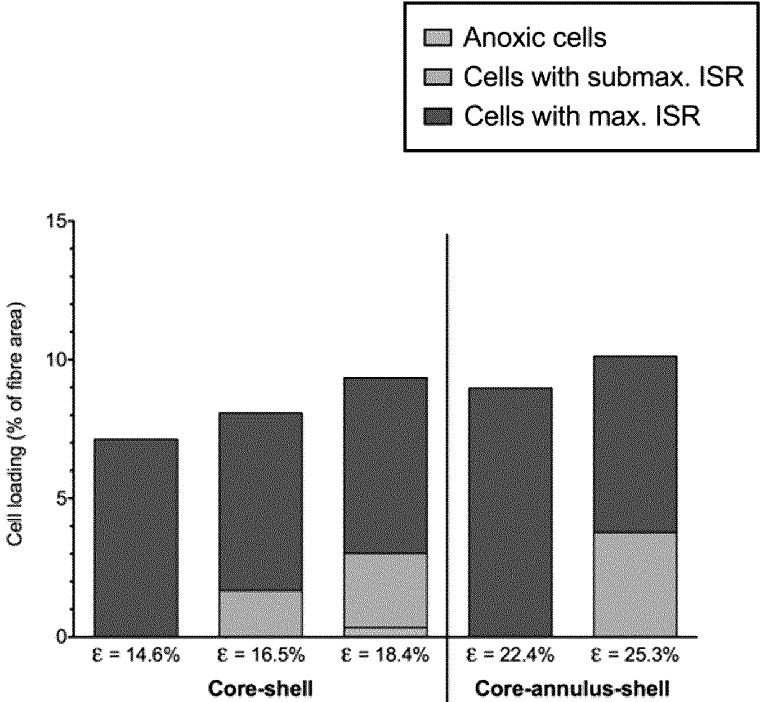


Fig. 10A

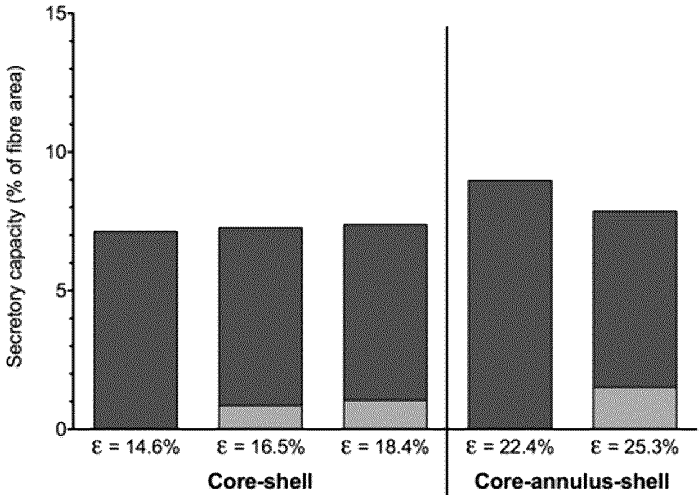


Fig. 10B

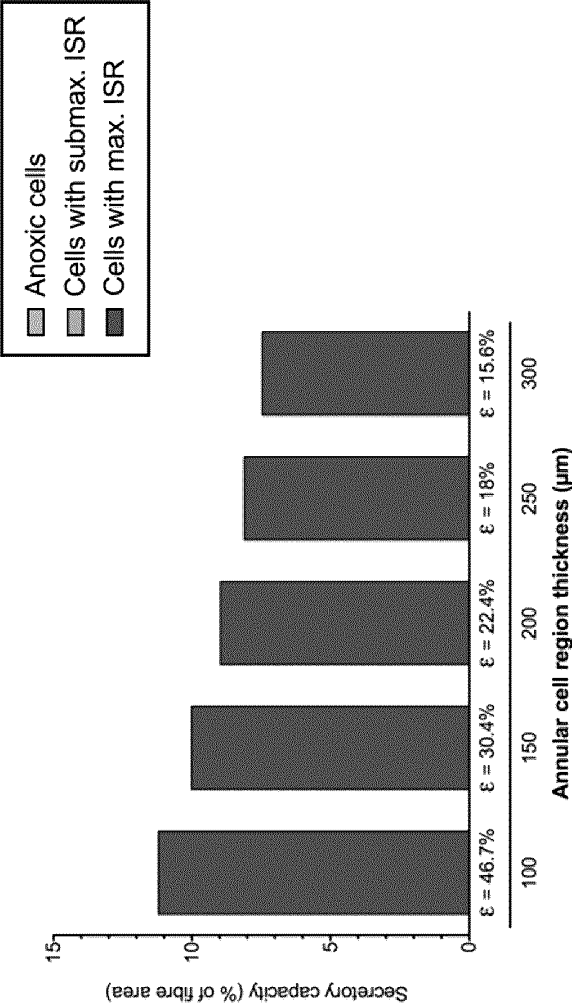


Fig. 10C

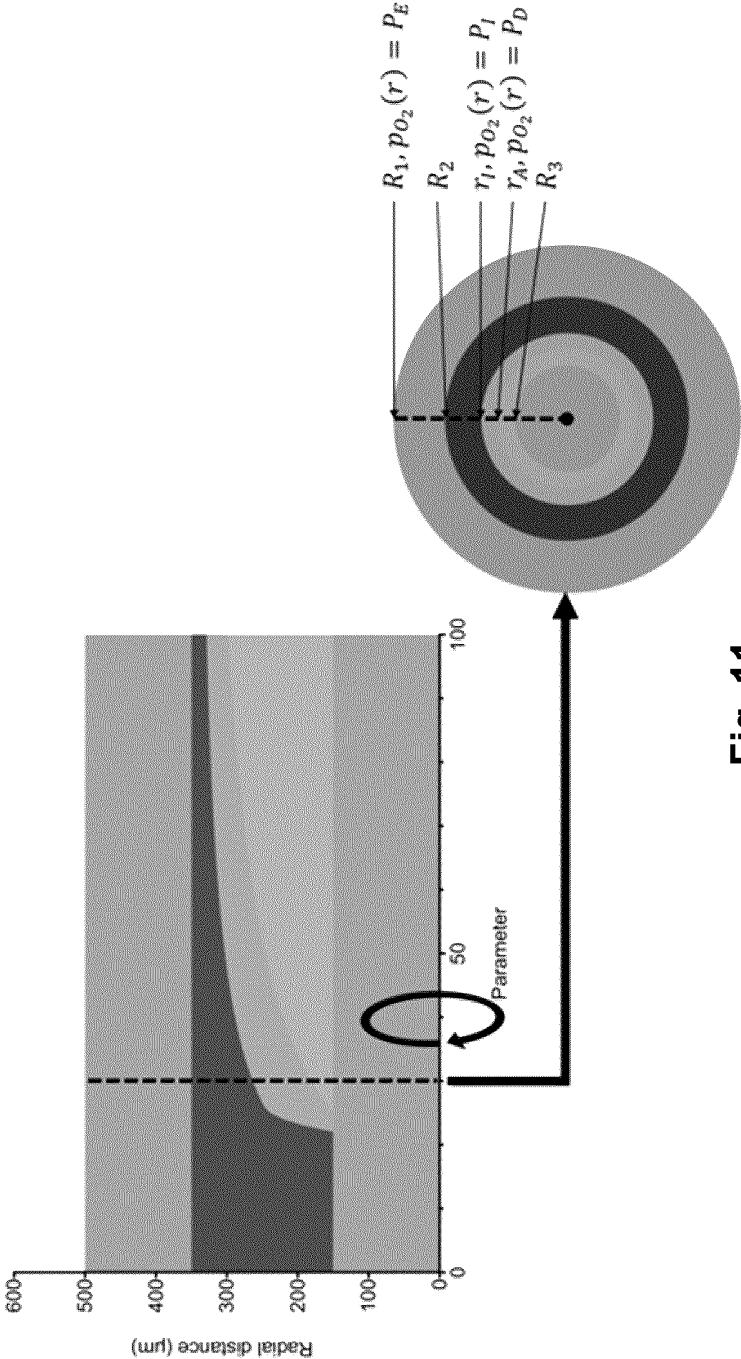


Fig. 11

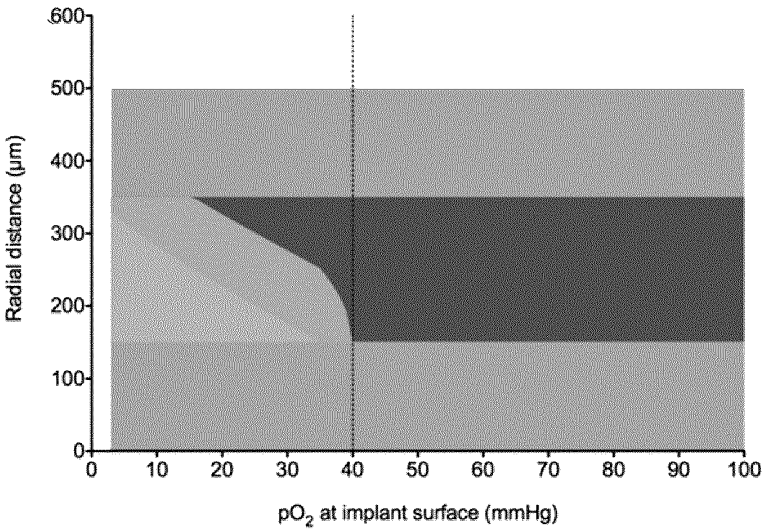


Fig. 12A

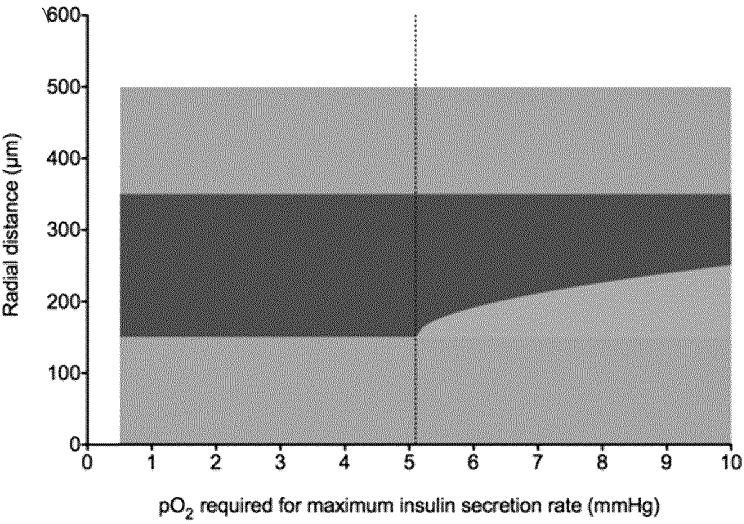


Fig. 12B

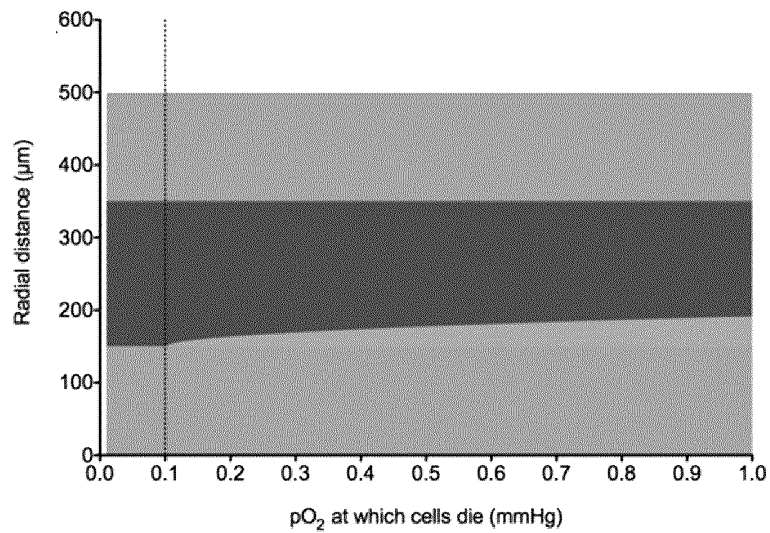


Fig. 12C

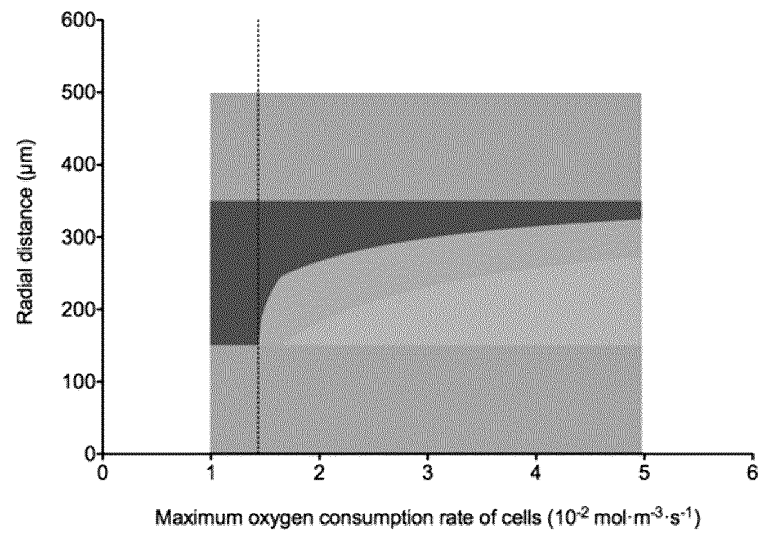
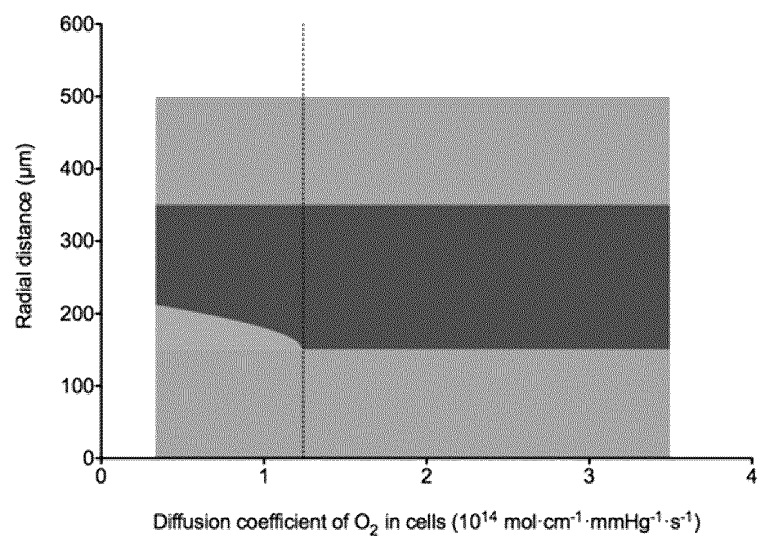
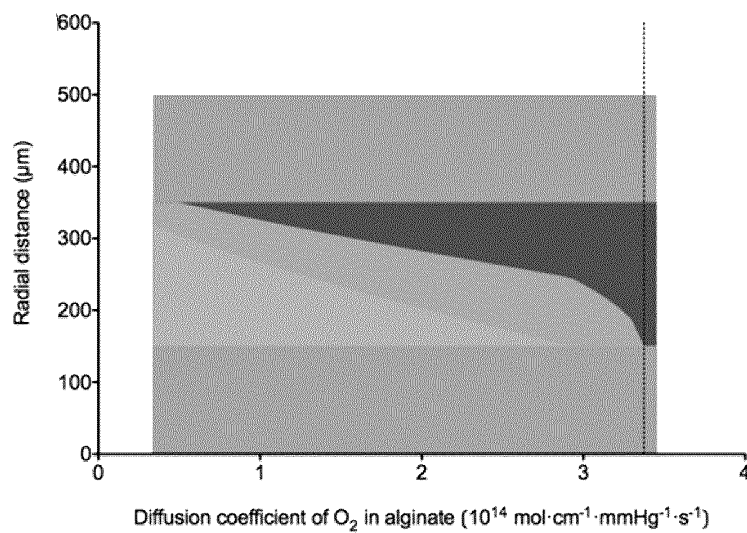


Fig. 12D

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**Fig. 12E****Fig. 12F**

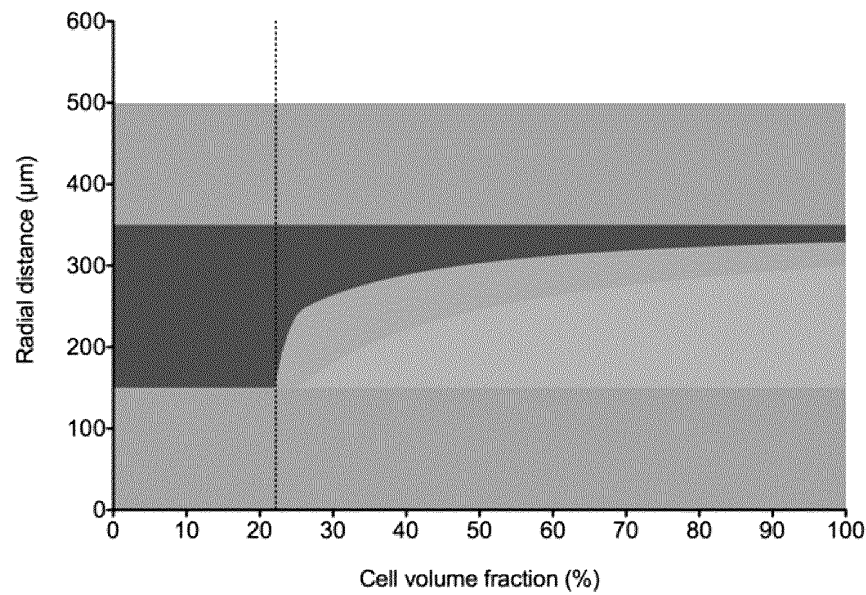


Fig. 13A

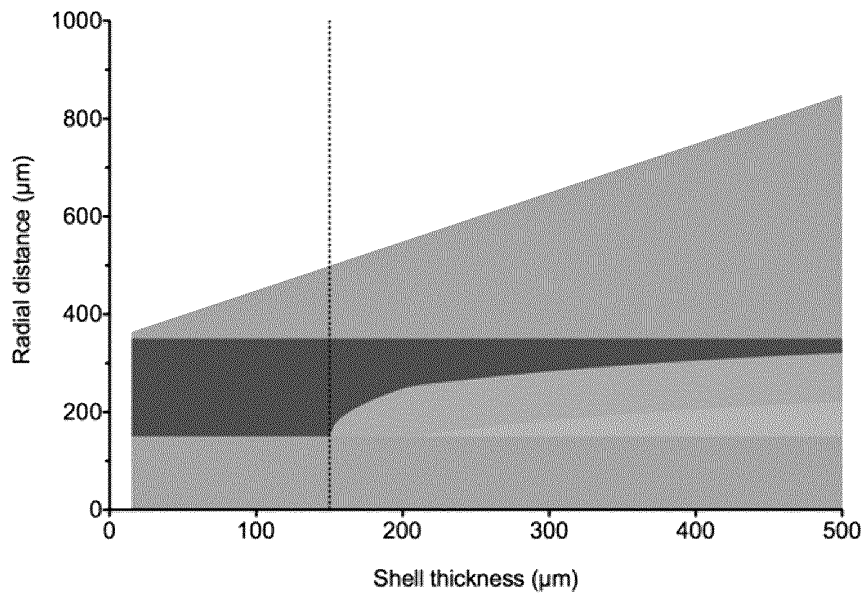


Fig. 13B

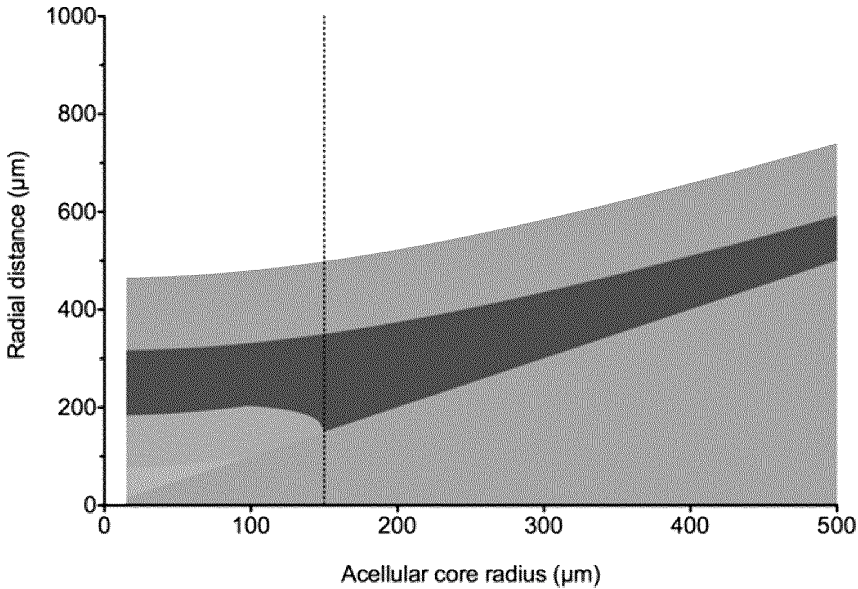


Fig. 13C

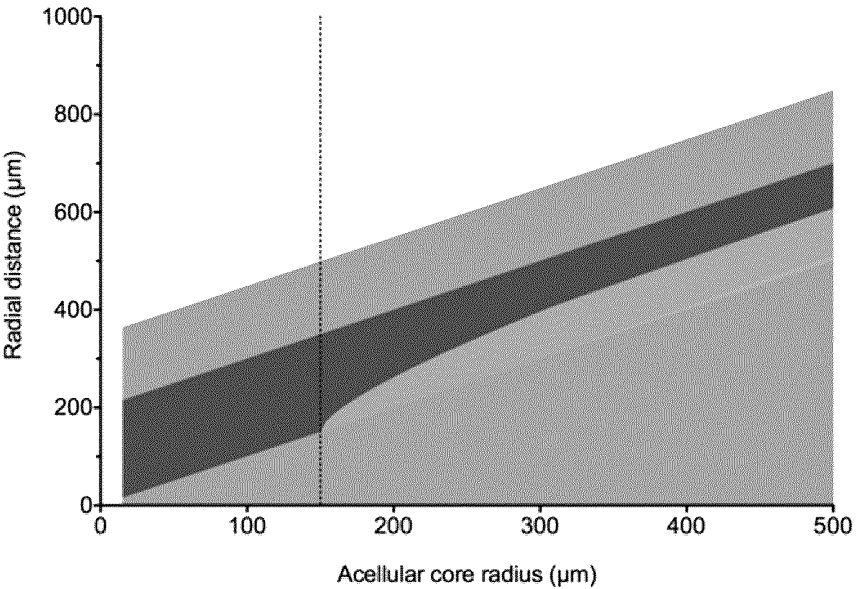


Fig. 13D

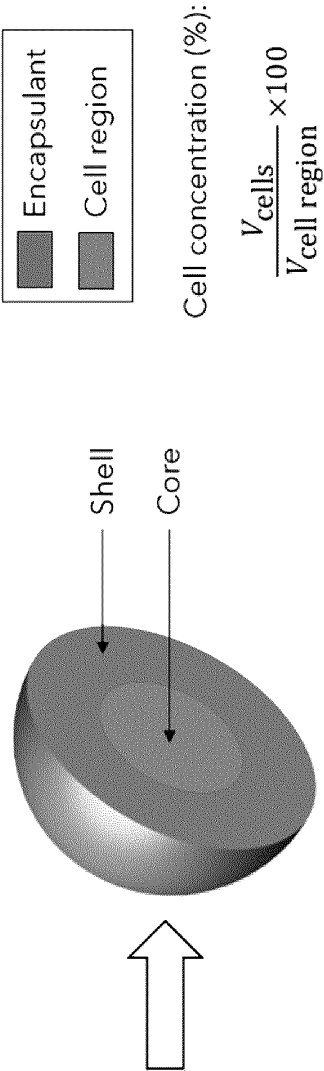


Fig. 14A

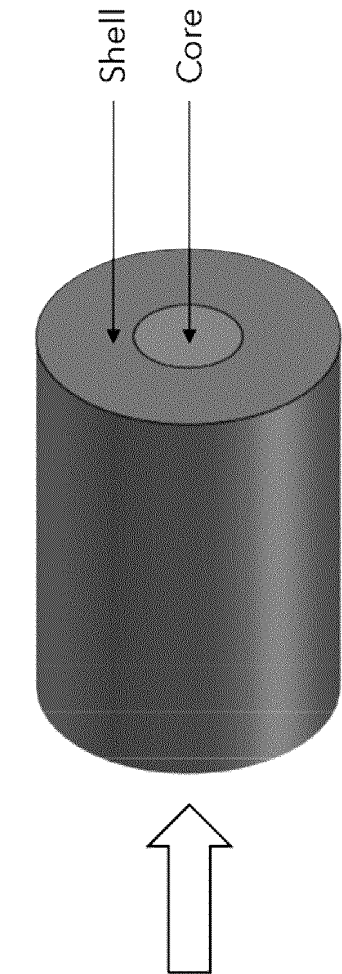


Fig. 14B

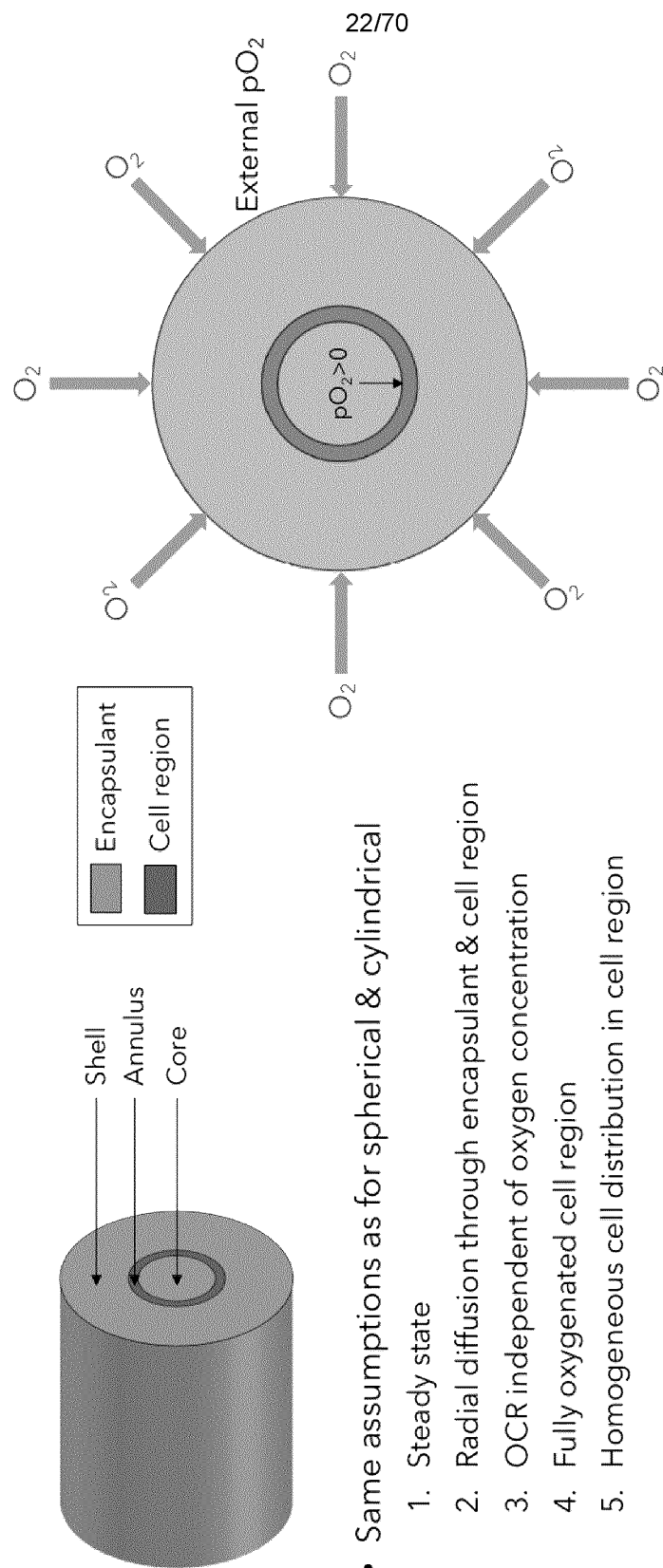


Fig. 15A

Fig. 15B

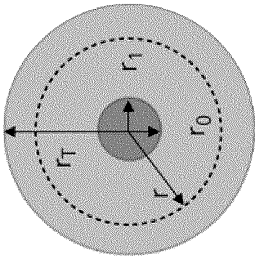
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External pO₂	40 mmHg	• Intraperitoneal pO ₂ used by Avgoustiniatos & Colton (1997)
OCR	150 nmol/min·mg DNA	• Mean value for human islets reported by Papas et al. (2015)
Islet cell content	1,300 cells/islet 6.5 pg DNA/cell	• From Pisanía et al. (2010)
Cell concentration	100%	• Affects OCR & effective diffusivity of oxygen
Diffusivity of O₂ in cells	1.3·10 ⁻⁵ cm ² /s	• From Avgoustiniatos & Colton (1997)
Diffusivity of O₂ in water	2.8·10 ⁻⁵ cm ² /s	• From Avgoustiniatos & Colton (1997)
Encapsulant	2% alginate	• Affects effective diffusivity of oxygen

Effective diffusivity in encapsulant or cell region:

$$\frac{D_{\text{eff},i}}{D_c} = \frac{2 - 2\phi_i + (D_d/D_c)(1 + 2\phi_i)}{2 + \phi_i + (D_d/D_c)(1 - \phi_i)}$$

Fig. 16



Radius (μm)	Spherical	Cylindrical
Total, r_T	300	300
Cell region, r_1	75	75

Fig. 17B

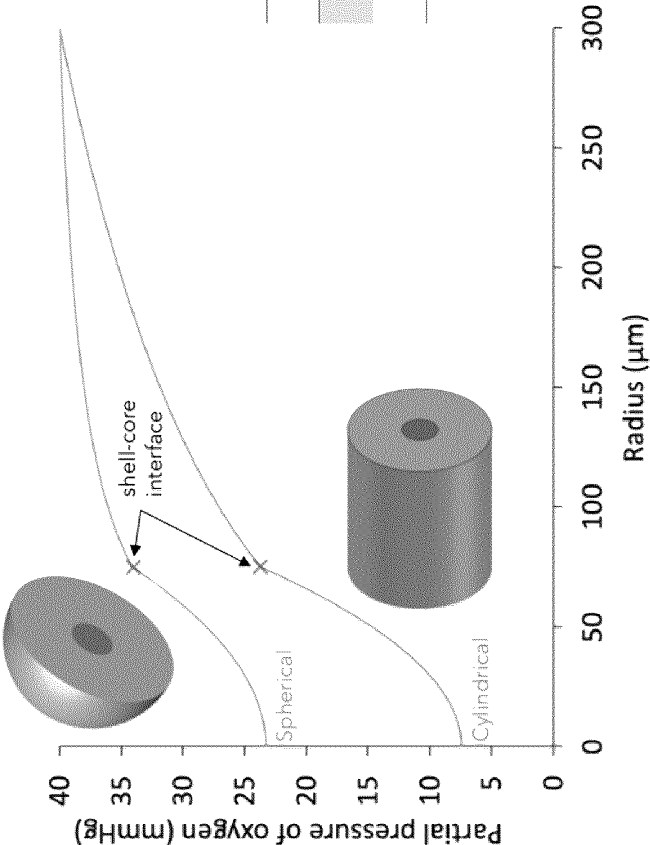
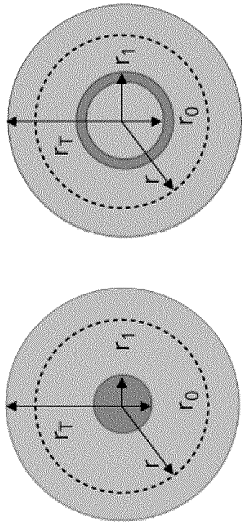


Fig. 17A



Radius (μm)	Spherical	Cylindrical	Annular
Total, r_T	300	300	300
Cell region, r_1	75	75	125
Inner, r_0	-	-	100

• Cell region in cylindrical & annular: $17.7 \cdot 10^3 \mu\text{m}^2$

Area of cylindrical cross section = πr_1^2
Area of annular cross section = $\pi(r_1^2 - r_0^2)$

Fig. 18B

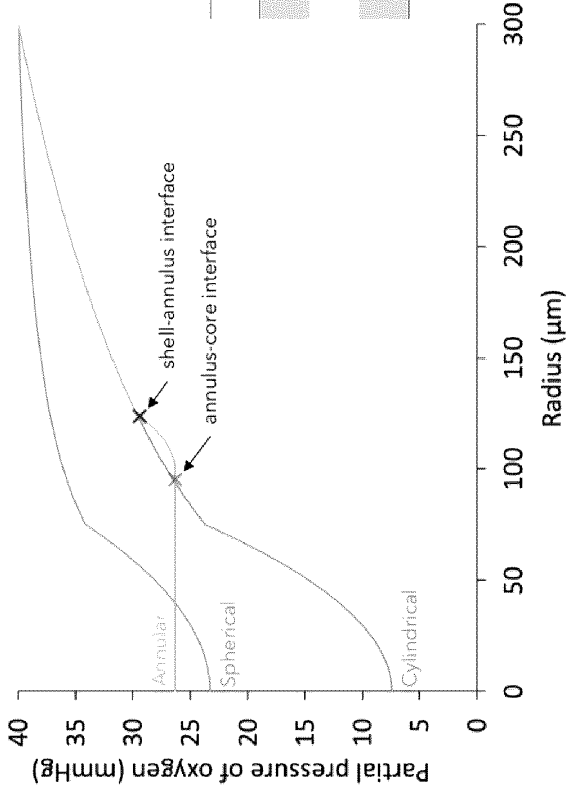


Fig. 18A

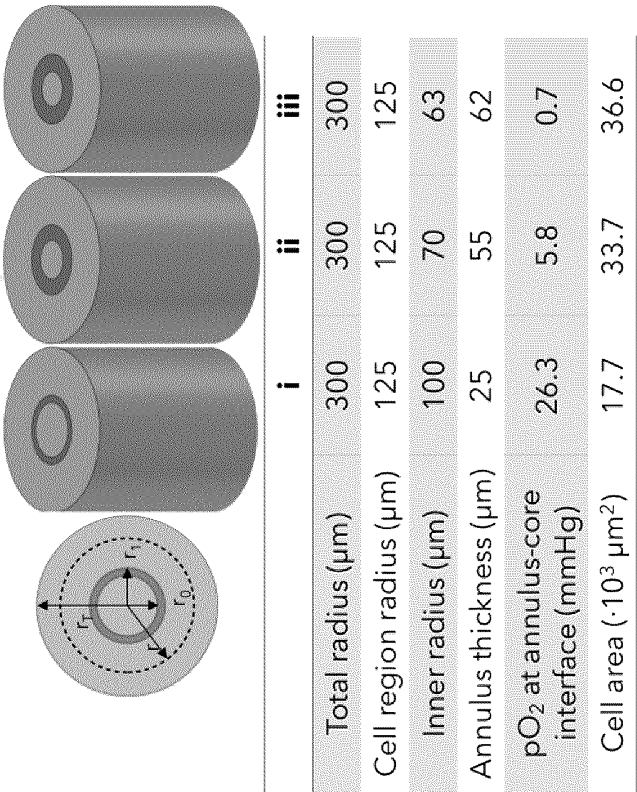


Fig. 19B

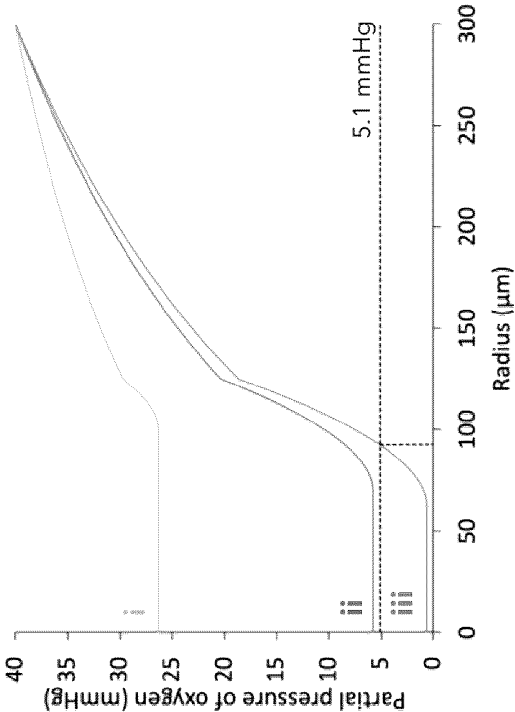


Fig. 19A

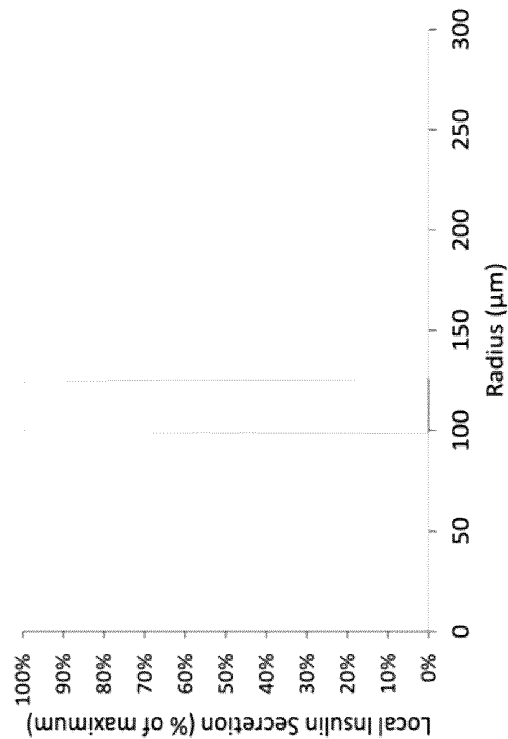


Fig. 20B

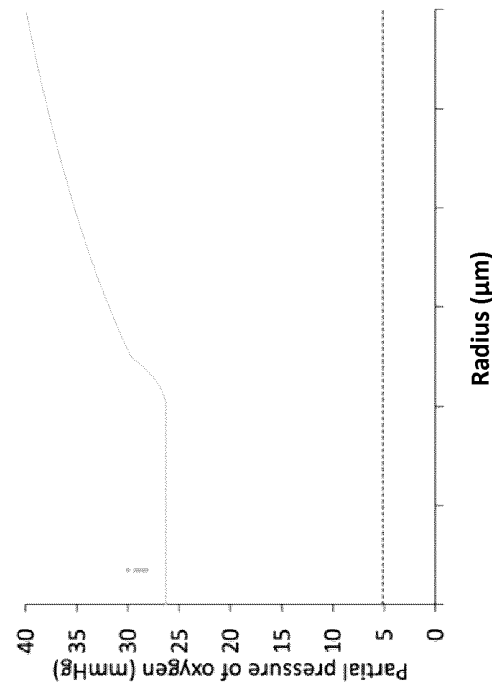


Fig. 20A

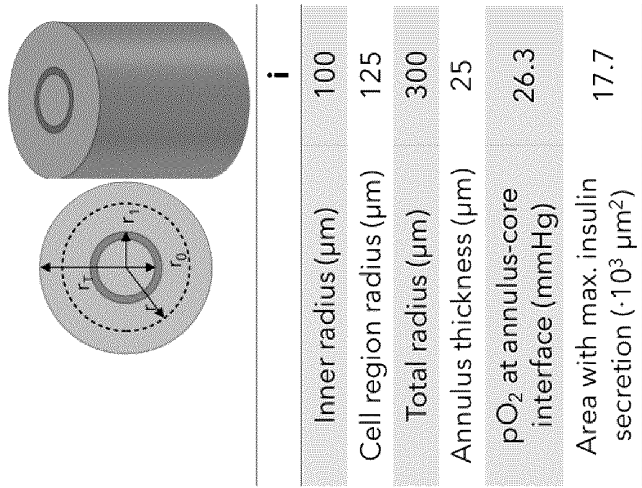


Fig. 20C

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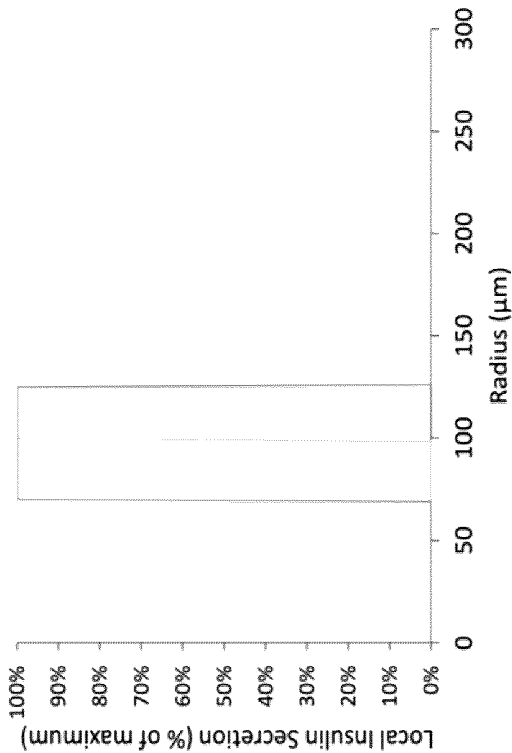


Fig. 20E

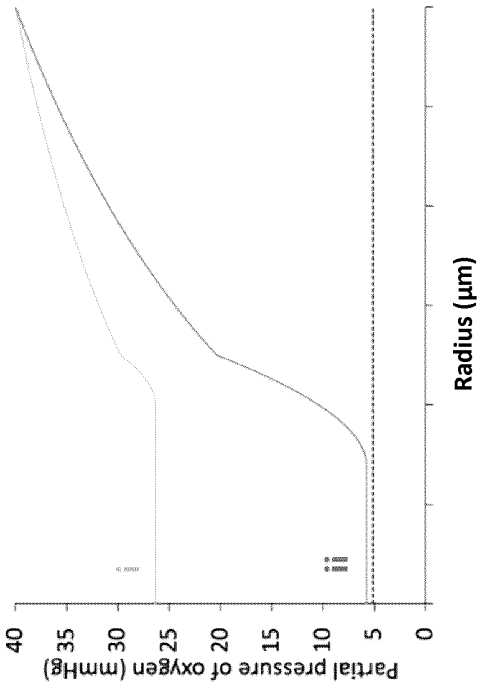


Fig. 20D

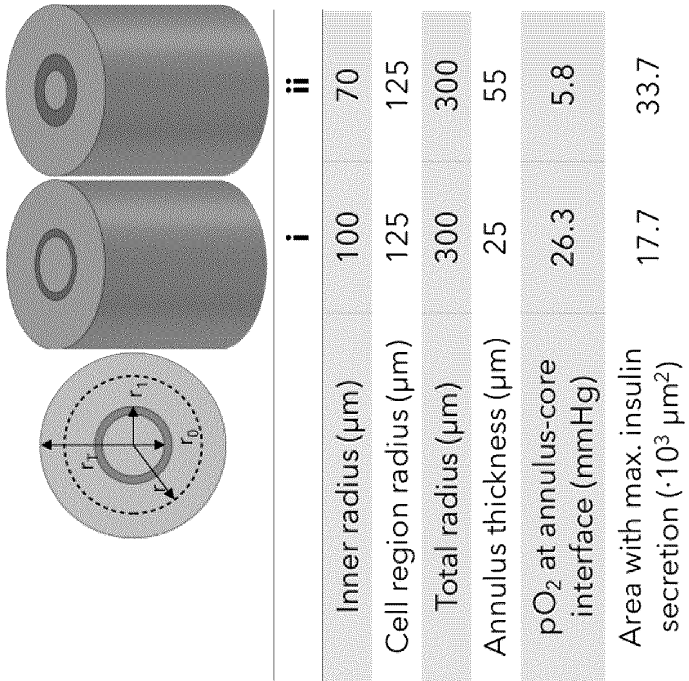


Fig. 20F

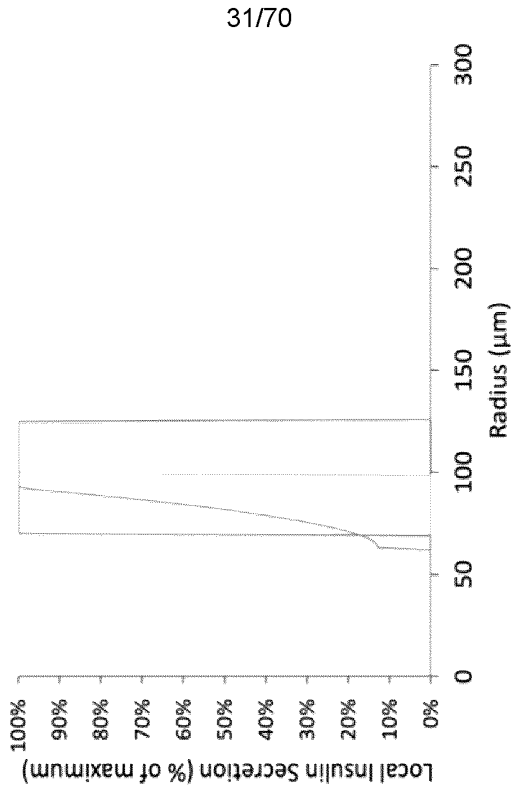


Fig. 20H

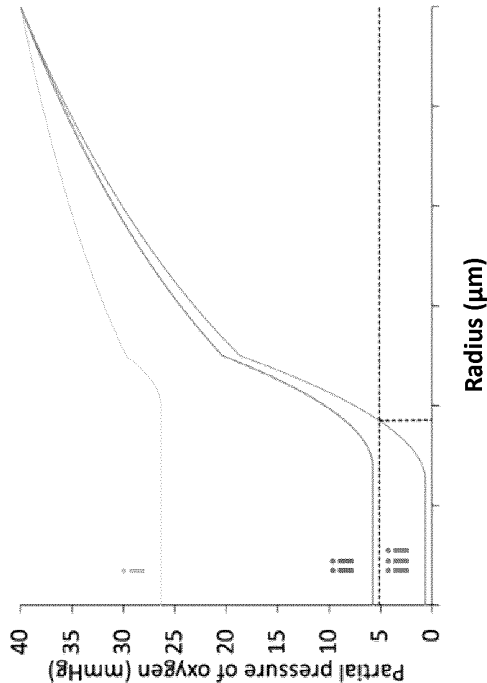


Fig. 20G

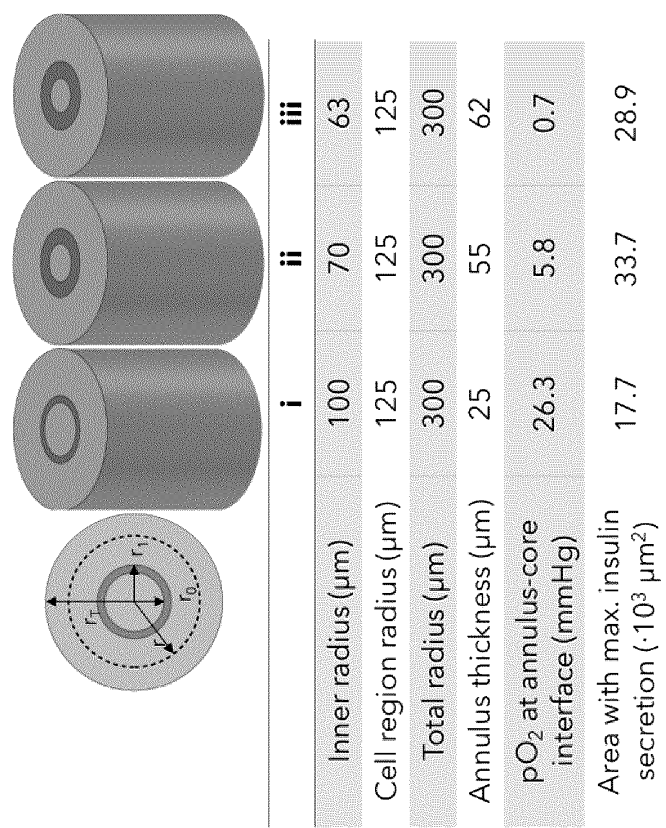


Fig. 20I

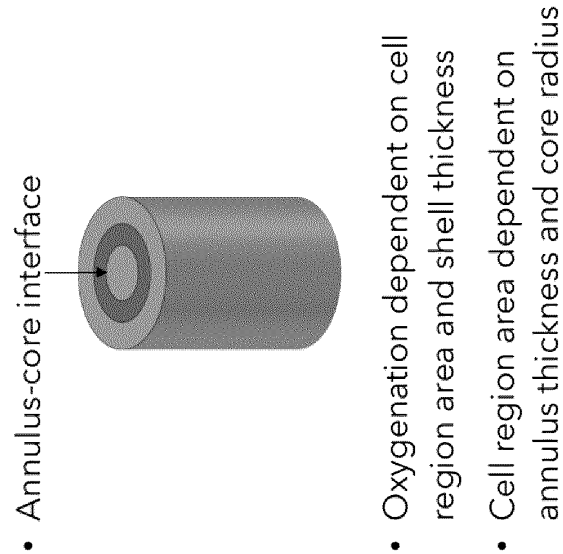


Fig. 21B

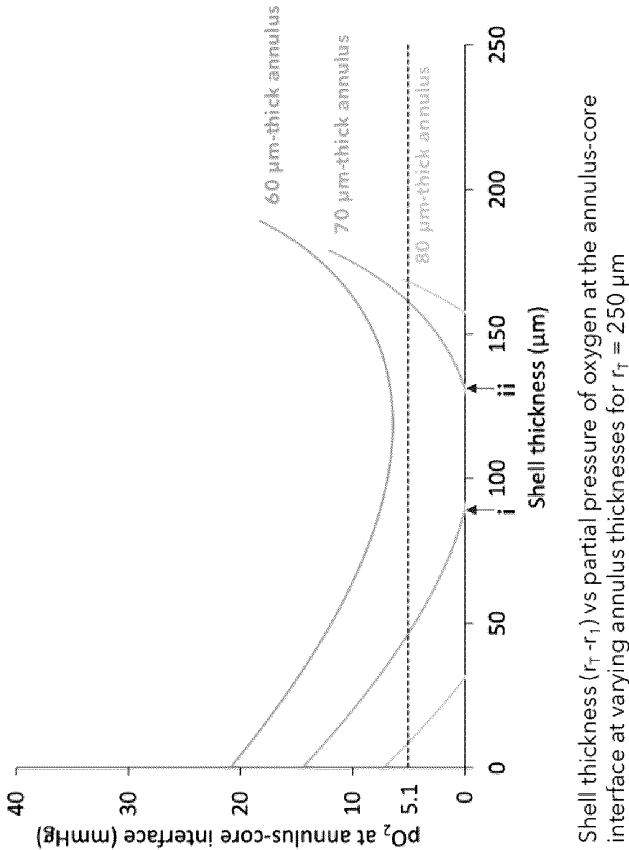


Fig. 21A

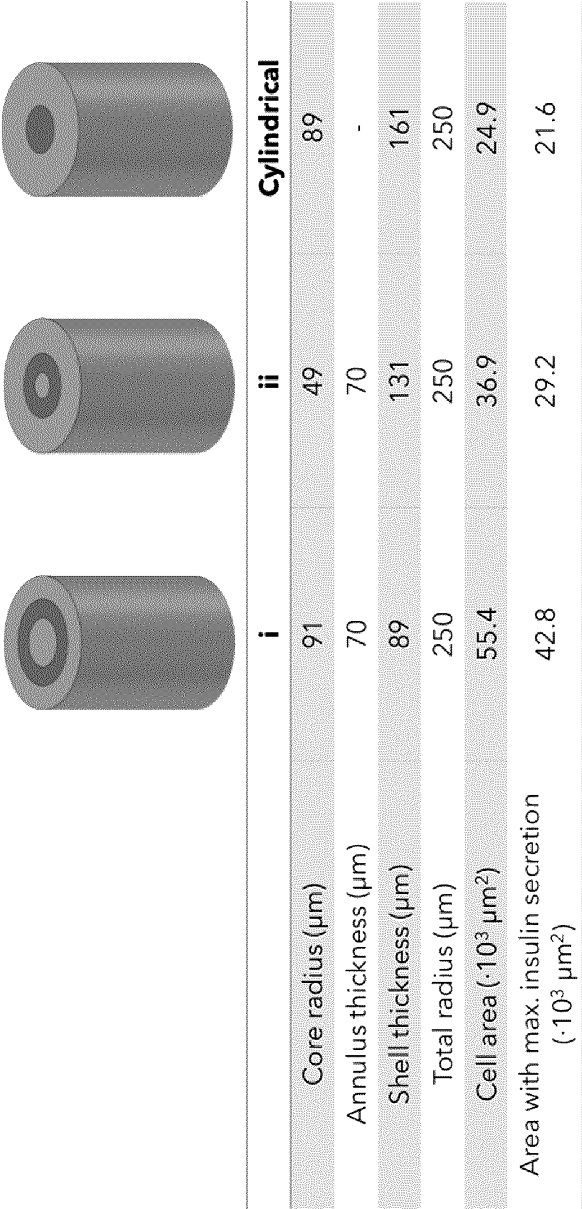


Fig. 21C

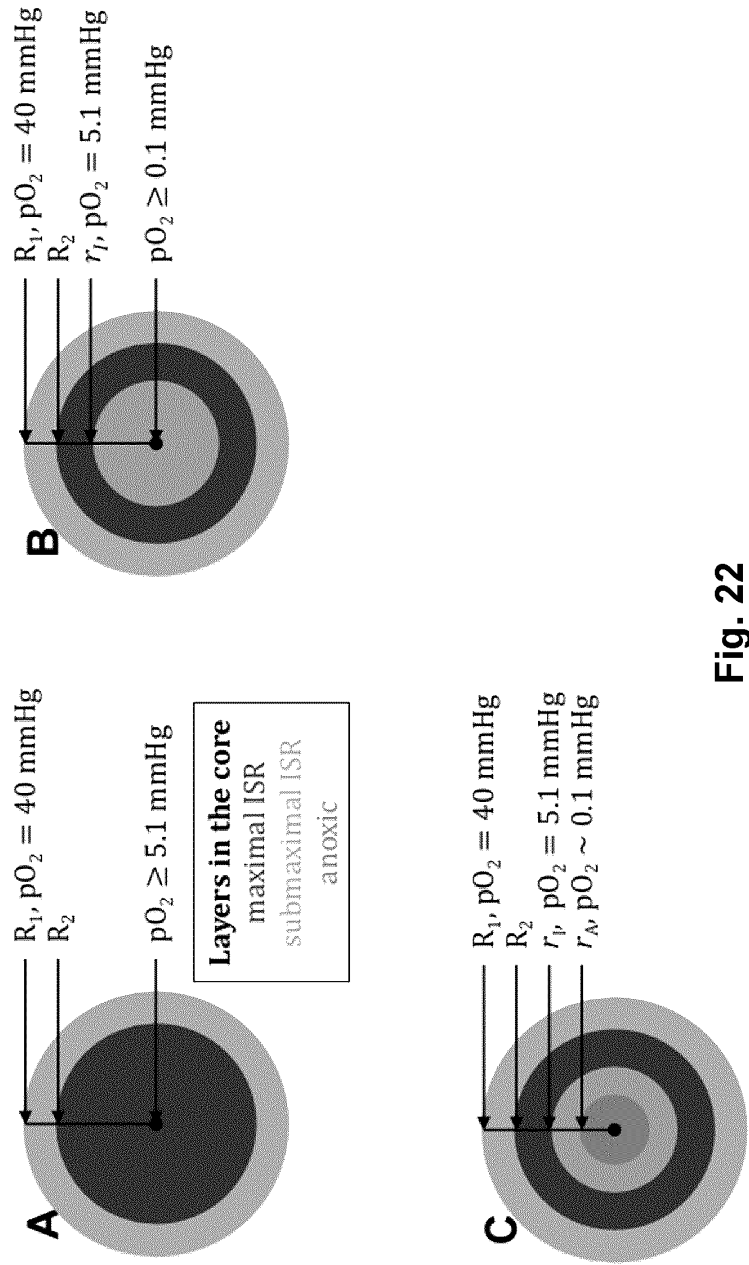


Fig. 22

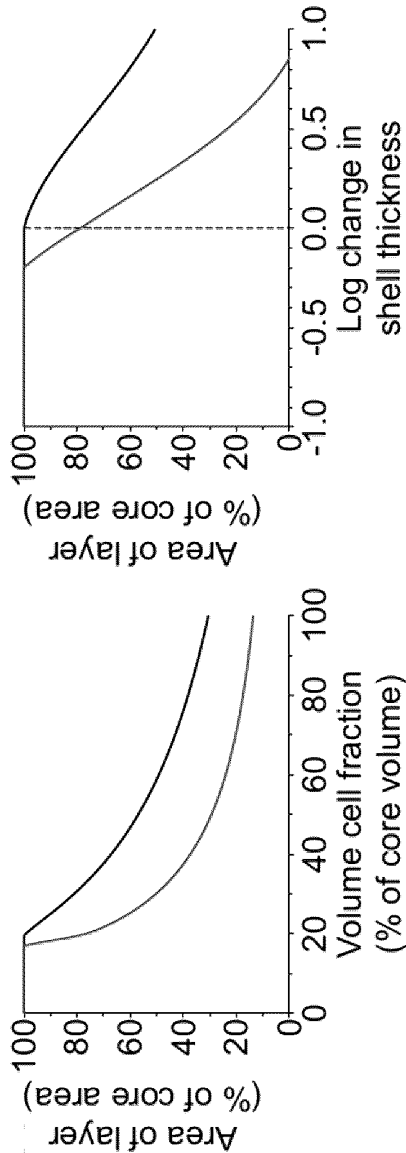


Fig. 23B

Fig. 23A

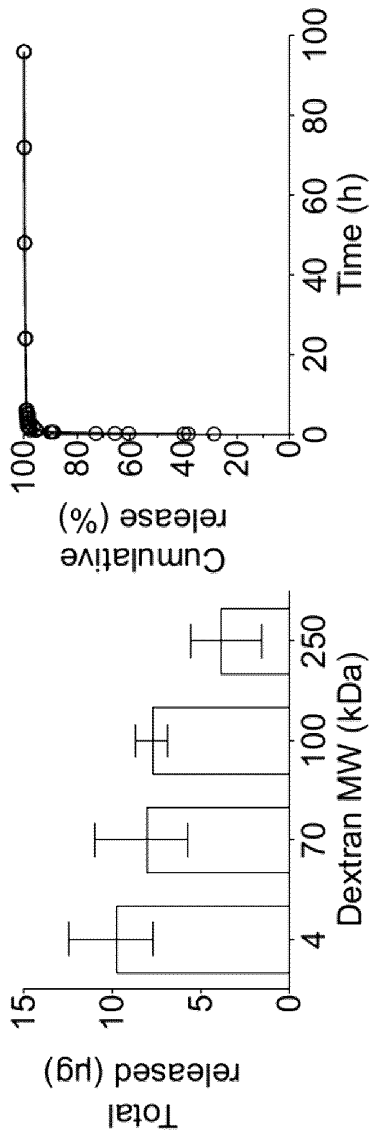


Fig. 24A

Fig. 24B

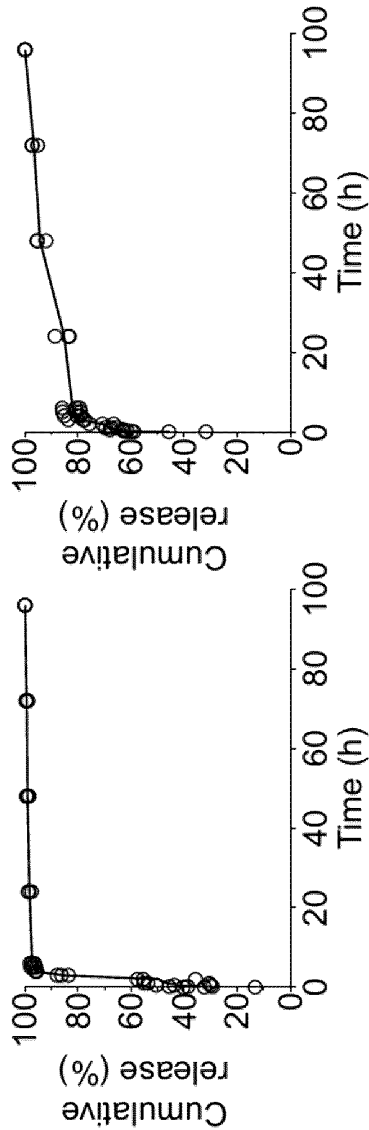


Fig. 24D

Fig. 24C

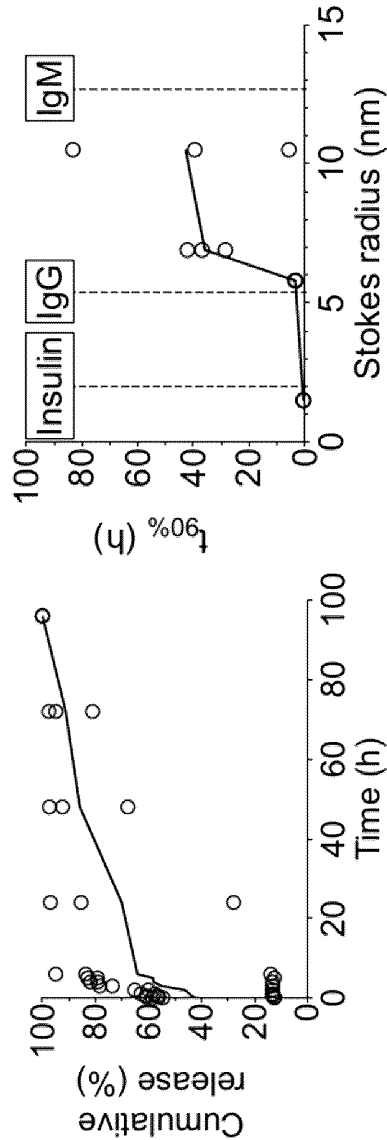


Fig. 24F

Fig. 24E

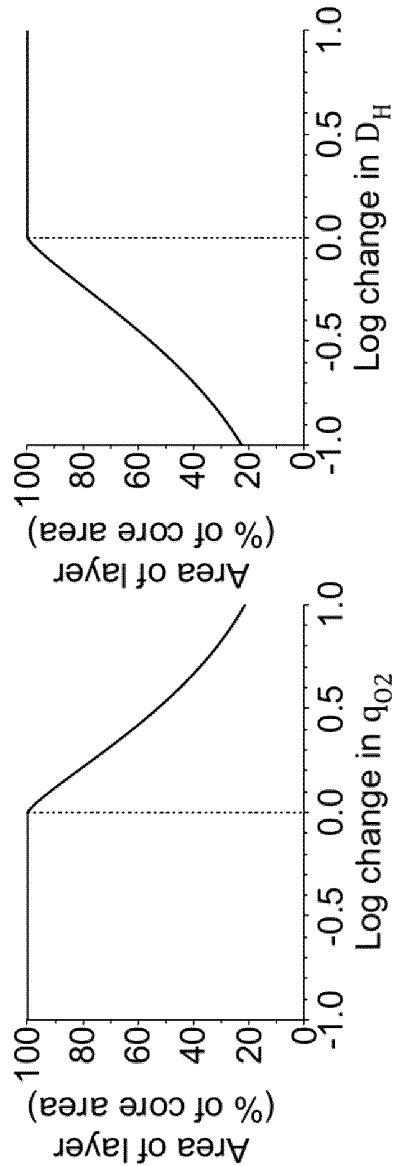


Fig. 25A

Fig. 25B

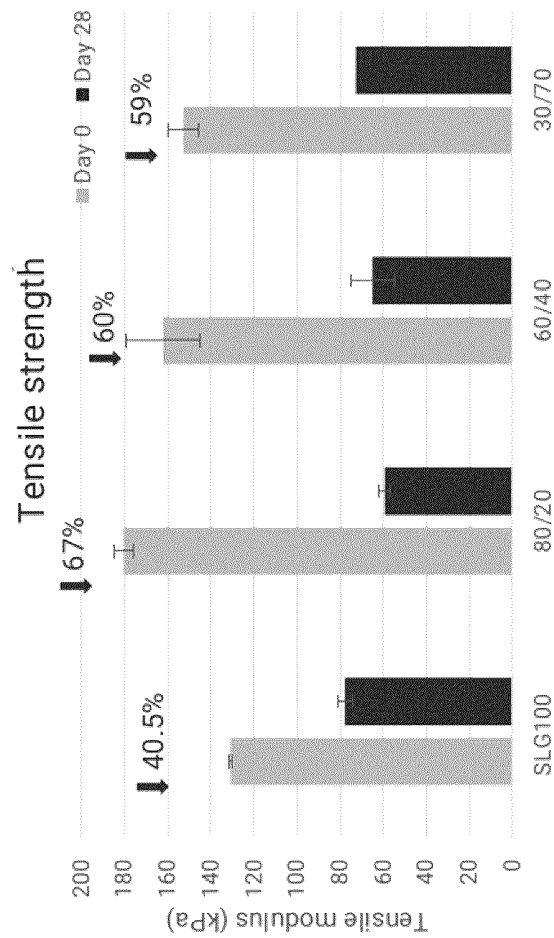
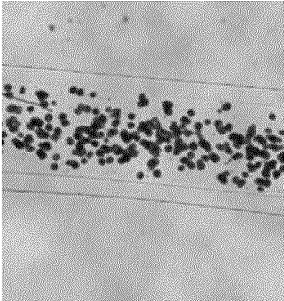


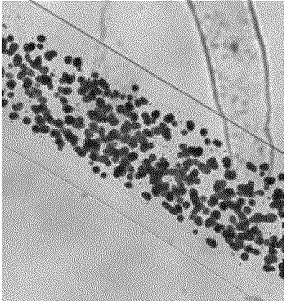
Fig. 26A

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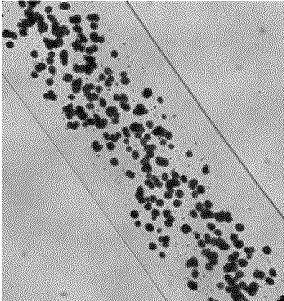
80/20 (zwitt/SLG100)

Fig. 26E



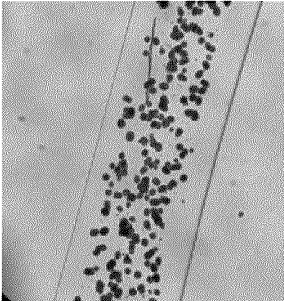
60/40 (zwitt/SLG100)

Fig. 26D



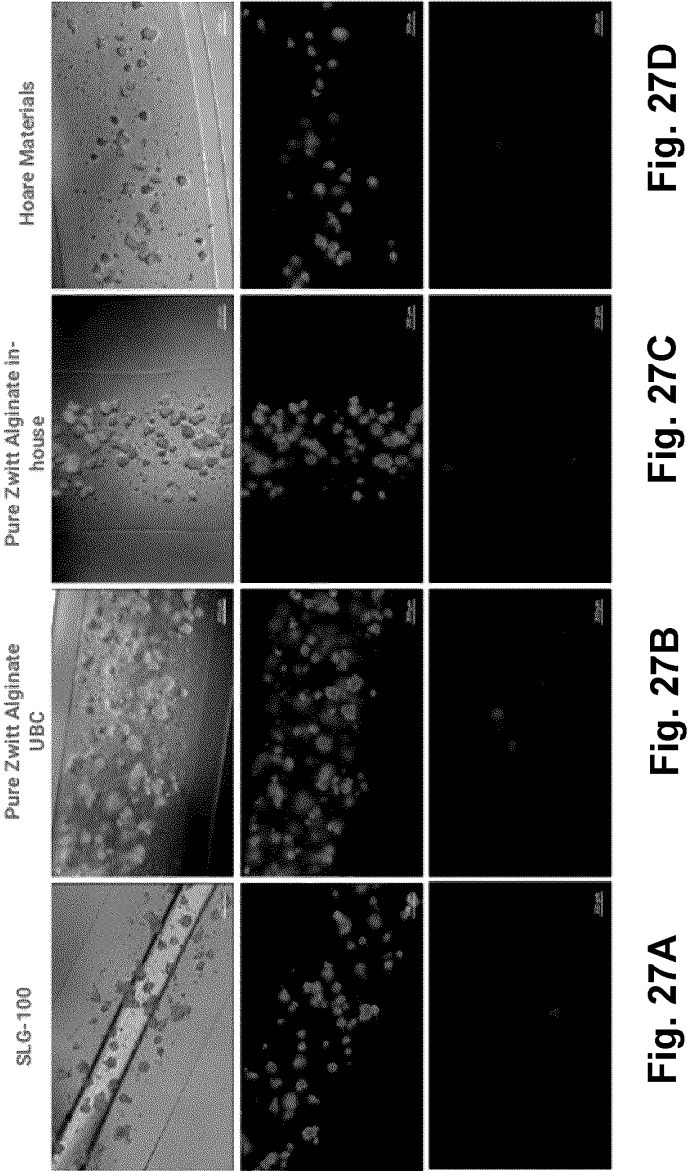
30/70 (zwitt/SLG100)

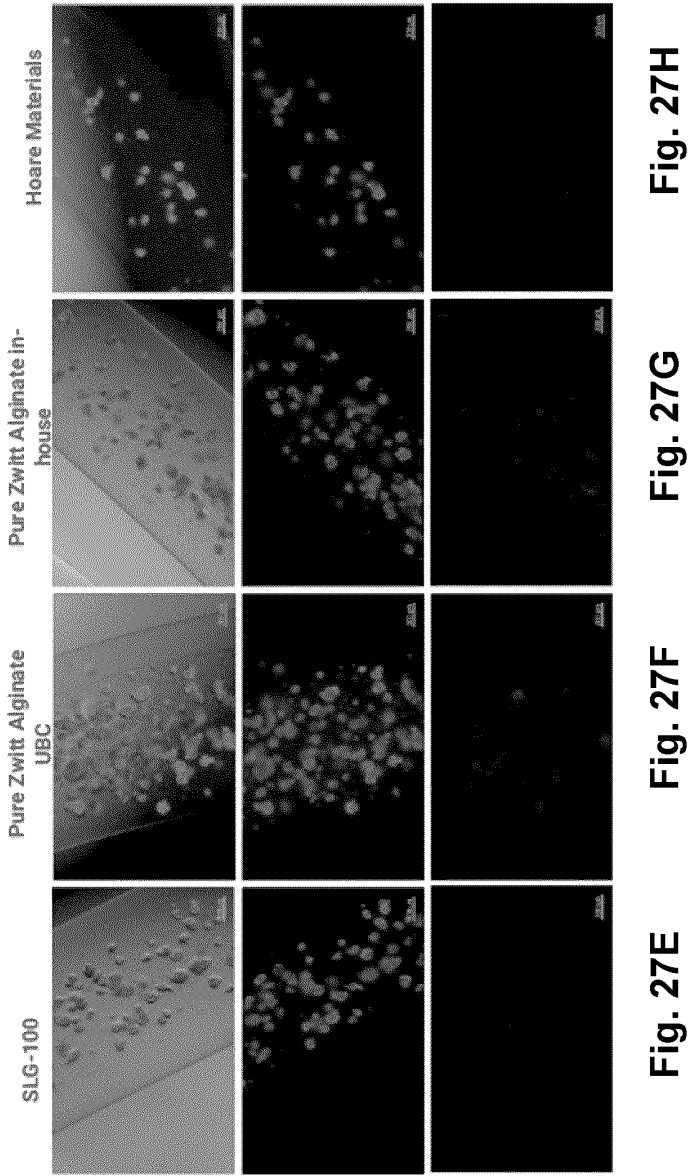
Fig. 26C



SLG100

Fig. 26B





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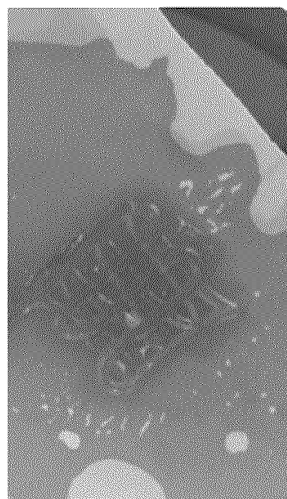


Fig. 28B

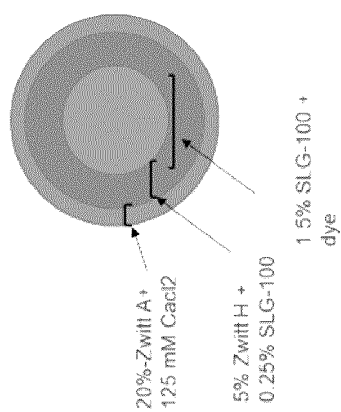


Fig. 28A

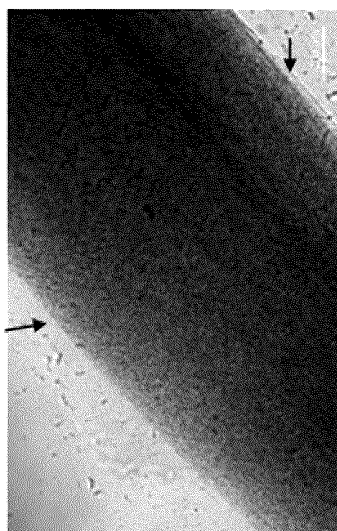
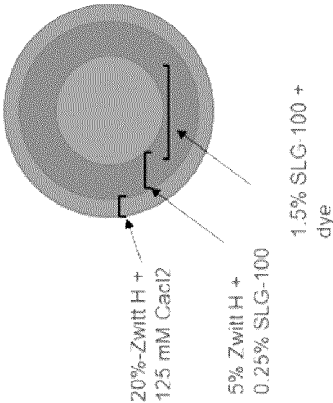


Fig. 28C



Fig. 28E



Incubated in 20% Zwitt-A
for 5 mins post-print

Fig. 28D

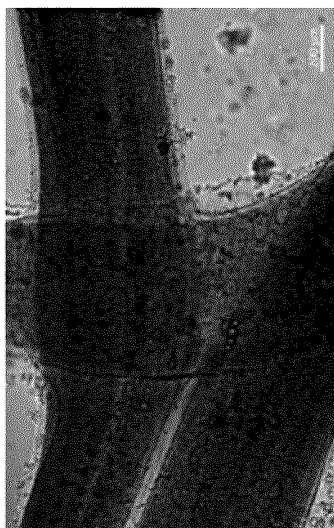
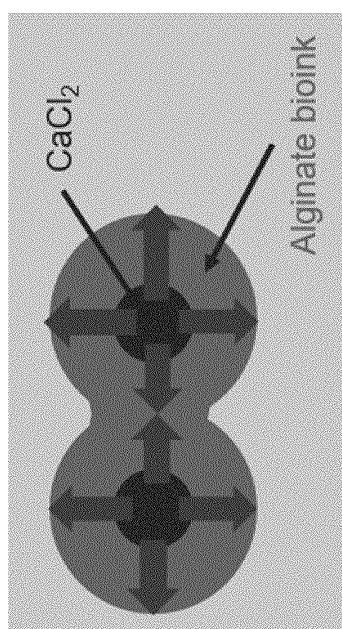


Fig. 28F

**Fig. 28G**

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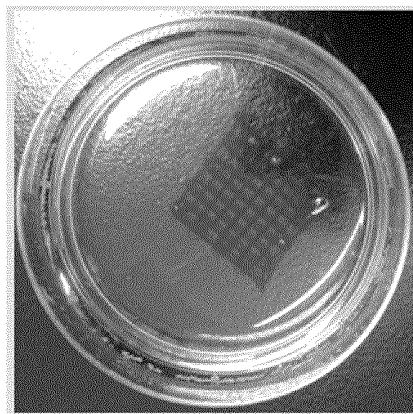


Fig. 28I

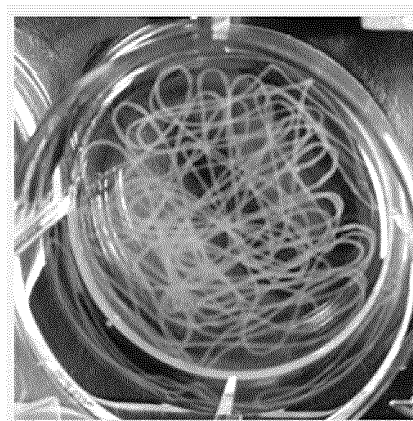


Fig. 28H

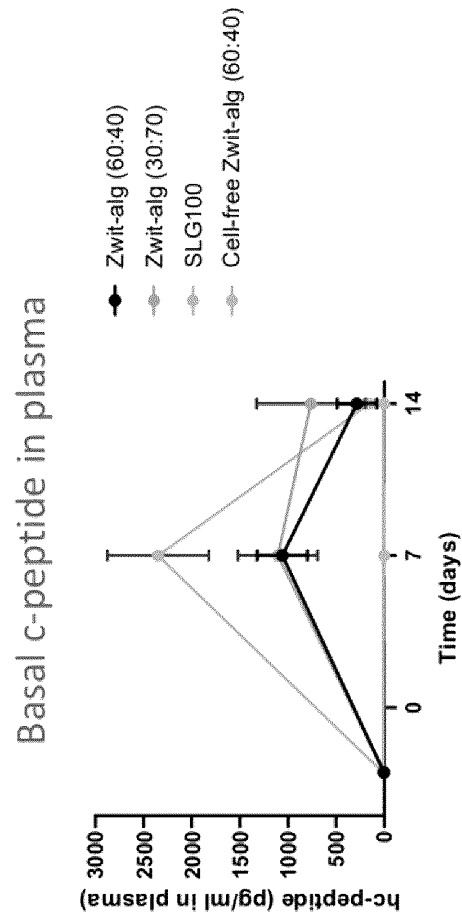


Fig. 29

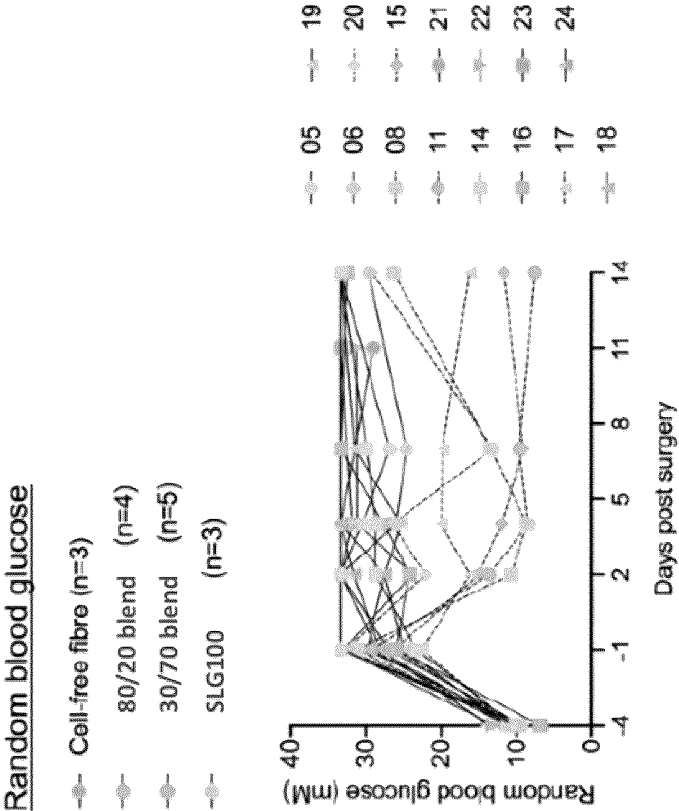


Fig. 30A

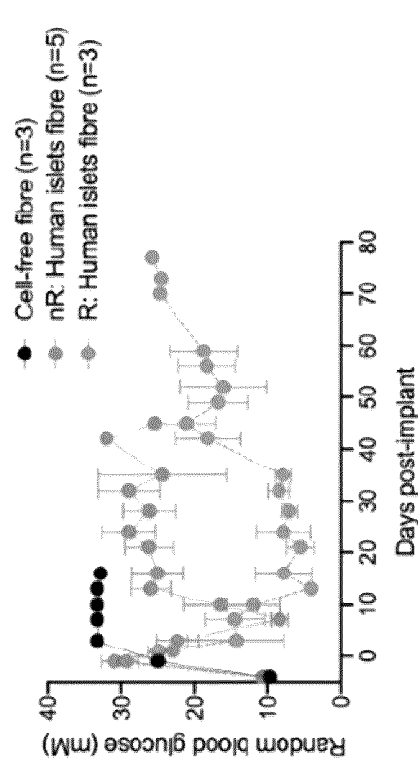


Fig. 30B

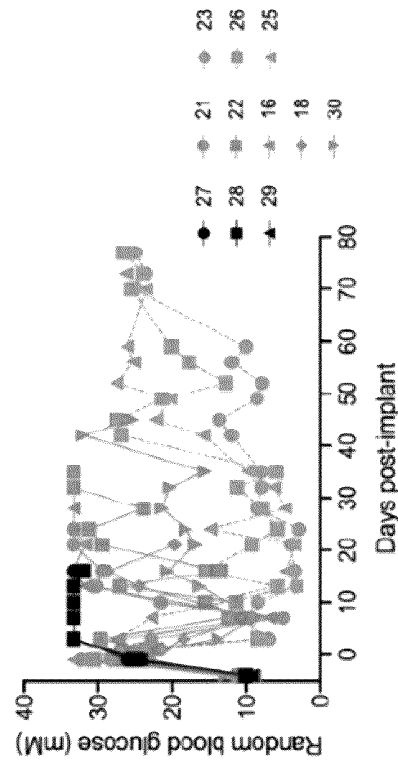


Fig. 30C

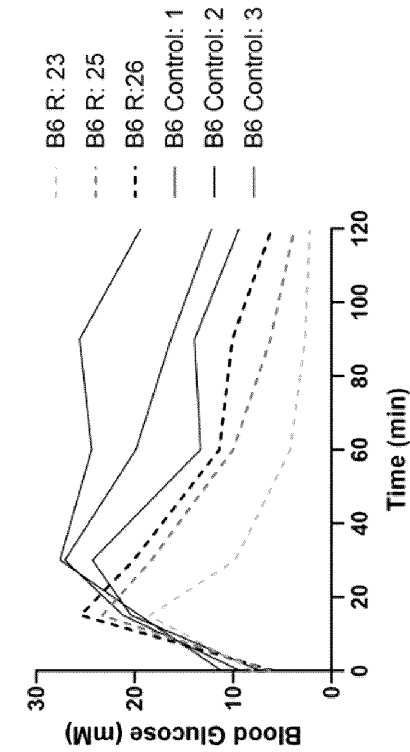


Fig. 31B

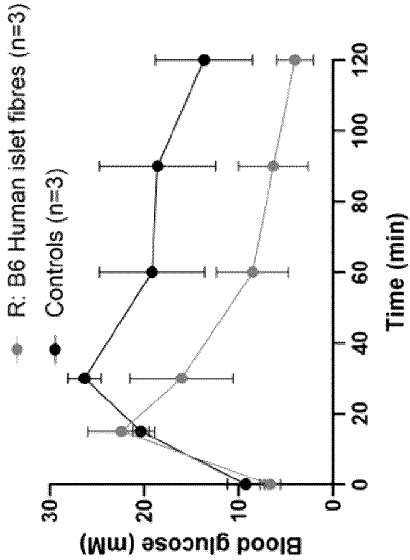


Fig. 31A

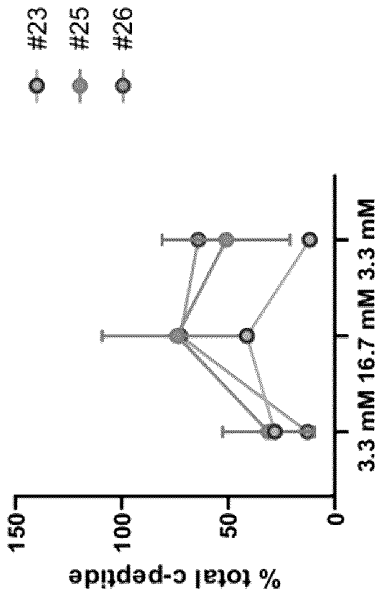


Fig. 32B

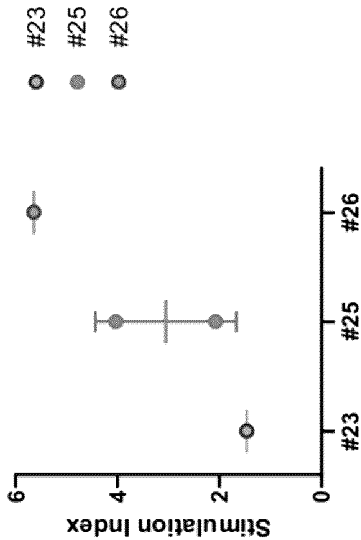


Fig. 32A

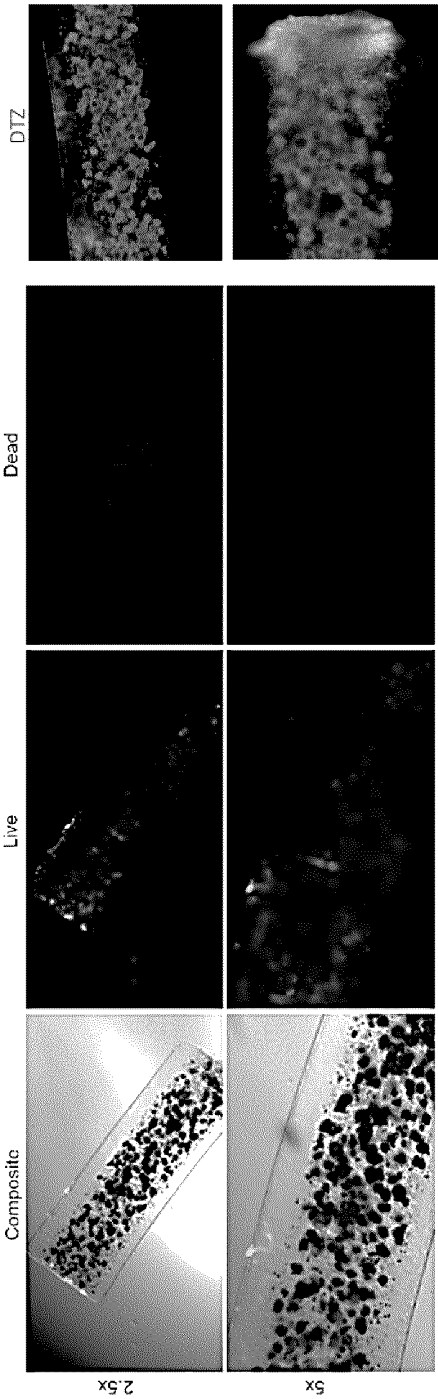


Fig. 33A

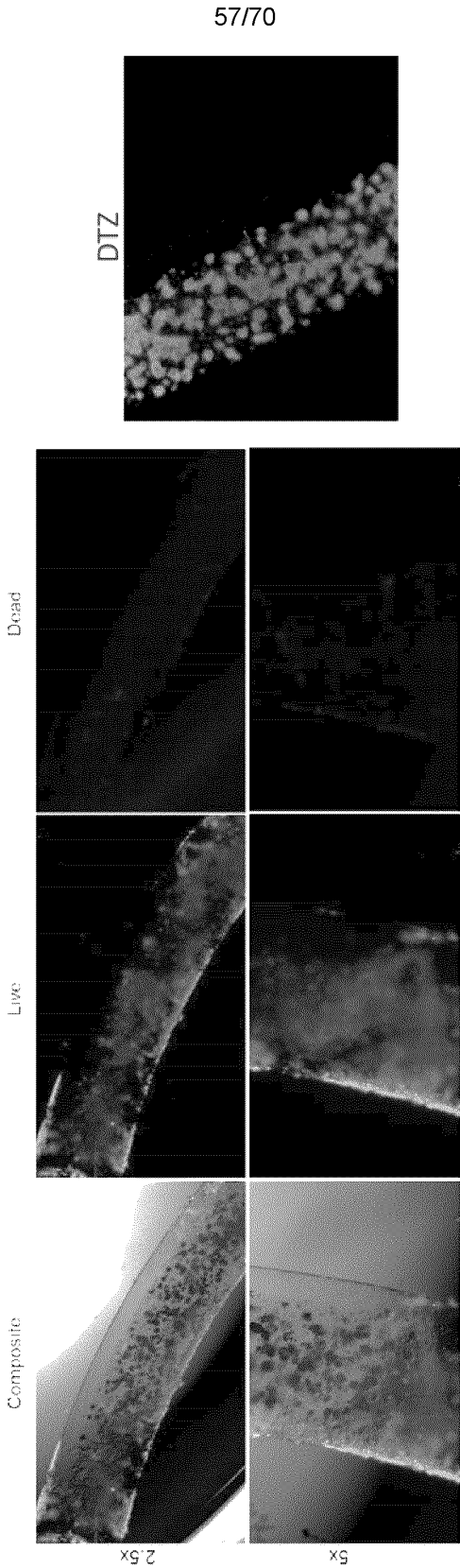


Fig. 33B

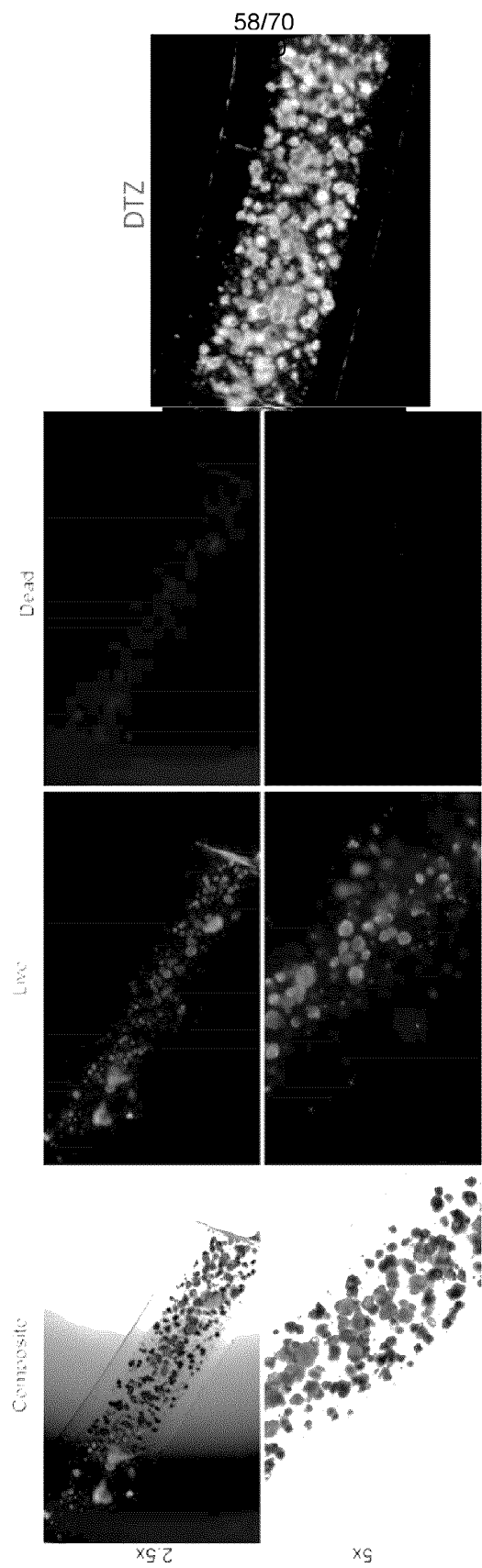


Fig. 33C

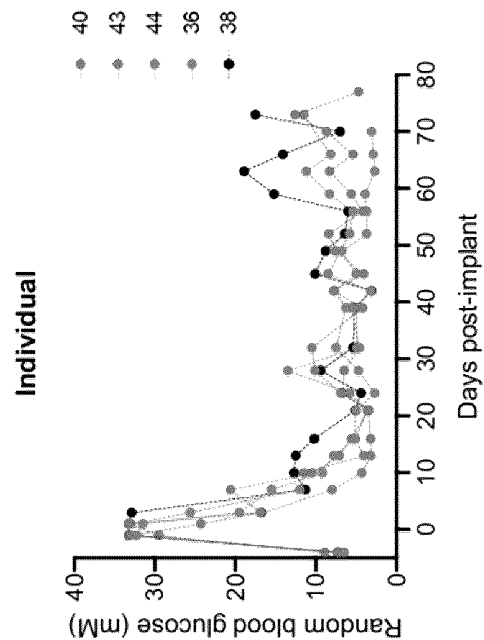


Fig. 34B

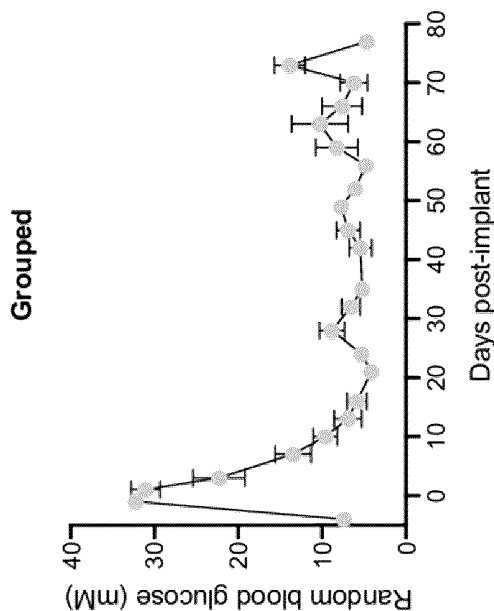
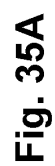
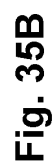


Fig. 34A



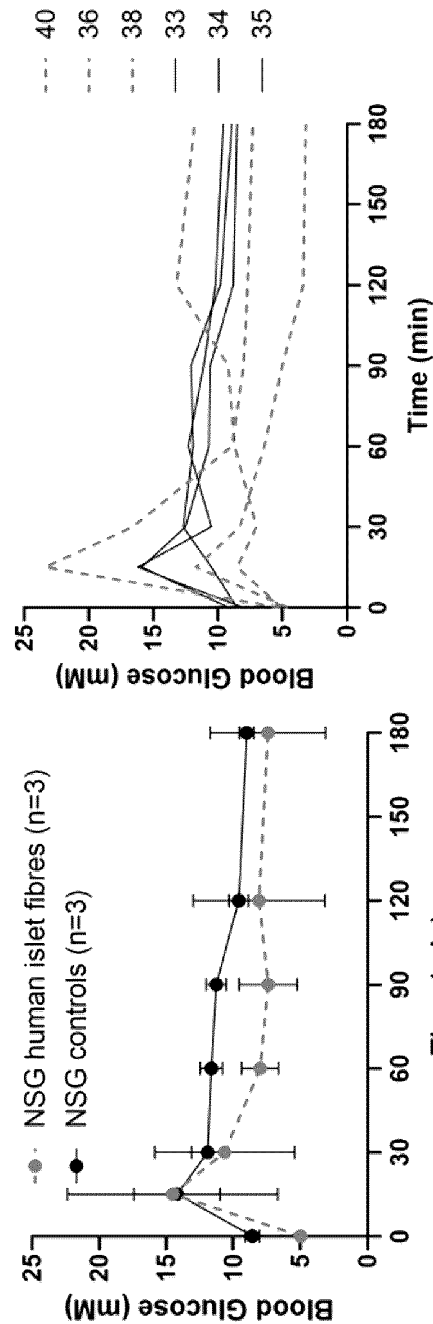


Fig. 35C

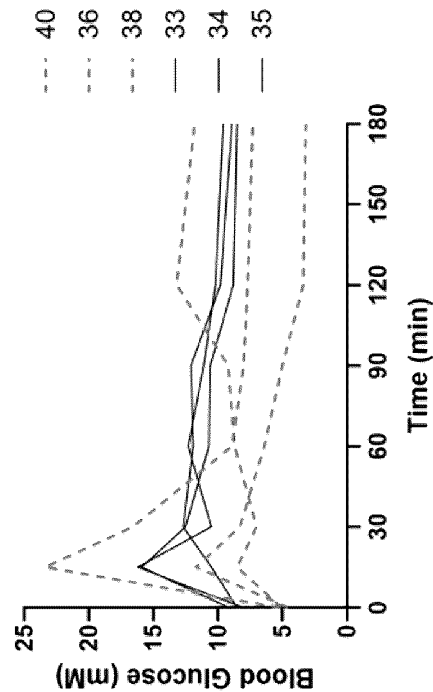


Fig. 35D

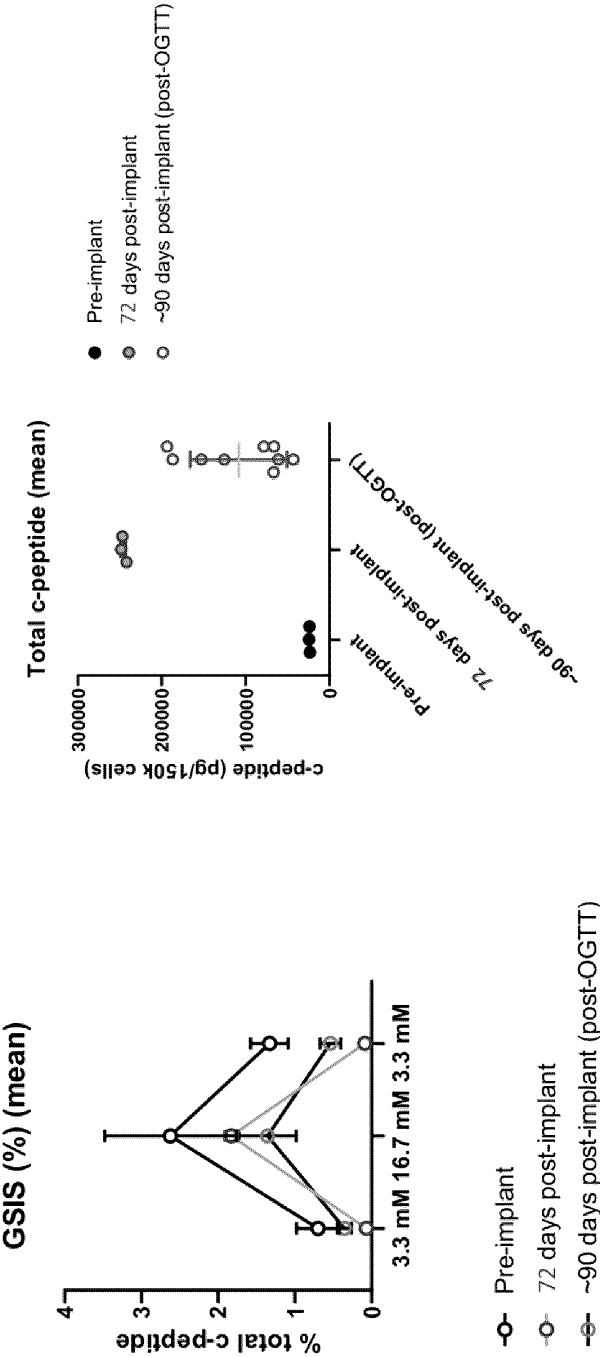


Fig. 36B

Fig. 36A

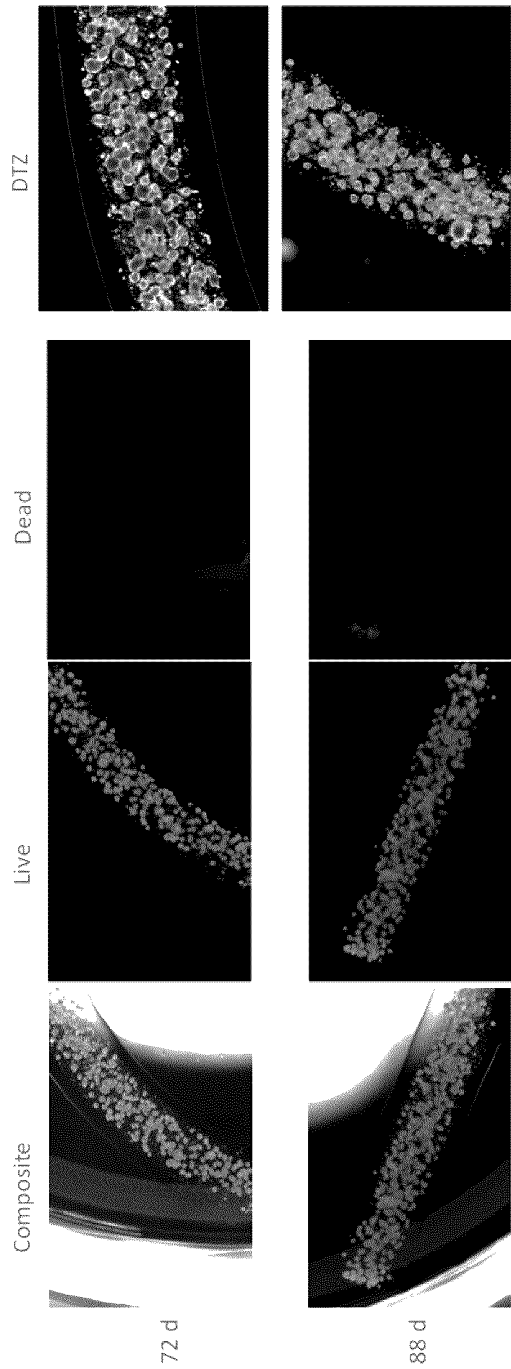


Fig. 37

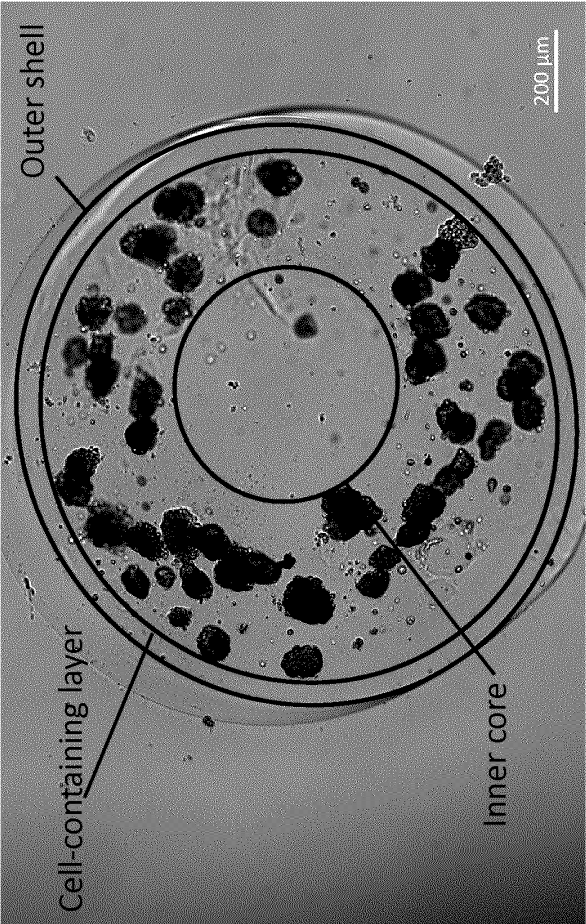


Fig. 38

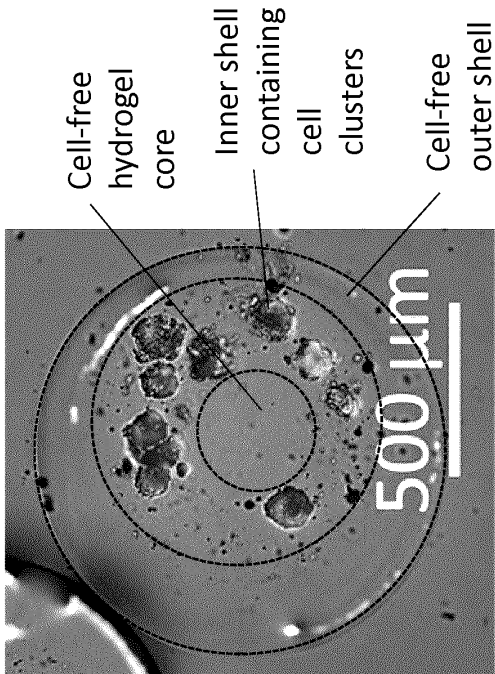


Fig. 39B

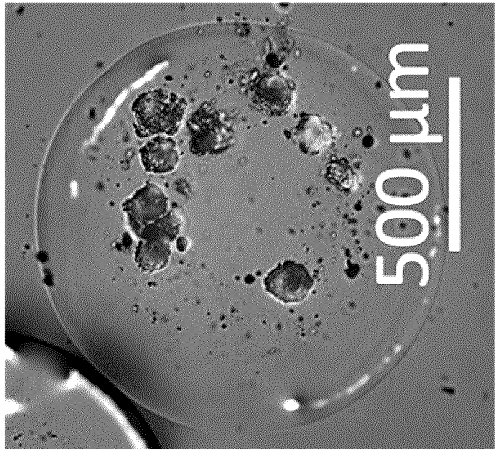


Fig. 39A

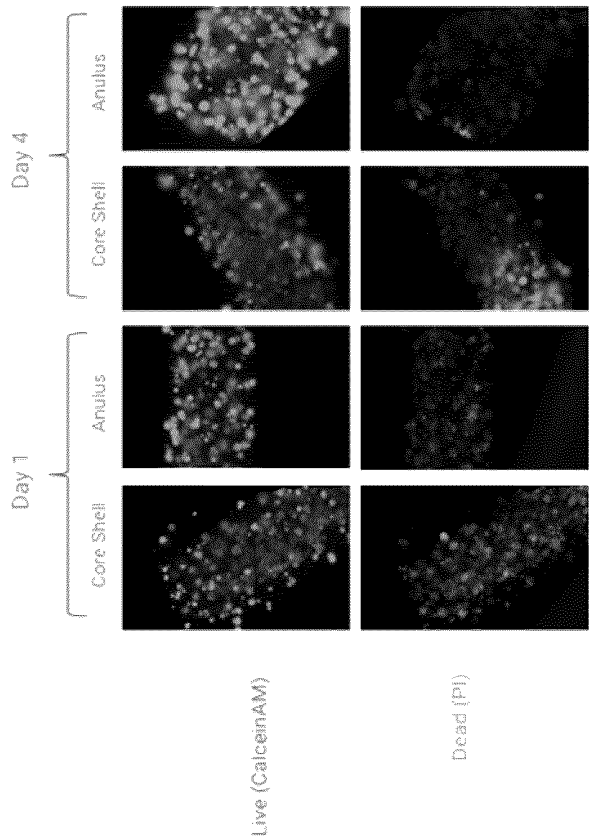


Fig. 40A

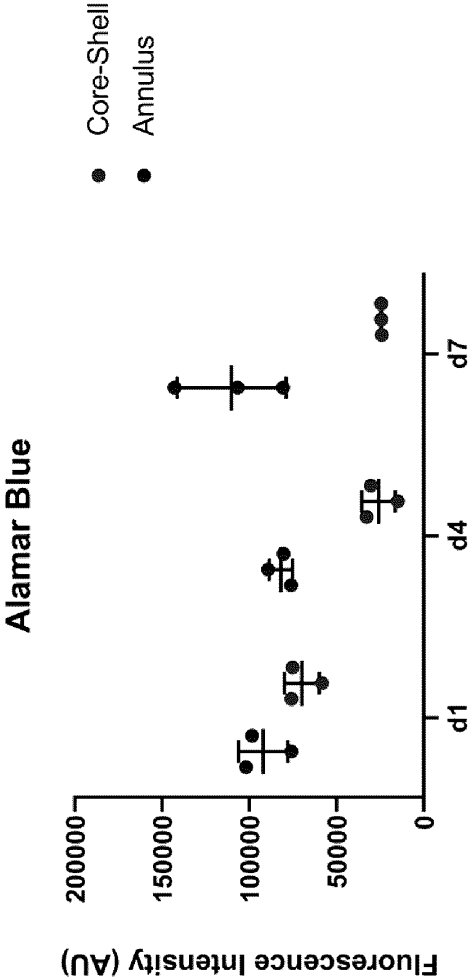


Fig. 40B

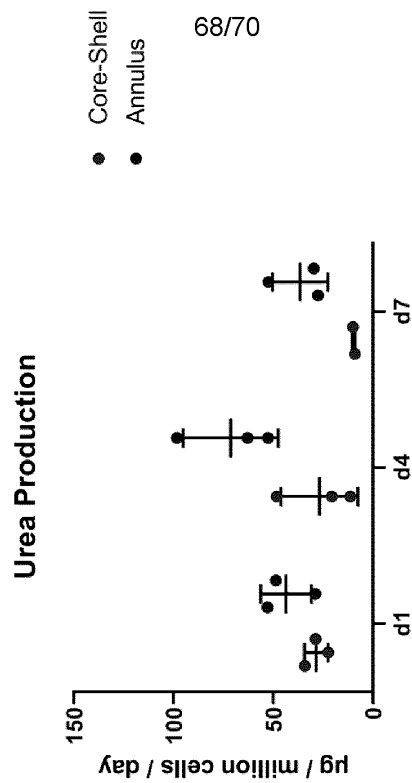


Fig. 40D

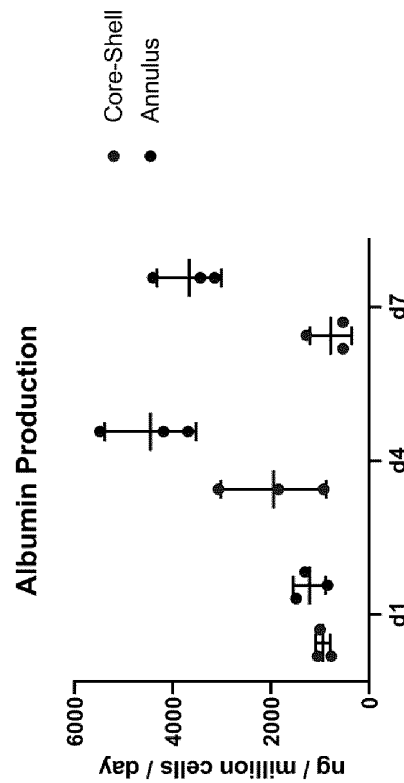


Fig. 40C

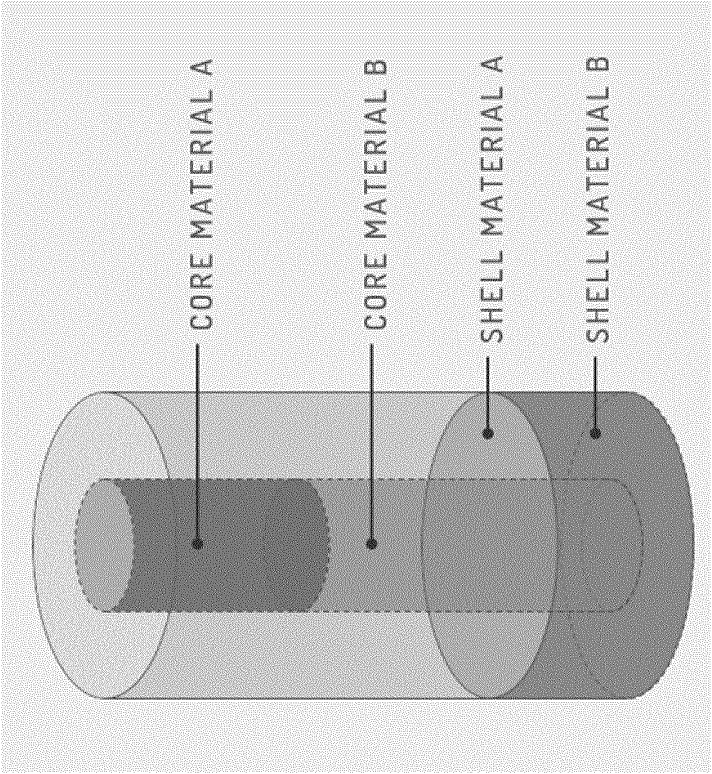


Fig. 41A

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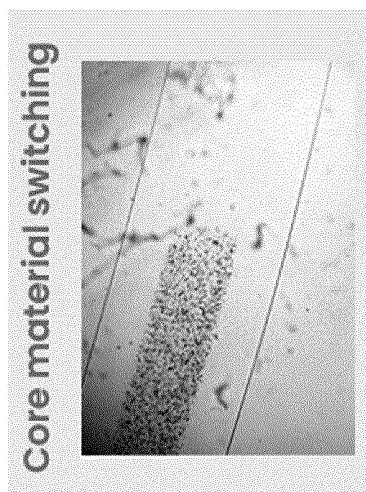


Fig. 41C



Fig. 41B