Figure 1

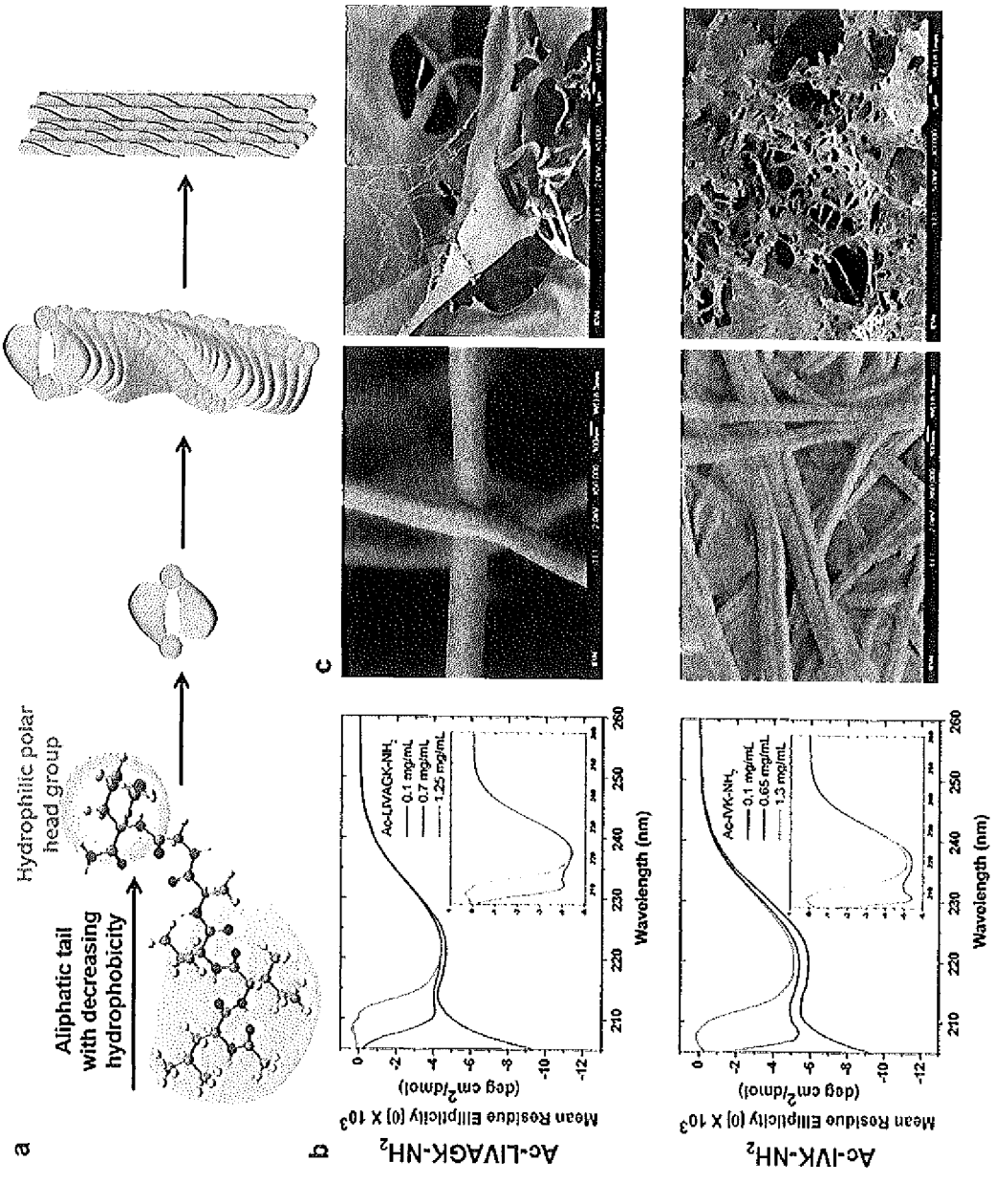

a
Hydrophilic polar head group
Aliphatic tail with decreasing hydrophobicity
b
Ac-LIVAGK-NH2
Ac-IVK-NH2
Mean Residue Ellipticity [θ] X 10^3 (deg cm^2/dmol)
Wavelength (nm)
Ac-LIVAGK-NH2
0.1 mg/mL
0.7 mg/mL
1.25 mg/mL
Ac-IVK-NH2
0.1 mg/mL
0.65 mg/mL
1.3 mg/mL
c

Figure 2

Subclass with acidic amino acids as polar head group

- Stimuli-responsive gelation at low pH
- Amidation or esterification removes sensitivity to pH, but hydrogels can still be obtained

Subclass with amidated basic amino acids as polar head group

- Stimuli-responsive gelation in the presence of salts at physiological concentrations (0.9% saline and PBS)

Minimum gelation concentration

Peptide	Water	PBS
Ac-IK3-NH_2	>30	10
Ac-IK6-NH_2	10	3
Ac-LK6-NH_2	15	6

Substitutions with synthetic amino acids

- Sequence of aliphatic amino acid residues influences gelation:

Minimum gelation concentration of hexamers in PBS

Head group	I-Series	L-Series
L-Lysine	3	6
L-Ornithine	5	6
2,4-Diaminobutyric acid	5	6

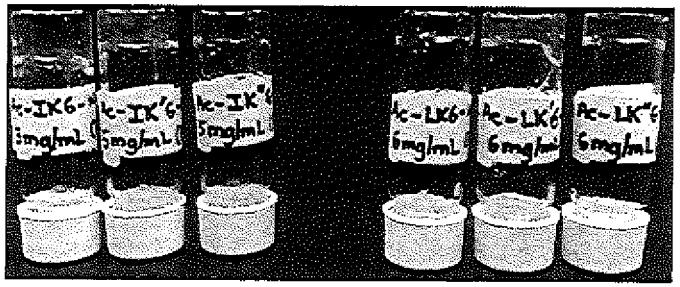


Figure 3

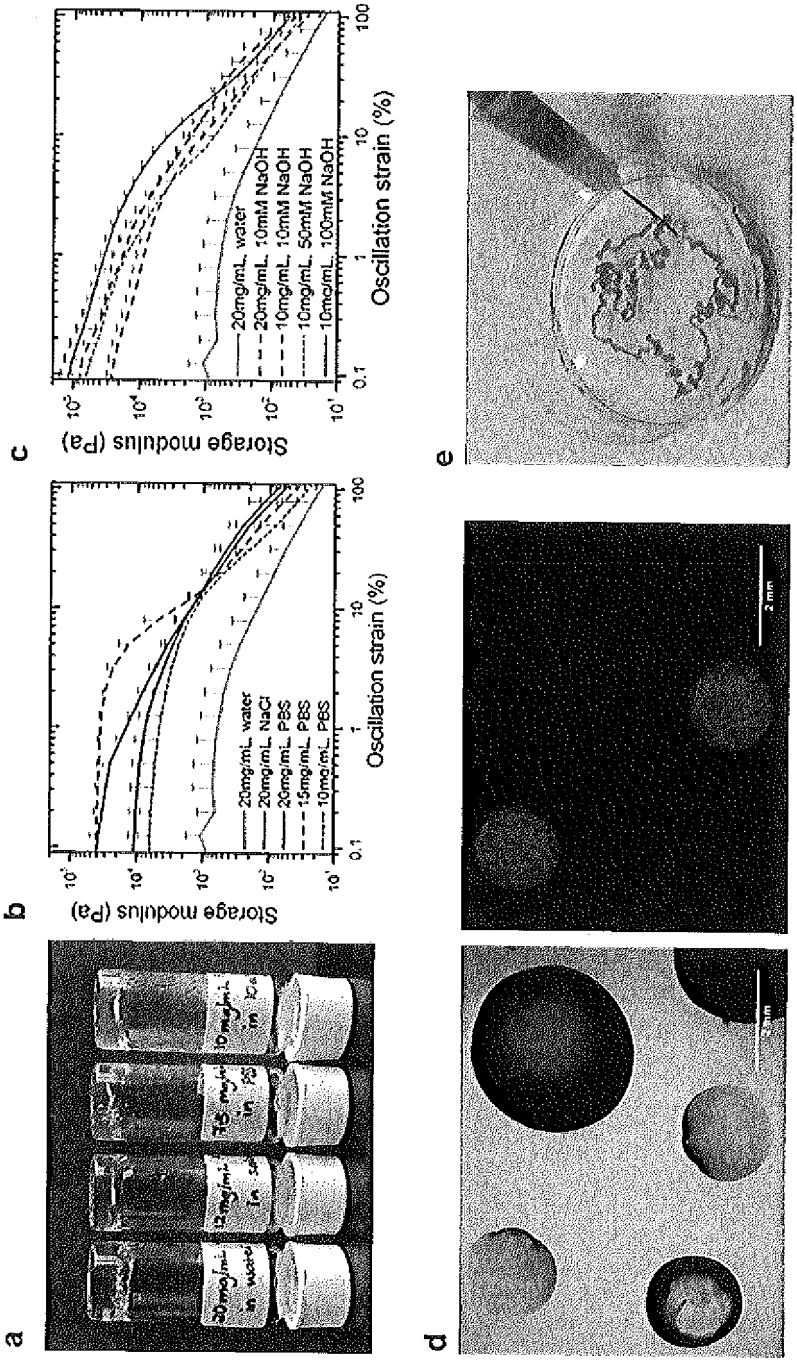

a
b
Storage modulus (Pa)
Oscillation strain (%)
20mg/mL water
20mg/mL NaCl
20mg/mL PBS
15mg/mL PBS
10mg/mL PBS
c
Storage modulus (Pa)
Oscillation strain (%)
20mg/mL water
20mg/mL 10mM NaOH
10mg/mL 10mM NaOH
10mg/mL 50mM NaOH
10mg/mL 100mM NaOH
d
2 mm
e

Figure 4

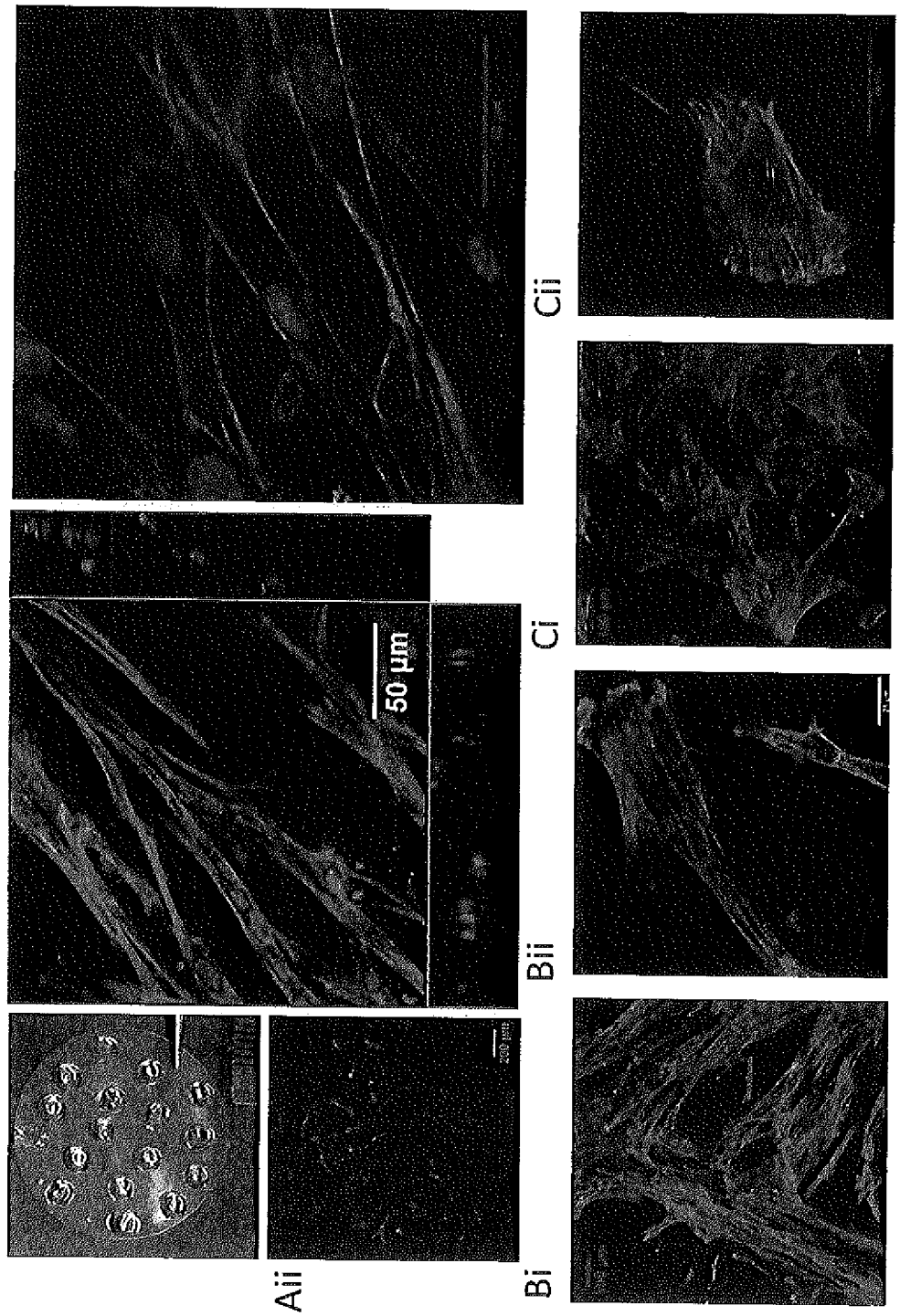
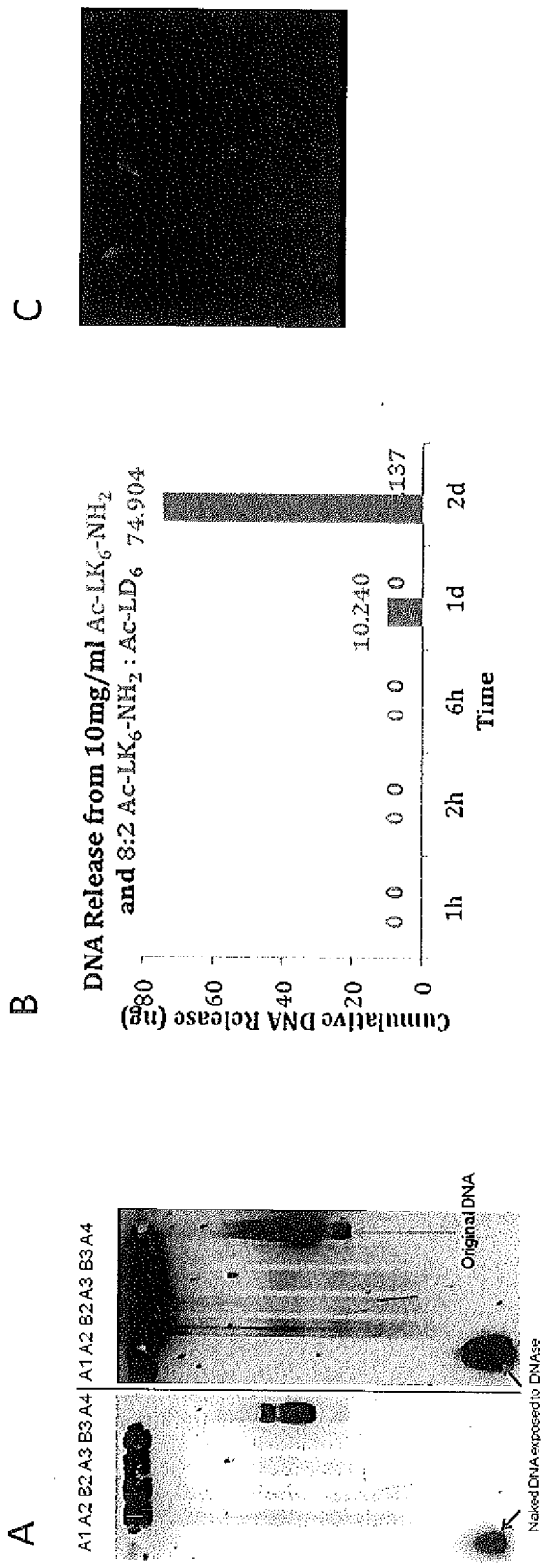


Figure 5


A
A1 A2 B2 A3 B3 A4
A1 A2 B2 A3 B3 A4
Original DNA
Naked DNA exposed to DNAse
B
DNA Release from 10mg/ml Ac-LK6-NH2
and 8:2 Ac-LK6-NH2 : Ac-LD6
74.904
10.240
137
0 0 0 0 0 0 0
Cumulative DNA Release (ng)
0
20
40
60
80
1h
2h
6h
1d
2d
Time
C

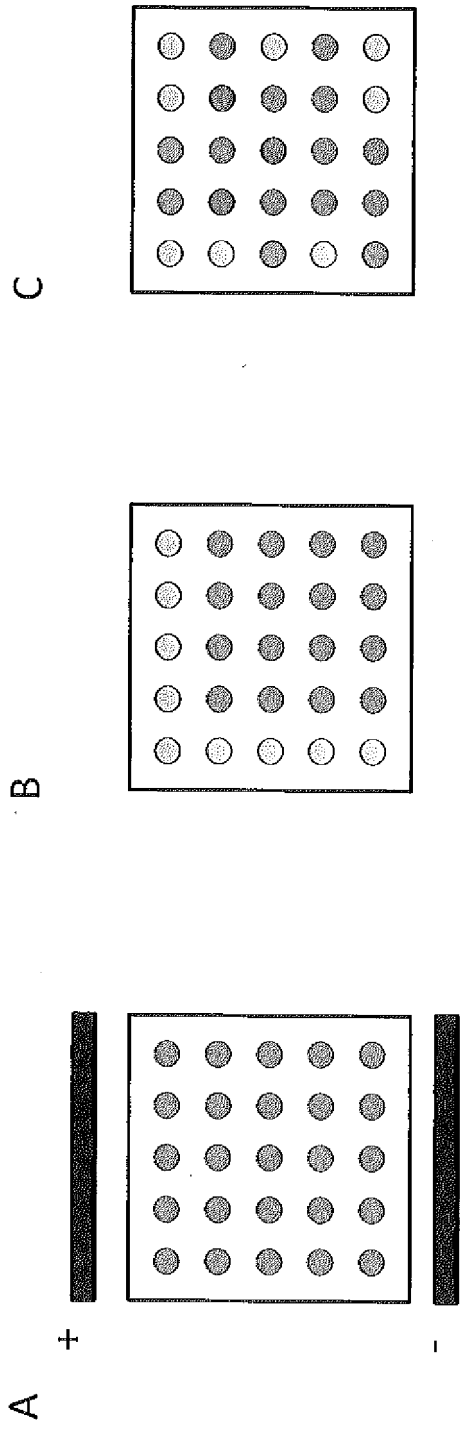


Figure 6

Figure 7

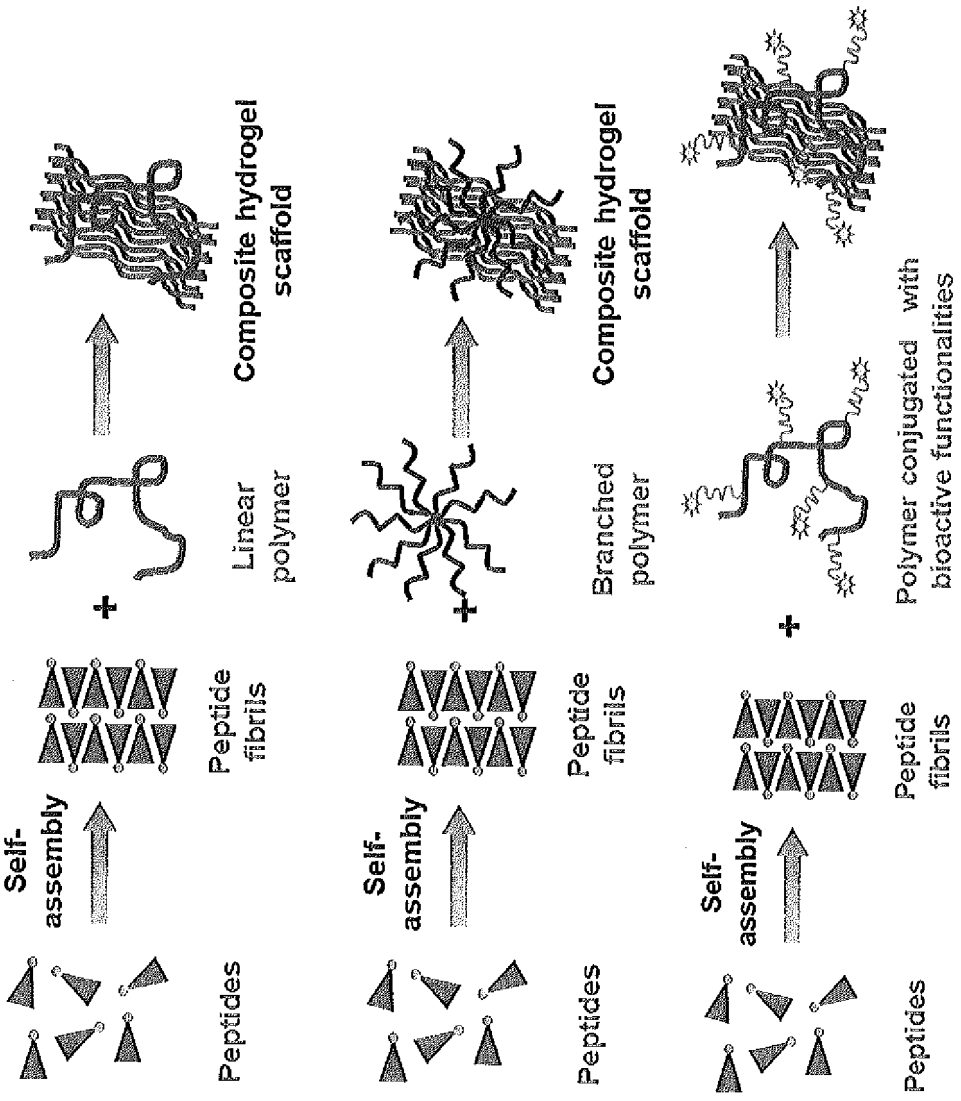

A
Peptides
Self-assembly
Peptide fibrils
+
Linear polymer
Composite hydrogel scaffold
B
Peptides
Self-assembly
Peptide fibrils
+
Branched polymer
Composite hydrogel scaffold
C
Peptides
Self-assembly
Peptide fibrils
+
Polymer conjugated with bioactive functionalities

Figure 8

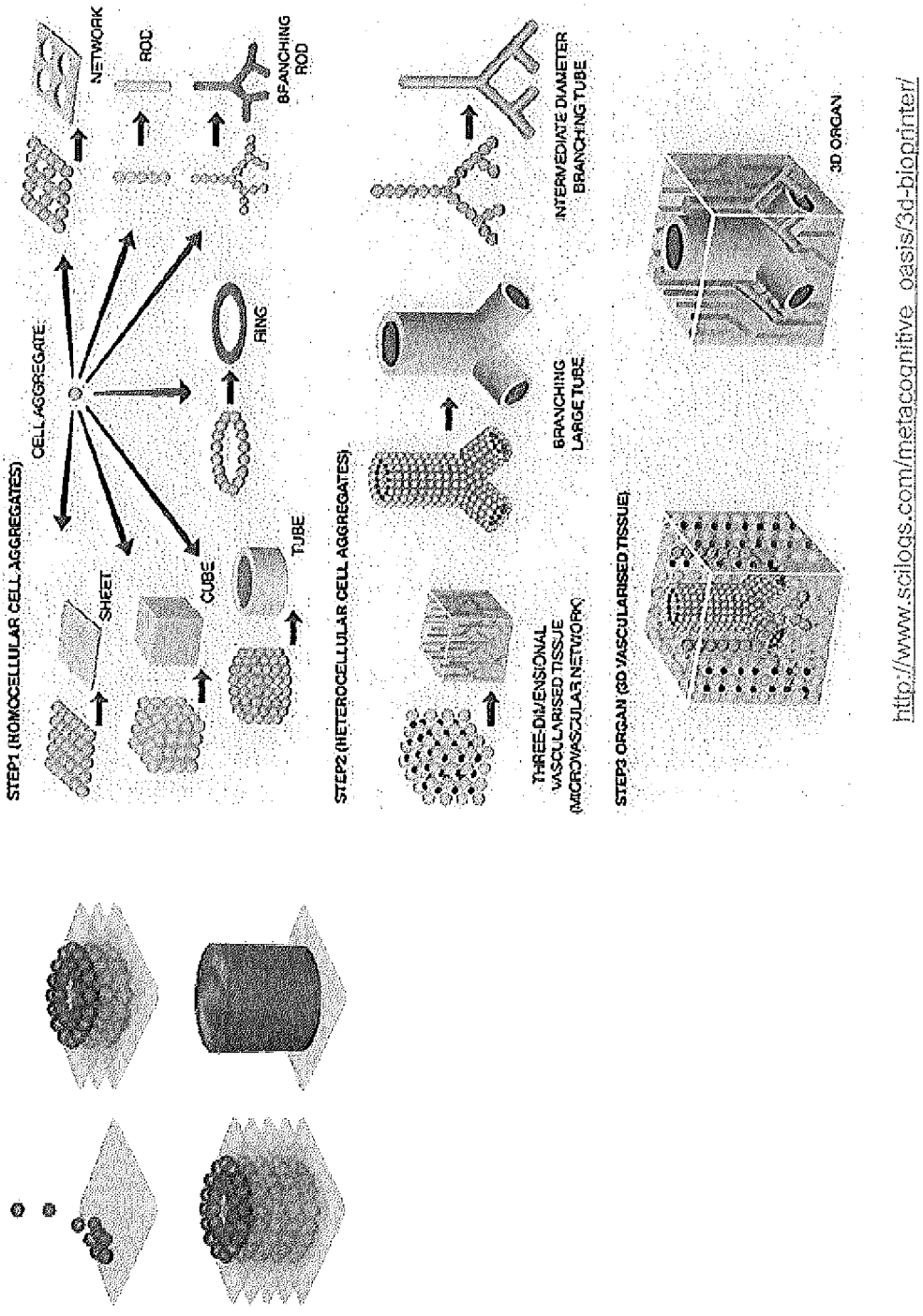

STEP1 (HOMOCELLULAR CELL AGGREGATES)
CELL AGGREGATE
SHEET
NETWORK
CUBE
ROD
TUBE
RING
BRANCHING ROD
STEP2 (HETEROCELLULAR CELL AGGREGATES)
THREE-DIMENSIONAL VASCULARISED TISSUE (MICROVASCULAR NETWORK)
BRANCHING LARGE TUBE
INTERMEDIATE DIAMETER BRANCHING TUBE
STEP3 ORGAN (3D VASCULARISED TISSUE)
3D ORGAN
http://www.scilogs.com/metacognitive_oasis/3d-bioprinter/

Figure 9

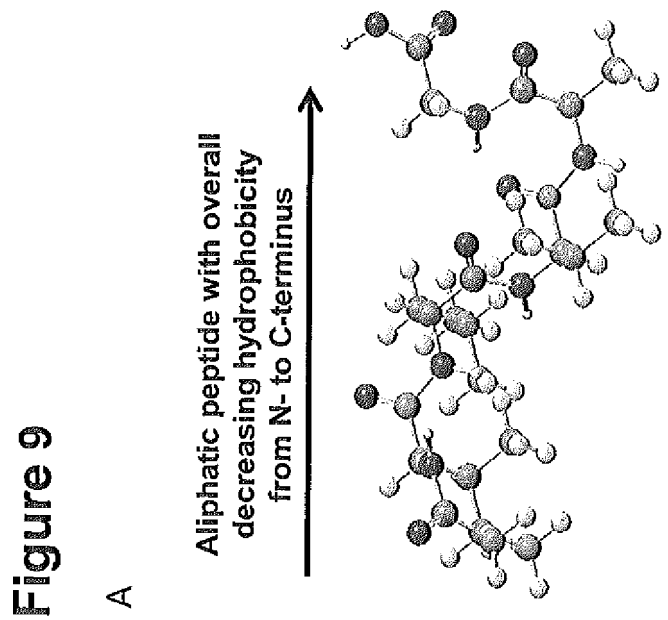
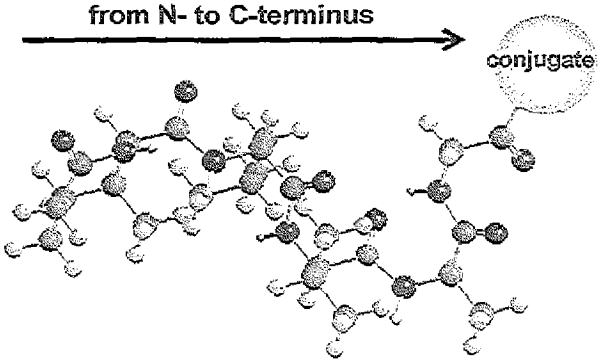

A
Aliphatic peptide with overall
decreasing hydrophobicity
from N- to C-terminus
B

Figure 10

A



Where the **conjugate**



= Functional groups such as (but not limited to) -COOH, -COOR, -NH_2, -OH, -SH, -CHO, -COR, maleimide,imidoester, carbodiimide ester, isocyanate, etc

Small molecules such as (but not limited to) sugars, alcohols, hydroxy acids, amino acids, vitamins, etc

Short linkers terminating in a polar functional group such as (but not limited to) ethylenediamine, PEG, carbodiimide ester, imidoester, etc

Short linkers coupled to small molecules or vitamins such as biotin, sugars, hydroxy acids, etc

B

