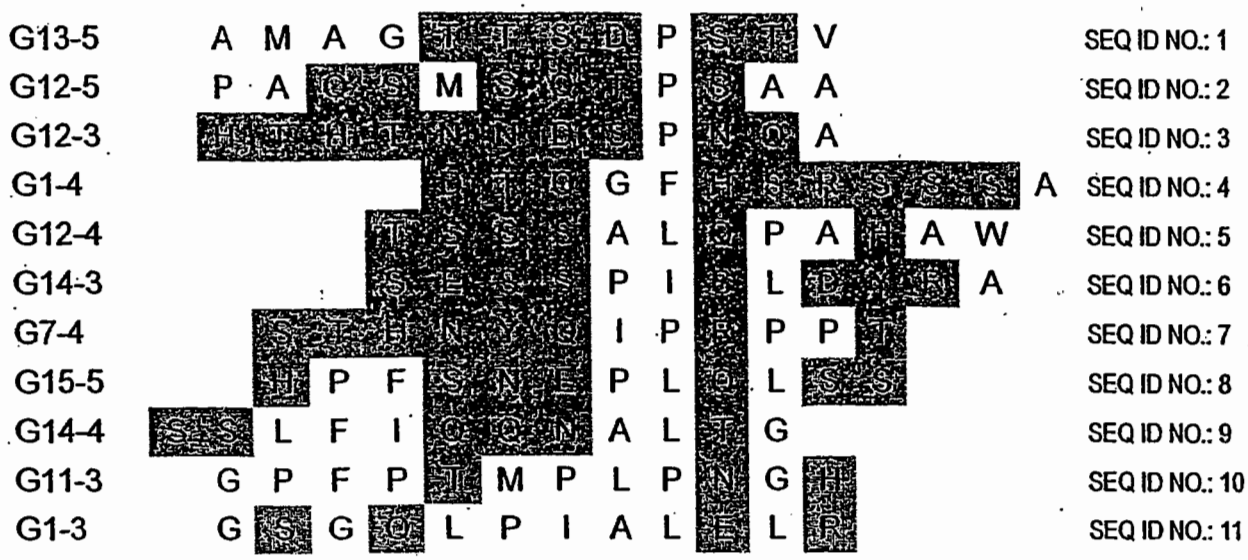

G13-5 A M A G P V SEQ ID NO.: 1
G12-5 P A P A A SEQ ID NO.: 2
G12-3 P A SEQ ID NO.: 3
G1-4 G F A SEQ ID NO.: 4
G12-4 A L P A A W SEQ ID NO.: 5
G14-3 P I L A SEQ ID NO.: 6
G7-4 I P P P SEQ ID NO.: 7
G15-5 P L L SEQ ID NO.: 8
G14-4 L F I A L G SEQ ID NO.: 9
G11-3 G P F P M P L P G SEQ ID NO.: 10
G1-3 G G L P I A L L SEQ ID NO.: 11

Fig. 1

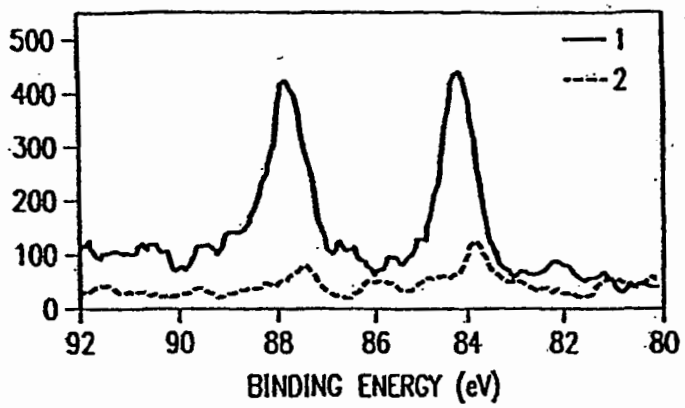


FIG. 2A

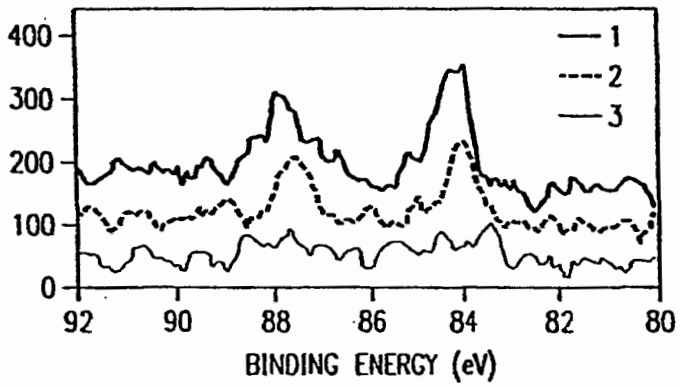


FIG. 2B

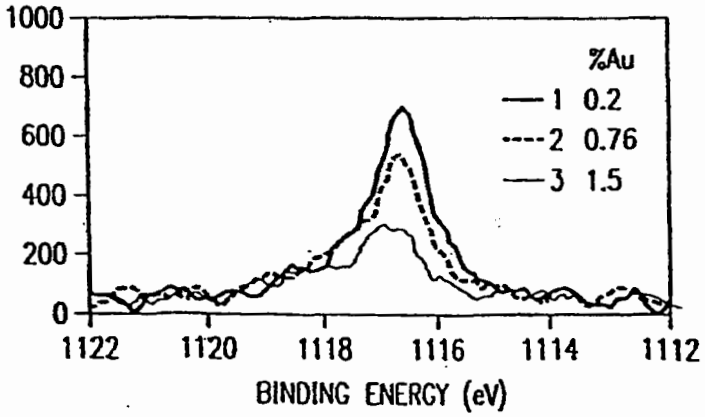


FIG. 2C

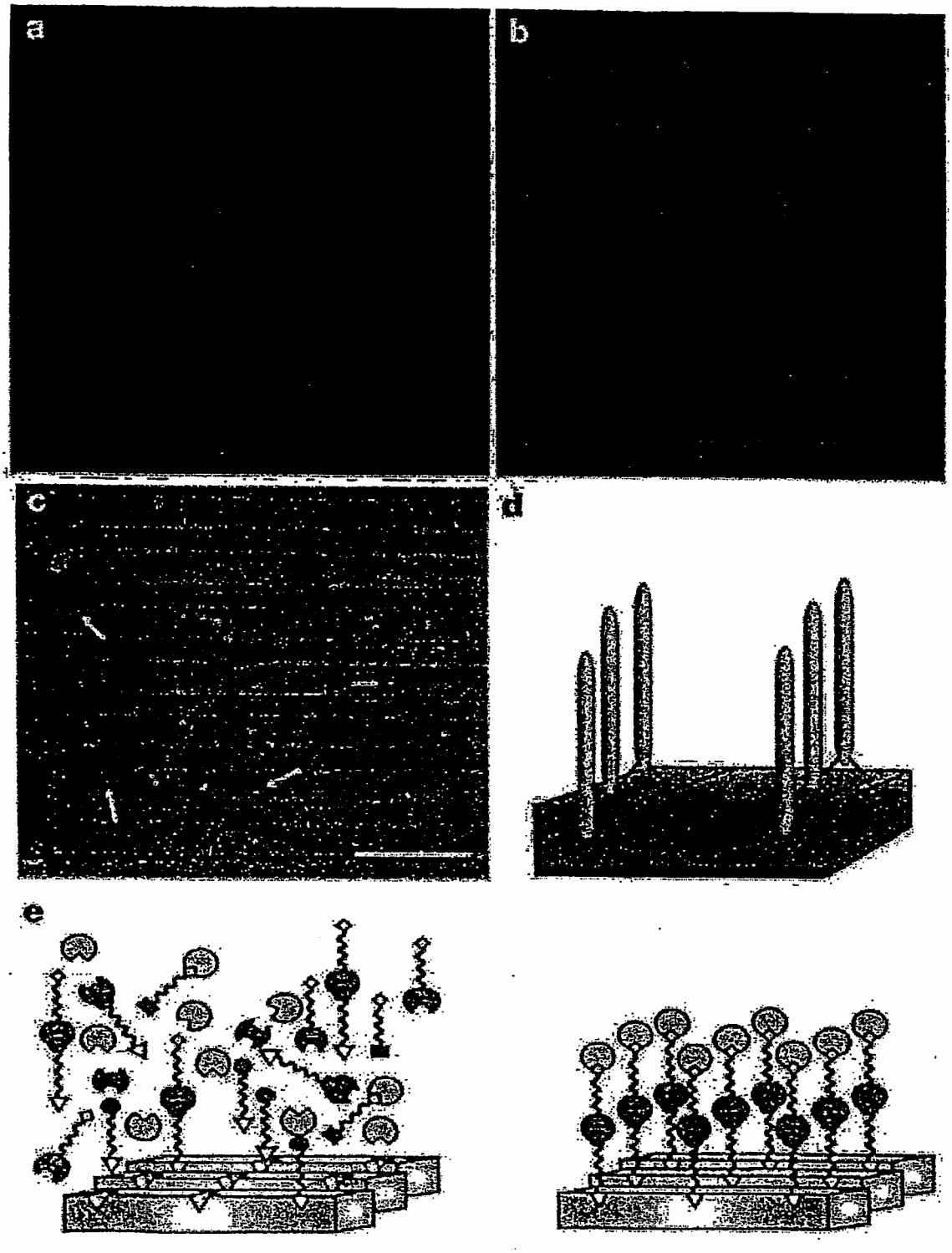


Fig. 3

CdS Single Crystal

12-mer library (N to C terminus)

CEF-81	E1	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-82	E2	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-83	E3	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-84	E4	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-85	E5	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-86	E6	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-88	E8	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-89	E9	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-90	E10	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-91	E11	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-92	E12	C	H	A	S	N	R	L	S	C			SEQ ID NO.:12
CEF-159	E13	S	M	D	R	S	D	M	T	M	R	L	P	SEQ ID NO.:13
CEF-160	E14	G	T	F	T	P	R	P	T	P	I	Y	P	SEQ ID NO.:14
CEF-161	E15	Q	M	S	E	N	L	T	S	Q	I	E	S	SEQ ID NO.:15
CEF-162	E16	D	M	L	A	R	L	R	A	T	A	G	P	SEQ ID NO.:16
CEF-163	E18	S	Q	T	W	L	L	M	S	P	V	A	T	SEQ ID NO.:17
CEF-164	E19	A	S	P	D	Q	Q	V	G	P	L	Y	V	SEQ ID NO.:18
CEF-165	E20	L	T	W	S	P	L	Q	T	V	A	R	F	SEQ ID NO.:19
CEF-166	E21	Q	I	S	A	H	Q	M	P	S	R	P	I	SEQ ID NO.:20
CEF-167	E22	S	M	K	Y	N	L	I	V	D	S	P	Y	SEQ ID NO.:21
CEF-168	E23	wt												
CEF-169	E24	Q	M	P	I	R	N	Q	L	A	W	P	M	SEQ ID NO.:22
CEF-170	E25	T	Q	N	L	E	I	R	E	P	L	T	P	SEQ ID NO.:23
CEF-171	E26	Q	I	S	A	H	Q	M	P	S	R	P	I	SEQ ID NO.:20
CEF-172	E27	Y	P	M	S	P	S	P	Y	P	Y	Q	L	SEQ ID NO.:24
CEF-173	E28	S	F	M	I	Q	P	T	P	L	P	P	S	SEQ ID NO.:25
CEF-174	E29	G	L	A	P	H	I	H	S	L	N	E	A	SEQ ID NO.:26
CEF-175	E30	M	Q	F	P	V	T	P	Y	L	N	A	S	SEQ ID NO.:27

Fig. 4

CdS Biopan 3 Sequences (N to C terminus)

JCW-96	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-97	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-98	Q	I	S	A	H	Q	M	P	S	R	P	I	SEQ ID NO.:20
JCW-99	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-100	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-101	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-102	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-103	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-104	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-105	G	Y	H	M	Q	T	L	P	G	P	V	A	SEQ ID NO.:29

CdS Biopan 4 Sequences (N to C terminus)

JCW-106	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-108	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-111	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30

CdS Biopan 5 Sequences (N to C terminus)

JCW-118	T	L	T	N	G	P	L	R	P	F	T	G	SEQ ID NO.:31
JCW-122	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30

CdS Biopan 3 Sequences (repeat; N to C terminus))

JCW-125	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-126	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-127	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-128	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-129	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-130	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-131	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-132	WT												
JCW-133	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28
JCW-134	S	P	G	D	S	L	K	K	L	A	A	S	SEQ ID NO.:28

CdS Biopan 2 Sequences (N to C terminus)

JCW-137	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-139	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-140	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30
JCW-141	S	L	T	P	L	T	T	S	H	L	R	S	SEQ ID NO.:30

CdS Biopan 5 Sequences (repeat; N to C terminus)

JCW-146	T	L	T	N	G	P	L	R	P	F	T	G	SEQ ID NO.:31
JCW-148	L	N	T	P	K	P	F	T	L	G	Q	N	SEQ ID NO.:32

Fig. 5

Other arrangements (N to C terminus)

4	B71	CEF-215	C	D	L	Q	N	Y	K	A	C	SEQ ID NO.:33
4	G	CEF-156	C	R	H	P	H	T	R	L	C	SEQ ID NO.:34
3t	H13	CEF-131	C	A	N	L	K	P	K	A	C	SEQ ID NO.:35
3t	H15	CEF-133	C	Y	I	N	P	P	K	V	C	SEQ ID NO.:36
3t	H14	CEF-132	C	N	N	K	V	P	V	L	C	SEQ ID NO.:37
3	B49	CEF-203	C	H	A	S	K	T	P	L	C	SEQ ID NO.:38
3t	H2	CEF-120	C	A	S	Q	L	Y	P	A	C	SEQ ID NO.:39
3	G4	CEF-102	C	N	M	T	Q	Y	P	A	C	SEQ ID NO.:40
3t	H17	CEF-135	C	F	A	P	S	G	P	A	C	SEQ ID NO.:41
4		B20	C	P	V	W	I	Q	A	P	C	SEQ ID NO.:42
5	CEF-27	B29	C	Q	V	A	V	N	P	L	C	SEQ ID NO.:43
3	G2	CEF-100	C	Q	P	E	A	M	P	A	C	SEQ ID NO.:44
3	B48	CEF-202	C	H	P	T	M	P	L	A	C	SEQ ID NO.:45
3a	B92	CEF-229	C	P	P	F	A	A	P	I	C	SEQ ID NO.:46

his-met-pro sequences from Aldrich ZnS screenings

3a	B63	CEF-207	C	N	K	H	Q	P	M	H	C	SEQ ID NO.:47
4		B18	C	F	P	M	R	S	N	Q	C	SEQ ID NO.:48
4a	B73	CEF-217	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
5		B7	C	N	N	P	M	H	Q	N	C	SEQ ID NO.:50
5	CEF-28	B30	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
5	CEF-34	B36	C	H	M	A	P	R	W	Q	C	SEQ ID NO.:51
5	CEF-35	B37	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
	JCW-87	503	H	V	H	I	H	S	R	P	M	SEQ ID NO.:52
	JCW-87	503	H	V	H	I	H	S	R	P	M	SEQ ID NO.:52
5	JCW-65	5H7	L	P	N	M	H	P	L	P	L	SEQ ID NO.:53
4	JCW-57	4H9	L	P	L	R	L	P	P	M	P	SEQ ID NO.:54
4	JCW-30	437-10	H	S	M	I	G	T	P	T	T	SEQ ID NO.:55
4	JCW-28	437-8	S	V	S	V	G	M	K	P	S	SEQ ID NO.:56
4	JCW-21	437-1	L	D	A	S	F	M	Q	D	W	SEQ ID NO.:57
4	JCW-22	437-2	T	P	P	S	Y	Q	M	A	M	SEQ ID NO.:58
4	JCW-23	437-3	Y	P	Q	L	V	S	M	S	T	SEQ ID NO.:59
3	JCW-3	337-3	G	Y	S	T	I	N	M	Y	S	SEQ ID NO.:60
5	CEF-11	Z35	S	V	S	V	G	M	K	P	S	SEQ ID NO.:56
5	CEF-6	Z30	D	R	M	L	L	P	F	N	L	SEQ ID NO.:61
5	CEF-3	Z27	I	P	M	T	P	S	Y	D	S	SEQ ID NO.:62
5		Z22	M	Y	S	P	R	P	P	A	L	SEQ ID NO.:63
5		Z23	Q	P	T	T	D	L	M	A	H	SEQ ID NO.:64
5		Z15	A	T	H	V	Q	M	A	W	A	SEQ ID NO.:65
5		Z9	S	M	H	A	T	L	T	P	M	SEQ ID NO.:66
5		Z10	S	G	P	A	H	G	M	F	A	SEQ ID NO.:67
2		Z4	I	A	N	R	P	Y	S	A	Q	SEQ ID NO.:68
		C16	V	M	T	Q	P	T	R			SEQ ID NO.:69
		C10	H	M	R	P	L	S	I			SEQ ID NO.:70

Fig. 6

ZnS capping:		BP5												
		Z6	L	T	R	S	P	L	H	V	D	Q	R	R	SEQ ID NO.:71
		Z8	V	I	S	N	H	A	E	S	S	R	R	L	SEQ ID NO.:72
		Z10	S	G	P	A	H	G	M	F	A	R	P	L	SEQ ID NO.:67
ZnS 12-mer repeats														
5	JCW-44	537-4	S	V	S	V	G	M	K	P	S	P	R	P	SEQ ID NO.:56
4	JCW-28	437-8	S	V	S	V	G	M	K	P	S	P	R	P	SEQ ID NO.:56
5	CEF-11	Z35	S	V	S	V	G	M	K	P	S	P	R	P	SEQ ID NO.:56
CdS contamination														
1	CEF-83	E3	C	H	A	S	N	R	L	S	C				SEQ ID NO.: 12
PbS 7-mer repeats 7C														
4a	JCW-72	P74-4	H	T	H	I	P	N	Q						SEQ ID NO.:73
4	JCW-74	P74-6	H	T	H	I	P	N	Q						SEQ ID NO.:73
5	JCW-76	P75-2	L	A	P	V	S	P	P						SEQ ID NO.:74
5	JCW-78	P75-4	L	A	P	V	S	P	P						SEQ ID NO.:74
7C repeats														
	B73	CEF-217	C	Q	S	M	P	H	N	R	C				SEQ ID NO.:49
5	CEF-35	B37	C	Q	S	M	P	H	N	R	C				SEQ ID NO.:49
5	CEF-28	B30	C	Q	S	M	P	H	N	R	C				SEQ ID NO.:49
3t	G5	CEF-103	C	M	T	A	G	K	N	T	C				SEQ ID NO.:75
3t	G7	CEF-105	C	Q	T	L	W	R	N	S	C				SEQ ID NO.:76
3a	B93	CEF-230	C	T	S	V	H	T	N	T	C				SEQ ID NO.:77
5	CEF-30	B32	C	T	S	V	H	T	N	T	C				SEQ ID NO.:77
4a	B72	CEF-216	C	P	S	L	A	M	N	S	C				SEQ ID NO.:78
5	CEF-23	B25	C	P	S	L	A	M	N	S	C				SEQ ID NO.:78
5	CEF-33	B35	C	S	N	N	T	V	H	A	C				SEQ ID NO.:79
5	CEF-25	B27	C	S	N	N	T	V	H	A	C				SEQ ID NO.:79
5	CEF-37	B39	C	L	P	A	Q	G	H	V	C				SEQ ID NO.:80
5	CEF-29	B31	C	L	P	A	Q	V	H	V	C				SEQ ID NO.:81
5	CEF-22	B24	C	L	P	A	Q	G	H	V	C				SEQ ID NO.:80
3a	B96	CEF-234	C	P	P	K	N	V	R	L	C				SEQ ID NO.:82
4	G	CEF-158	C	P	H	I	N	A	H	A	C				SEQ ID NO.:83
4	G	CEF-149	C	I	V	N	L	A	R	A	C				SEQ ID NO.:84

Fig. 7

Biopan 4 Lead Sulfide

JCW-154	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85
JCW-155	A	T	Q	S	Y	V	R	H	P	S	L	G	SEQ ID NO.:86
JCW-156	T	S	T	T	Q	G	A	L	A	Y	L	F	SEQ ID NO.:87
JCW-157	D	P	P	W	S	A	I	V	R	H	R	D	SEQ ID NO.:88
JCW-158	F	D	N	K	P	F	L	R	V	A	S	E	SEQ ID NO.:89
JCW-159	H	Q	S	H	T	Q	Q	N	K	R	H	L	SEQ ID NO.:90
JCW-160	T	S	T	T	Q	G	A	L	A	Y	L	F	SEQ ID NO.:91
JCW-161	K	T	P	I	H	T	S	A	W	E	F	Q	SEQ ID NO.:92
JCW-162	D	P	P	W	S	A	I	V	R	H	R	D	SEQ ID NO.:88
JCW-163	T	M	G	F	T	A	P	R	F	R	H	Y	SEQ ID NO.:85

Biopan 5 Lead Sulfide

JCW-164	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85
JCW-165	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85
JCW-166	D	L	F	H	L	K	P	V	S	N	E	K	SEQ ID NO.:93
JCW-167	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85
JCW-168	D	P	P	W	S	A	I	V	R	H	R	D	SEQ ID NO.:88
JCW-169	K	P	F	W	T	S	S	P	D	V	M	T	SEQ ID NO.:94
JCW-170	D	P	P	W	S	A	I	V	R	H	R	D	SEQ ID NO.:88
JCW-171	P	W	A	A	T	S	K	P	P	Y	S	S	SEQ ID NO.:95
JCW-172	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85
JCW-173	T	M	G	F	T	A	P	R	F	P	H	Y	SEQ ID NO.:85

Fig. 8

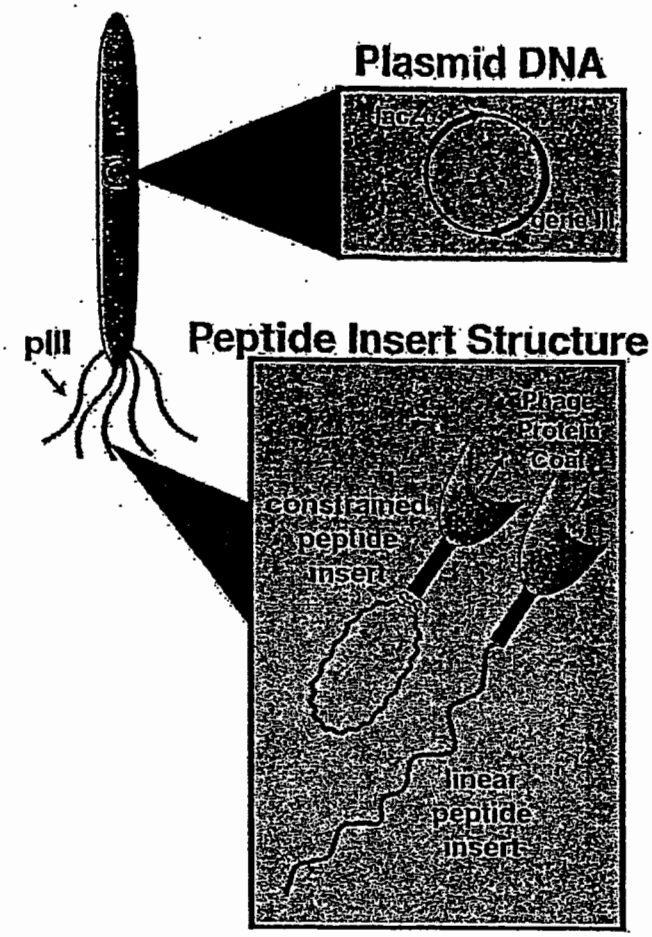

Plasmid DNA
lacZ
gene III
pIII
Peptide Insert Structure
Phage
Protein
Coat
constrained
peptide
insert
linear
peptide
insert

Fig. 9

THIRD ROUND % amino acid occurrence by position

Amino Acid functionality	pos 1	pos 2	pos 3	pos 4	pos 5	pos 6	pos 7
(+) Charges	20	5.882	22.86	5.714	11.43	25.71	25.71
(-) Charges	2.857	2.941	8.571	0	5.714	2.857	2.857
Phobics	14.29	20.59	17.14	28.57	22.86	28.57	20
OH	25.71	38.24	22.86	14.29	28.57	14.29	37.14
Met	2.857	5.882	0	5.714	2.857	2.857	5.714
Trp, Phe	2.857	0	8.571	11.43	0	0	2.857
Pro	11.43	20.59	14.29	11.43	17.14	14.29	2.857
Asn, Gln	20	5.882	5.714	22.86	11.43	11.43	2.857

FOURTH ROUND

Amino Acid functionality	pos 1	pos 2	pos 3	pos 4	pos 5	pos 6	pos 7
(+) Charges	9.091	27.27	4.545	23.81	28.57	40.91	9.524
(-) Charges	4.545	0	0	0	0	0	0
Phobics	13.64	36.36	31.82	47.62	28.57	9.091	38.1
OH	9.091	22.73	18.18	0	14.29	9.091	19.05
Met	0	0	9.091	9.524	9.524	4.545	0
Trp, Phe	4.545	0	4.545	0	0	0	0
Pro	22.73	13.64	4.545	9.524	9.524	9.091	9.524
Asn, Gln	36.36	0	27.27	9.524	9.524	27.27	23.81

Fig. 10

FIFTH ROUND

Amino Acid	pos 1	pos 2	pos 3	pos 4	pos 5	pos 6	pos 7
(+) Charges	7.407	3.704	3.704	3.704	48.15	26.92	14.81
(-) Charges	0	3.704	0	0	0	0	0
Phobics	14.81	7.407	29.63	7.407	25.93	3.846	25.93
OH	22.22	18.52	11.11	11.11	11.11	3.846	18.52
Met	0	3.704	7.407	37.04	3.704	0	3.704
Trp, Phe	0	0	3.704	3.704	0	3.846	3.704
Pro	3.704	11.11	37.04	18.52	0	3.846	0
Asn, Gln	51.85	51.85	7.407	18.52	11.11	57.69	33.33

	C	N	K	H	Q	P	M	H	C	SEQ ID NO.:47
	C	Q	N	P	M	Q	T	F	C	SEQ ID NO.:96
	C	N	Q	L	S	T	R	P	C	SEQ ID NO.:97
3rd	C	N	N	K	V	P	V	L	C	SEQ ID NO.:37
	C	L	Q	N	R	Q	S	Q	C	SEQ ID NO.:98
	C	Q	L	Q	R	Q	W	N	C	SEQ ID NO.:99
	C	Q	V	N	S	A	H	Q	C	SEQ ID NO.:100

	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
4th	C	F	P	M	R	S	N	Q	C	SEQ ID NO.:101
	C	P	P	Q	P	N	R	Q	C	SEQ ID NO.:102
	C	Q	M	P	M	Q	H	N	C	SEQ ID NO.:103
	C	A	N	V	A	Q	R	N	C	SEQ ID NO.:104

	C	H	M	A	P	R	W	Q	C	SEQ ID NO.:51
5th	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
	C	Q	S	M	P	H	N	R	C	SEQ ID NO.:49
	C	N	N	P	M	H	Q	N	C	SEQ ID NO.:50
A7 →	C	N	N	P	M	H	Q	N	C	SEQ ID NO.:50
clone	C	N	N	P	M	H	Q	N	C	SEQ ID NO.:50

Fig. 11

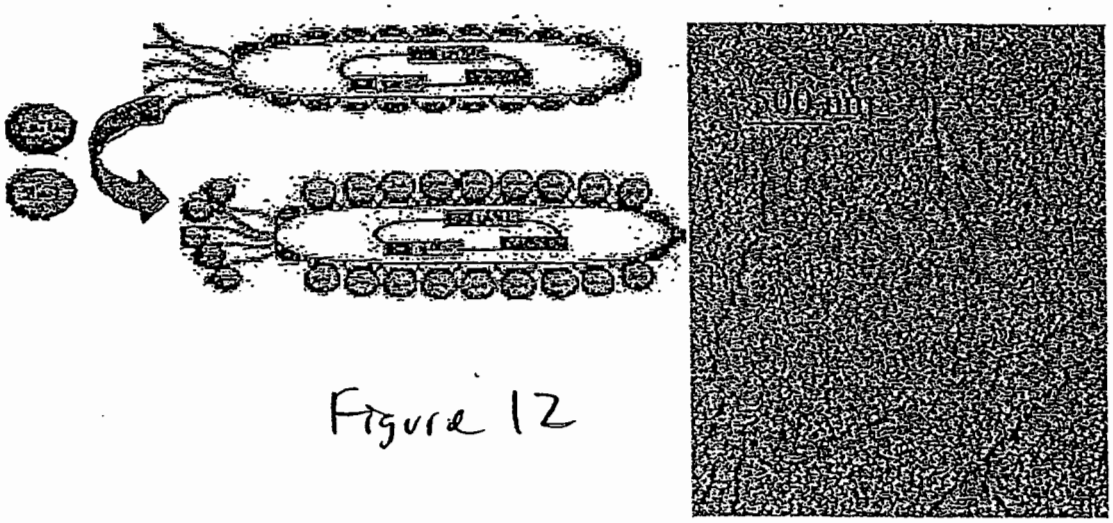


Figure 12

Round 3 – 1st try		
Graph3-07	SEQ ID NO:105	CNNKQLYYC
Graph3-01	SEQ ID NO:106	CQTAWIGQC
Graph3-08	SEQ ID NO:107	CQSANKLTC
Graph3-02	SEQ ID NO:108	CIPYTMAMC
Graph3-03	SEQ ID NO:109	CLPSYHNNC
Graph3-06	SEQ ID NO:110	CVSVAHKDC
Graph3-05	SEQ ID NO:111	CEVTTLYRC
Graph3-09	SEQ ID NO:112	CELTAFPAC
Graph3-04	SEQ ID NO:113	CTLASPHQC
Graph3-10	SEQ ID NO:114	CPLTGGPTC

Round 4 – 1st try		
Graph4-04	SEQ ID NO:115	CWWSWHPWC
Graph4-05	SEQ ID NO:115	CWWSWHPWC
Graph4-12	SEQ ID NO:115	CWWSWHPWC
Graph4-17	SEQ ID NO:115	CWWSWHPWC
Graph4-19	SEQ ID NO:115	CWWSWHPWC
Graph4-06	SEQ ID NO:116	CQKSGVHLC
Graph4-07	SEQ ID NO:117	CLFNALIRC
Graph4-20	SEQ ID NO:118	CVMWTSHSC
Graph4-09	SEQ ID NO:119	CVSRWRASC
Graph4-10	SEQ ID NO:120	CSSWEPKSC
Graph4-11	SEQ ID NO:121	CTLTGPFAC
Graph4-13	SEQ ID NO:122	CPPVLGNLC
Graph4-03	SEQ ID NO:123	CPHAPSGPC
Graph4-15	SEQ ID NO:124	CPLHKNGKC
Graph4-02	SEQ ID NO:125	CRSHHSWSC
Graph4-16	SEQ ID NO:126	CKQFLSLSC
Graph4-14	SEQ ID NO:127	CDDASLRHC
Graph4-08	SEQ ID NO:128	CDNRGSQFC

Round 4 – 2nd try		
Graph43-10	SEQ ID NO:133	CYFSWWHPC
Graph43-16	SEQ ID NO:133	CYFSWWHPC
Graph43-06	SEQ ID NO:134	CSPVKYPSC
Graph43-08	SEQ ID NO:135	CTSHFKLHC
Graph43-01	SEQ ID NO:136	CQQGTAPLC
Graph43-02	SEQ ID NO:137	CQEHSAKSC
Graph43-18	SEQ ID NO:138	CQTEDLPRC
Graph43-07	SEQ ID NO:139	CNRTSPAHC
Graph43-15	SEQ ID NO:140	CQGNHIGLC
Graph43-09	SEQ ID NO:141	CLNNYTHTC
Graph43-20	SEQ ID NO:142	CLTTASTKC
Graph43-12	SEQ ID NO:143	CLLSLRPAC
Graph43-04	SEQ ID NO:144	CDSQLWPIC
Graph43-05	SEQ ID NO:145	CDDRTTKIC
Graph43-17	SEQ ID NO:146	CWWPDGWYC
Graph43-03	SEQ ID NO:147	CKLQLTNQC

Round 4 – 1st try		
Graph42-01	SEQ ID NO:129	CHHNLSSAC
Graph42-02	SEQ ID NO:130	CITGPTGAC
Graph42-03	SEQ ID NO:115	CWWSWHPWC
Graph42-04	SEQ ID NO:131	CPPGPTASC
Graph42-05	SEQ ID NO:132	CHQAGGHQC
Graph42-06	SEQ ID NO:115	CWWSWHPWC
Graph42-07	SEQ ID NO:115	CWWSWHPWC
Graph42-08	SEQ ID NO:115	CWWSWHPWC
Graph42-09	SEQ ID NO:115	CWWSWHPWC
Graph42-10	SEQ ID NO:115	CWWSWHPWC

FIG. 13

Round 5 – 1st try		
Graph5-01	SEQ ID NO:115	CWWSWHPWC
Graph5-04	SEQ ID NO:115	CWWSWHPWC
Graph5-05	SEQ ID NO:115	CWWSWHPWC
Graph5-06	SEQ ID NO:115	CWWSWHPWC
Graph5-07	SEQ ID NO:115	CWWSWHPWC
Graph5-08	SEQ ID NO:115	CWWSWHPWC
Graph5-09	SEQ ID NO:115	CWWSWHPWC
Graph5-10	SEQ ID NO:115	CWWSWHPWC
Graph5-11	SEQ ID NO:115	CWWSWHPWC
Graph5-13	SEQ ID NO:115	CWWSWHPWC
Graph5-14	SEQ ID NO:115	CWWSWHPWC
Graph5-15	SEQ ID NO:115	CWWSWHPWC
Graph5-16	SEQ ID NO:115	CWWSWHPWC
Graph5-17	SEQ ID NO:115	CWWSWHPWC
Graph5-18	SEQ ID NO:115	CWWSWHPWC
Graph5-19	SEQ ID NO:115	CWWSWHPWC
Graph5-12	SEQ ID NO:148	CWHGLGGNC
Graph5-02	SEQ ID NO:149	CHITLLKRC
Graph5-20	SEQ ID NO:150	CESMARPHC

Round 5 – 2nd try		
Graph53-01	SEQ ID NO:151	CHWSWWHPC
Graph53-04	SEQ ID NO:151	CHWSWWHPC
Graph53-06	SEQ ID NO:151	CHWSWWHPC
Graph53-07	SEQ ID NO:151	CHWSWWHPC
Graph53-08	SEQ ID NO:151	CHWSWWHPC
Graph53-11	SEQ ID NO:151	CHWSWWHPC
Graph53-13	SEQ ID NO:151	CHWSWWHPC
Graph53-15	SEQ ID NO:151	CHWSWWHPC
Graph53-16	SEQ ID NO:151	CHWSWWHPC
Graph53-17	SEQ ID NO:151	CHWSWWHPC
Graph53-18	SEQ ID NO:151	CHWSWWHPC
Graph53-19	SEQ ID NO:151	CHWSWWHPC
Graph53-20	SEQ ID NO:151	CHWSWWHPC
Graph53-05	SEQ ID NO:133	CYFSWWHPC
Graph53-10	SEQ ID NO:133	CYFSWWHPC
Graph53-12	SEQ ID NO:133	CYFSWWHPC
Graph53-03	SEQ ID NO:152	CTLLLSRNC
Graph53-14	SEQ ID NO:153	CSSVSYMAC
Graph53-02	SEQ ID NO:154	CHWRWLPAC

FIG. 13

Round 4 – 1st try		
Graph12R4-01	SEQ ID NO:155	WSPGQQRLHNSX
Graph12R4-02	SEQ ID NO:156	DSSNPIFWRPSS
Graph12R4-05	SEQ ID NO:157	EPFPASSLMTIR
Graph12R4-13	SEQ ID NO:158	SYHWDKTPQVLI
Graph12R4-07	SEQ ID NO:159	SGHQLLLNKMPN
Graph12R4-09	SEQ ID NO:160	SIPSEASLSSPR
Graph12R4-12	SEQ ID NO:161	TVPPQLNAQFRS
Graph12R4-14	SEQ ID NO:162	SDNVHTWQAMFK
Graph12R4-06	SEQ ID NO:163	YPSLLKMQPQFS
Graph12R4-15	SEQ ID NO:164	LPIPAHVAPHGP
Graph12R4-16	SEQ ID NO:165	LWGRPFPDLLHQ
Graph12R4-17	SEQ ID NO:166	QTPPWILSHPPQ
Graph12R4-08	SEQ ID NO:167	NHPHPTPARGII
Graph12R4-18	SEQ ID NO:168	HPSSAPWGVALA
Graph12R4-04	SEQ ID NO:169	HWXNHRYSMWGA

Round 5 – 1st try		
Graph12R5-01	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-04	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-07	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-09	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-10	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-12	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-13	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-14	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-15	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-17	SEQ ID NO:170	NHRIWESFWPSA
Graph12R5-03	SEQ ID NO:171	HSSWWLALAKPT
Graph12R5-05	SEQ ID NO:172	SNNDLSPLQTSH
Graph12R5-11	SEQ ID NO:173	SGLPHLSLNAPR
Graph12R5-02	SEQ ID NO:174	SWPLYSRDSGLG
Graph12R5-06	SEQ ID NO:175	LPGWPLAERVGQ

Round 5 – 2nd try		
Graph12R52-01	SEQ ID NO:176	SHPWNAQRELSV
Graph12R52-14	SEQ ID NO:176	SHPWNAQRELSV
Graph12R52-16	SEQ ID NO:176	SHPWNAQRELSV
Graph12R52-17	SEQ ID NO:176	SHPWNAQRELSV
Graph12R52-05	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R52-06	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R52-08	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R52-10	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R52-15	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R52-02	SEQ ID NO:179	SSAWWSYWPPVA
Graph12R52-03	SEQ ID NO:180	APLGFNSMRLPA
Graph12R52-18	SEQ ID NO:181	WNMRWLPTWAPA
Graph12R52-07	SEQ ID NO:182	WPRYPSTLVSSH
Graph12R52-09	SEQ ID NO:183	GKESVPPPRIYA
Graph12R52-12	SEQ ID NO:184	LTLDMKRTSGPL
Graph12R52-13	SEQ ID NO:185	LSTHTTESRSMV
Graph12R52-11	SEQ ID NO:186	EYLSAIVAGPWP

FIG. 14

Round 6 – 2nd try		
Graph12R62-01	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-05	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-06	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-09	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-12	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-16	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-18	SEQ ID NO:177	VSRHQSWHPHDL
Graph12R62-02	SEQ ID NO:178	YWPSKHWWWLA
Graph12R62-04	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R62-07	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R62-14	SEQ ID NO:178	YWPSKHWWWLAP
Graph12R62-03	SEQ ID NO:187	QFKWWHSLSPTP
Graph12R62-11	SEQ ID NO:187	QFKWWHSLSPTP
Graph12R62-17	SEQ ID NO:179	SSAWWSYWPPVA
Graph12R62-08	SEQ ID NO:181	WNMRWLPTWAPA
Graph12R62-15	SEQ ID NO:176	SHPWNAQRELSV

FIG. 14

Round 4 – 1st try		
Hipco12R4-01	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-02	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-03	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-05	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-06	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-08	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-10	SEQ ID NO:176	SHPWNAQRELSV
Hipco12R4-04	SEQ ID NO:188	APTPLIGKRLVQ
Hipco12R4-07	SEQ ID NO:189	LINPRDHVLAPQ

Round 3 – 3rd try		
Hipco12R34-01	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R34-05	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R34-12	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R34-14	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R34-15	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R34-03	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R34-18	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R34-02	SEQ ID NO:195	STPALMTLIART
Hipco12R34-06	SEQ ID NO:196	TSNFINRMNPGL
Hipco12R34-08	SEQ ID NO:197	TSASTRPELHYP
Hipco12R34-07	SEQ ID NO:198	NLLEVISLPHRG
Hipco12R34-04	SEQ ID NO:199	QHPNNAHVRQFP
Hipco12R34-11	SEQ ID NO:200	QHANNQAWNNLR
Hipco12R34-13	SEQ ID NO:201	QHYPGRAIPHST
Hipco12R34-09	SEQ ID NO:202	VPPPHPQFDHLI
Hipco12R34-10	SEQ ID NO:203	LKMNPSISSSLK
Hipco12R34-17	SEQ ID NO:204	HWDPFSLSAYFP

FIG. 15

Round 3 – 2nd try		
Hipco12R33-01	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-03	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-05	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-06	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-07	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-08	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-09	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-10	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-12	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-14	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-15	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-16	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-17	SEQ ID NO:190	LLADTTHHRPWT
Hipco12R33-02	SEQ ID NO:191	QASISPLWTPTP
Hipco12R33-13	SEQ ID NO:192	NSXLHLAHQPHK

Round 4 – 3rd try		
Hipco12R44-01	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-02	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-05	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-06	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-07	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-12	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-15	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-16	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-17	SEQ ID NO:194	DMPRTTMSPPPR
Hipco12R44-03	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R44-08	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R44-10	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R44-13	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R44-14	SEQ ID NO:193	TKNMLSLPVGPG
Hipco12R44-18	SEQ ID NO:205	WSPGQQRLHNST

FIG. 15

Round 4 – 1st try		
HOPG12R4-03	SEQ ID NO:206	NMTKHPLAYTEP
HOPG12R4-05	SEQ ID NO:206	NMTKHPLAYTEP
HOPG12R4-08	SEQ ID NO:170	NHRIWESFWPSA
HOPG12R4-02	SEQ ID NO:207	HMPTKSASQTYF
HOPG12R4-04	SEQ ID NO:171	HSSWWLALAKPT
HOPG12R4-07	SEQ ID NO:208	HNAYWHWPPSMT
HOPG12R4-06	SEQ ID NO:209	VLPPKPMRQPVA
HOPG12R4-01	SEQ ID NO:210	SLHKISQLSFAS

Round 5 – 1st try		
HOPG12R5-04	SEQ ID NO:211	WHSRLPPMTVAF
HOPG12R5-06	SEQ ID NO:211	WHSRLPPMTVAF
HOPG12R5-07	SEQ ID NO:211	WHSRLPPMTVAF
HOPG12R5-17	SEQ ID NO:211	WHSRLPPMTVAF
HOPG12R5-09	SEQ ID NO:163	YPSLLKMQPQFS
HOPG12R5-03	SEQ ID NO:163	YPSLLKMQPQFS
HOPG12R5-12	SEQ ID NO:212	TPWFQWHQWNLN
HOPG12R5-10	SEQ ID NO:56	SVSVGMKPSPRP
HOPG12R5-01	SEQ ID NO:213	SDTISRLHVSMT
HOPG12R5-13	SEQ ID NO:167	NHPHPTPARGII
HOPG12R5-18	SEQ ID NO:214	NPYHPTIPQSVH
HOPG12R5-08	SEQ ID NO:215	LPSAKLPPGPPK

Round 5 – 2nd try		
HOPG12R52-02	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-08	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-11	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-12	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-14	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-18	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R52-01	SEQ ID NO:217	SNFTTQMTFYTG
HOPG12R52-05	SEQ ID NO:217	SNFTTQMTFYTG
HOPG12R52-06	SEQ ID NO:217	SNFTTQMTFYTG
HOPG12R52-10	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R52-15	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R52-17	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R52-13	SEQ ID NO:219	MPAVMSSAQVPR
HOPG12R52-16	SEQ ID NO:219	MPAVMSSAQVPR
HOPG12R52-07	SEQ ID NO:220	DRAPLIPFASQH
HOPG12R52-03	SEQ ID NO:221	DQYIQQAHRSHI
HOPG12R52-09	SEQ ID NO:222	HARINPSFPLPI
HOPG12R52-04	SEQ ID NO:223	GWWPYAALRALS

FIG. 16

Round 6 – 1st try		
HOPG12R6-01	SEQ ID NO:190	LLADTTHHRPWT
HOPG12R6-05	SEQ ID NO:190	LLADTTHHRPWT
HOPG12R6-06	SEQ ID NO:224	TAATSSPHSRSP
HOPG12R6-10	SEQ ID NO:213	SDTISRLHVSMT
HOPG12R6-16	SEQ ID NO:225	STTGQSPALAPP
HOPG12R6-13	SEQ ID NO:226	HSSWYIQHFPPL
HOPG12R6-17	SEQ ID NO:211	WHSRLPPMTVAF
HOPG12R6-12	SEQ ID NO:227	GSHSNPTPLTPR

Round 6 – 2nd try		
HOPG12R62-03	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-06	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-09	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-11	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-12	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-13	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-14	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-17	SEQ ID NO:216	TSNPHTRHYYPI
HOPG12R62-02	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R62-04	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R62-15	SEQ ID NO:218	KMDRHDPSPALL
HOPG12R62-07	SEQ ID NO:217	SNFTTQMTFYTG
HOPG12R62-16	SEQ ID NO:217	SNFTTQMTFYTG
HOPG12R62-10	SEQ ID NO:219	MPAVMSSAQVPR
HOPG12R62-18	SEQ ID NO:219	MPAVMSSAQVPR
HOPG12R62-05	SEQ ID NO:222	HARINPSFPLPI
HOPG12R62-01	SEQ ID NO:220	DRAPLIPFASQH
HOPG12R62-08	SEQ ID NO:228	YTGVLDTKATQN

FIG. 16

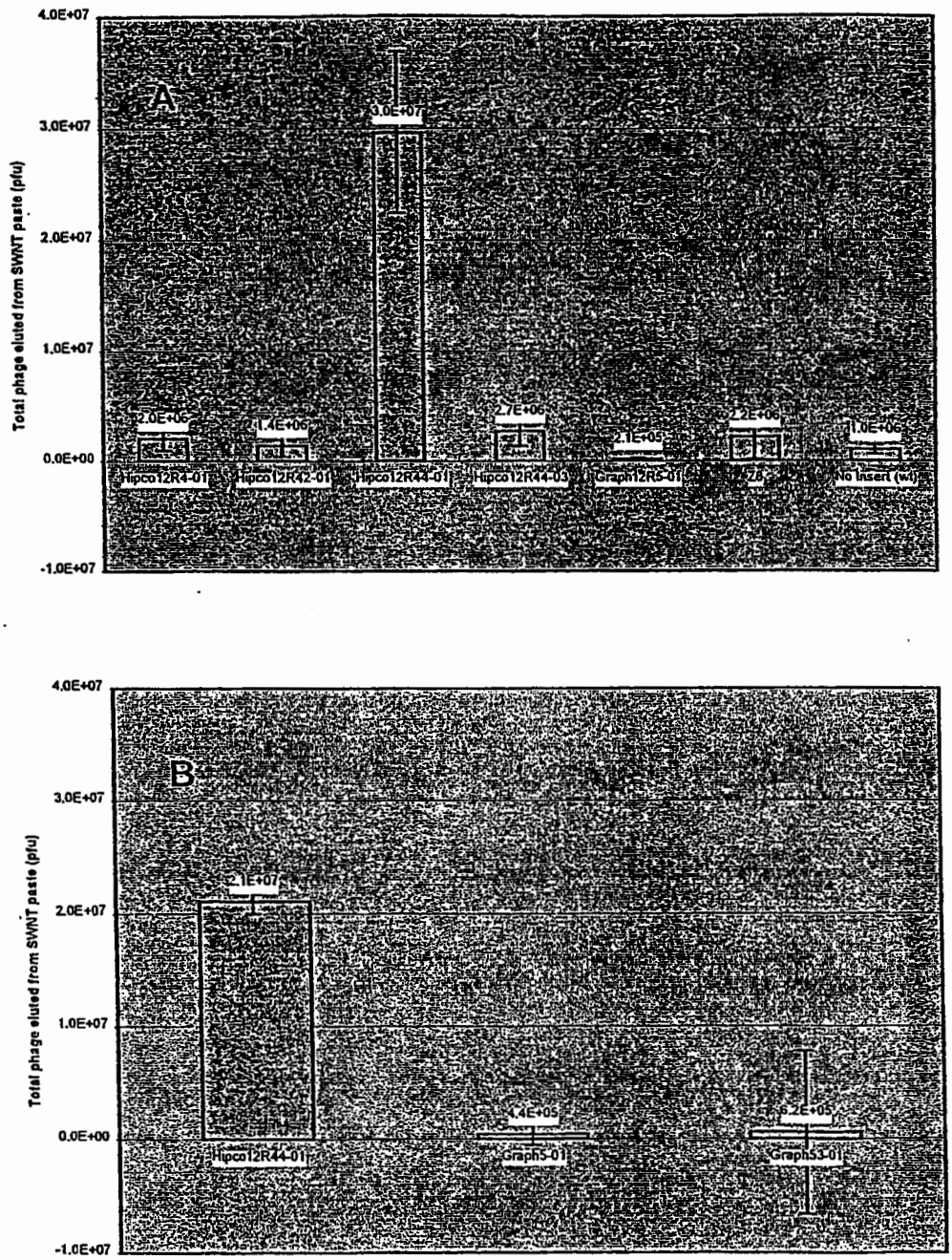

A
B
Total phage eluted from SWNT paste (pfu)
4.0E+07
3.0E+07
2.0E+07
1.0E+07
0.0E+00
-1.0E+07
2.0E+06
1.4E+06
3.0E+07
2.7E+06
2.1E+05
2.2E+06
1.0E+06
Hipco12R4-01
Hipco12R42-01
Hipco12R44-01
Hipco12R44-03
Graph12R5-01
No Insert (wt)
2.1E+07
1.4E+05
2.2E+05
Hipco12R44-01
Graph5-01
Graph53-01

Fig. 17

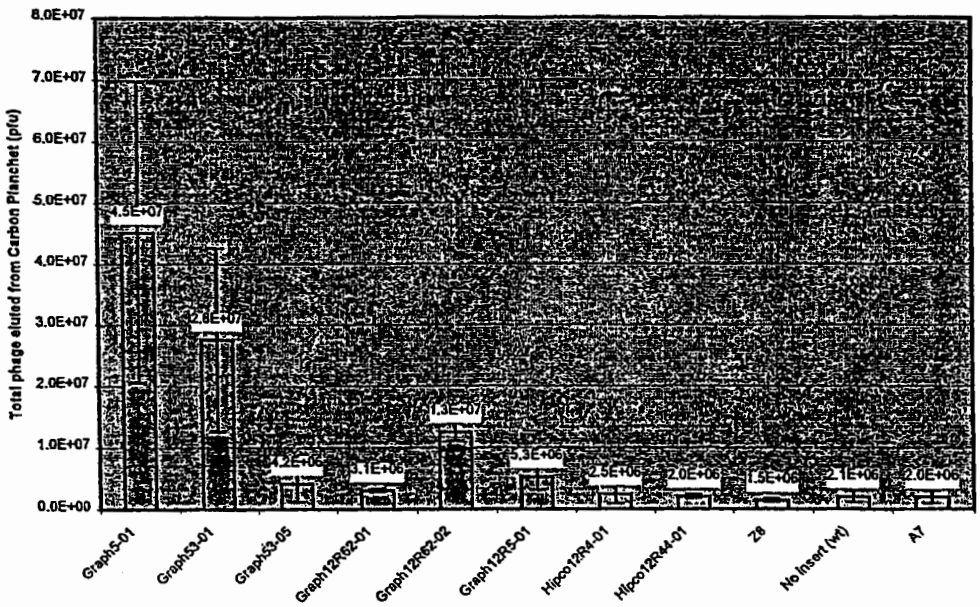

Total phage eluted from Carbon Planchet (plu)
8.0E+07
7.0E+07
6.0E+07
5.0E+07
4.0E+07
3.0E+07
2.0E+07
1.0E+07
0.0E+00
4.5E+07
2.8E+07
4.2E+06
3.1E+06
1.3E+07
5.3E+06
2.5E+06
2.0E+06
1.5E+06
2.1E+06
2.0E+06
Graph5-01
Graph53-01
Graph53-05
Graph12R62-01
Graph12R62-02
Graph12R5-01
Hipco12R4-01
Hipco12R44-01
Z8
No Insert (wt)
AT

Fig. 18

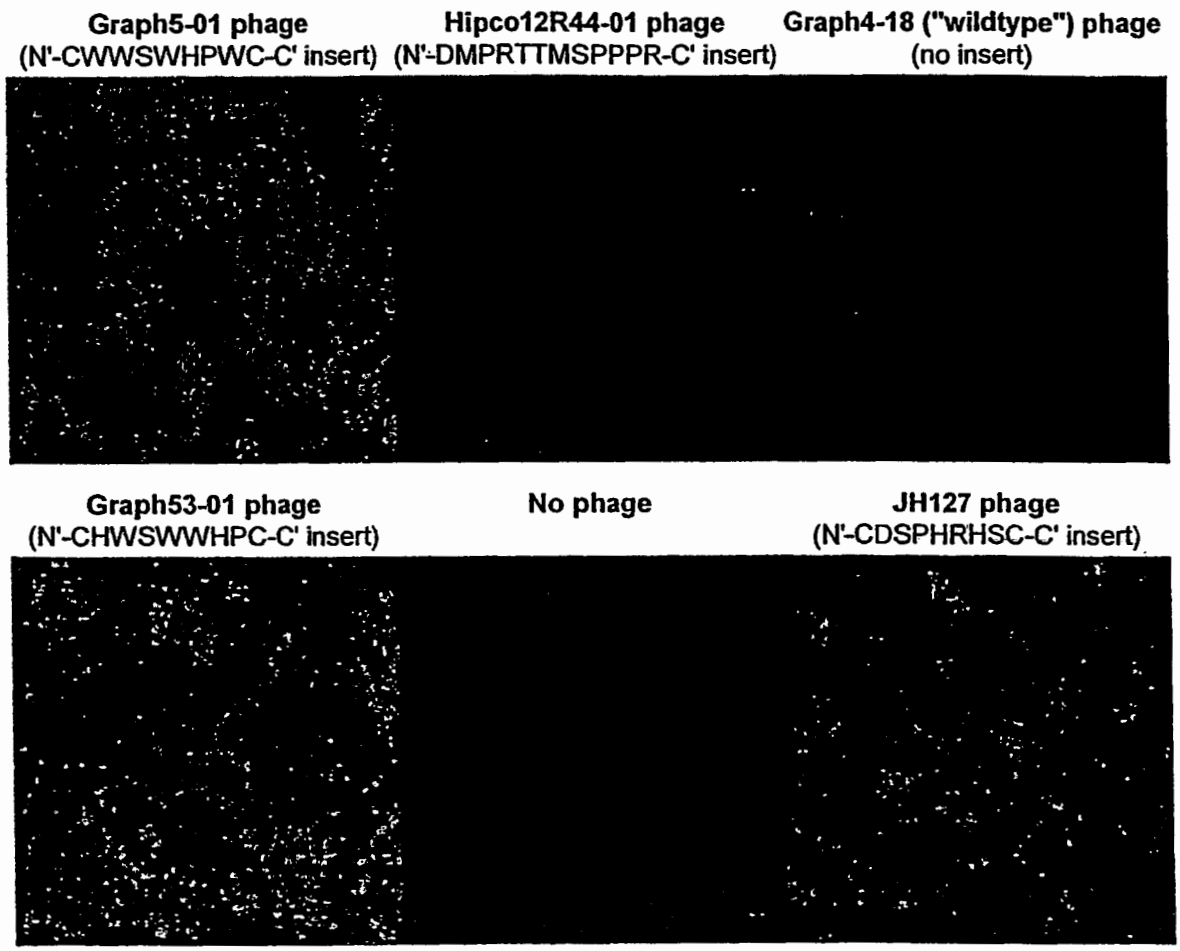

Graph5-01 phage
(N'-CWWSWHPWC-C' insert)
Hipco12R44-01 phage
(N'-DMPRTTMSPPPR-C' insert)
Graph4-18 ("wildtype") phage
(no insert)
Graph53-01 phage
(N'-CHWSWWHPC-C' insert)
No phage
JH127 phage
(N'-CDSPHRHSC-C' insert)

Fig. 19

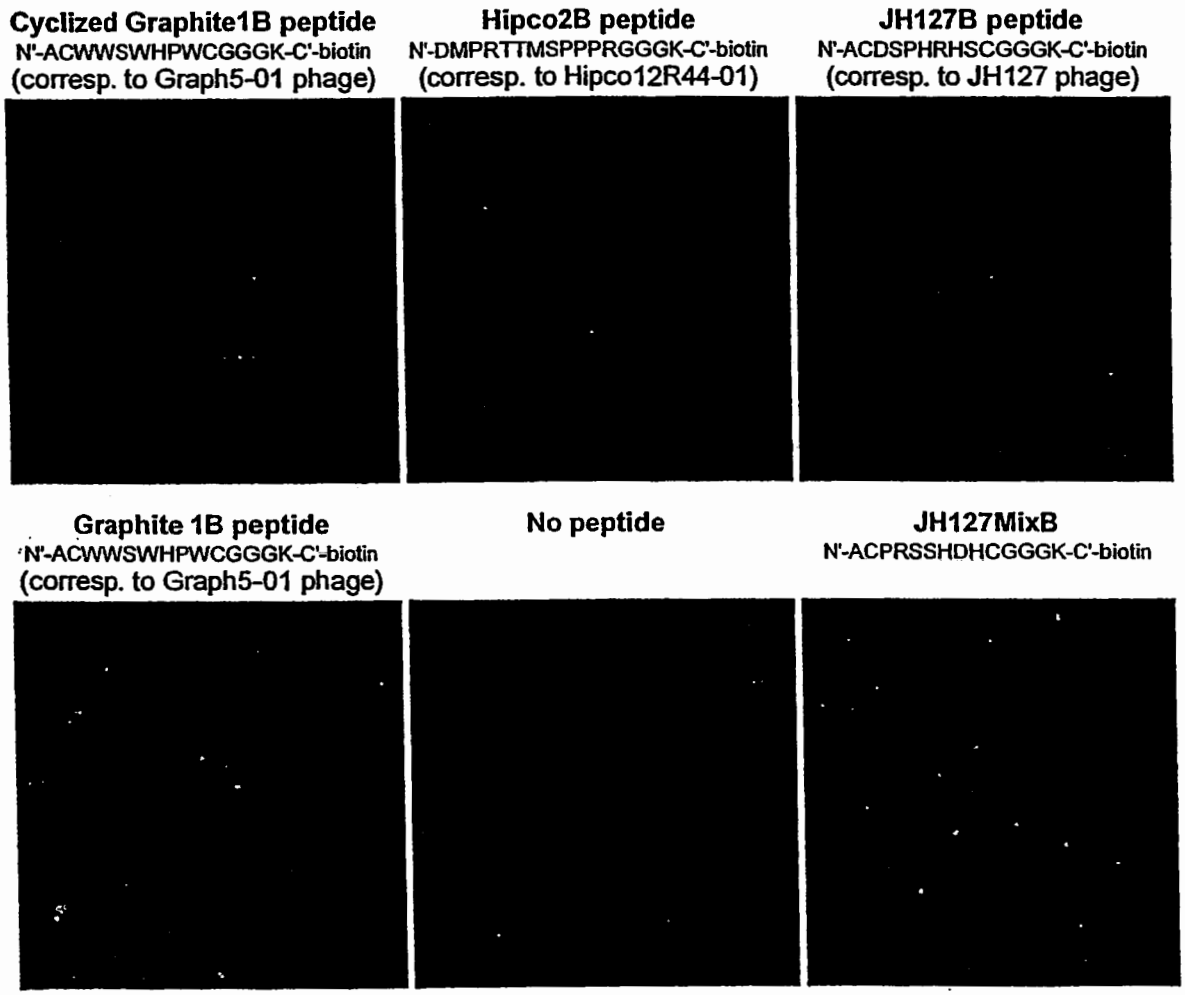

Cyclized Graphite1B peptide
N'-ACWWSWHPWCGGGK-C'-biotin
(corresp. to Graph5-01 phage)
Hipco2B peptide
N'-DMPRTTMSPPPRGGGK-C'-biotin
(corresp. to Hipco12R44-01)
JH127B peptide
N'-ACDSPHRHSCGGGK-C'-biotin
(corresp. to JH127 phage)
Graphite 1B peptide
N'-ACWWSWHPWCGGGK-C'-biotin
(corresp. to Graph5-01 phage)
No peptide
JH127MixB
N'-ACPRSSHDHCGGGK-C'-biotin

Fig. 20

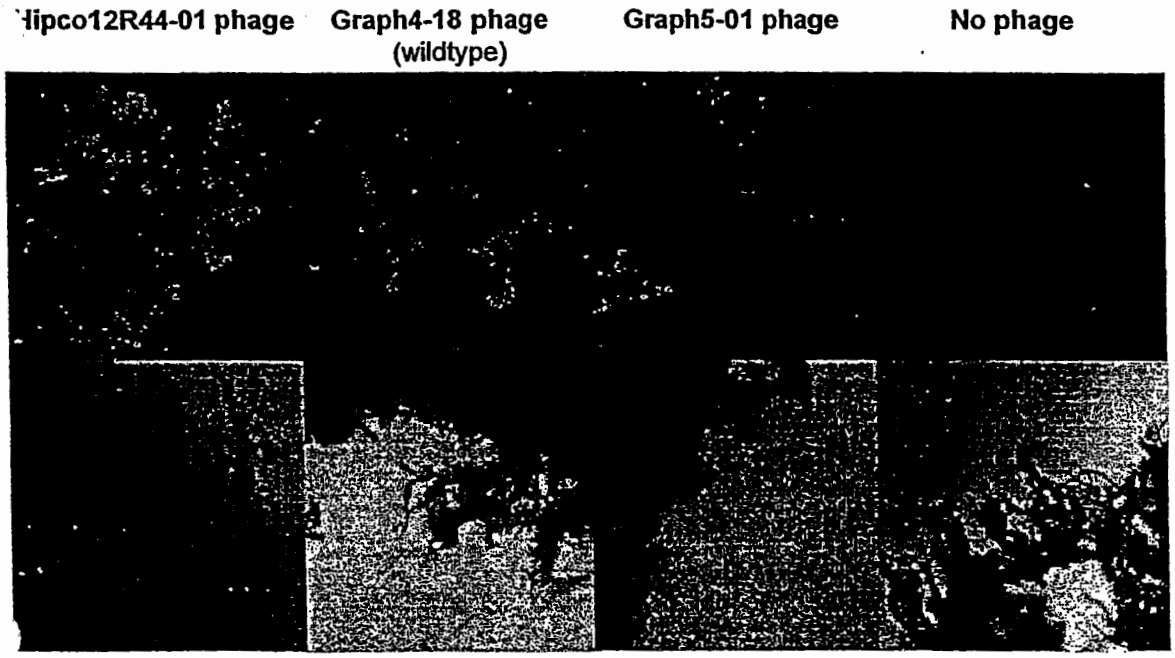
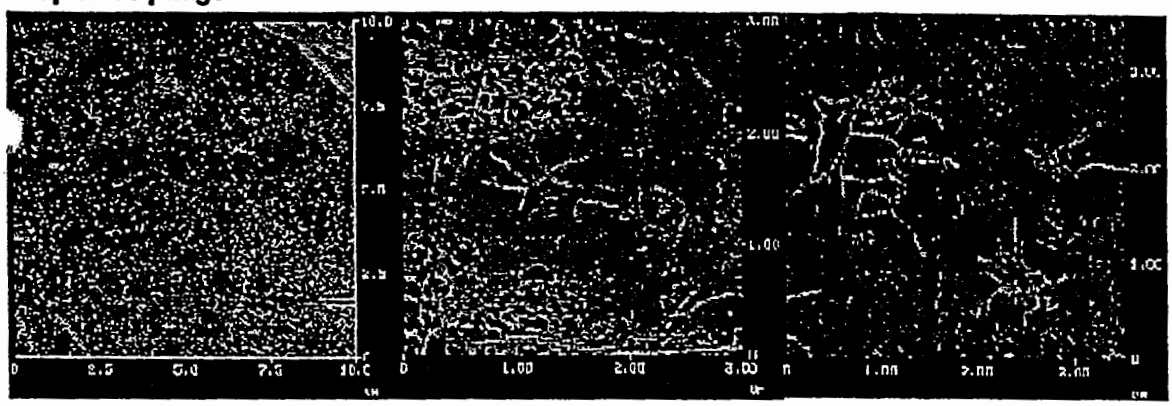

Hipco12R44-01 phage
Graph4-18 phage (wildtype)
Graph5-01 phage
No phage

Fig. 21

Graph5-01 phage



Graph4-18 (wildtype) phage

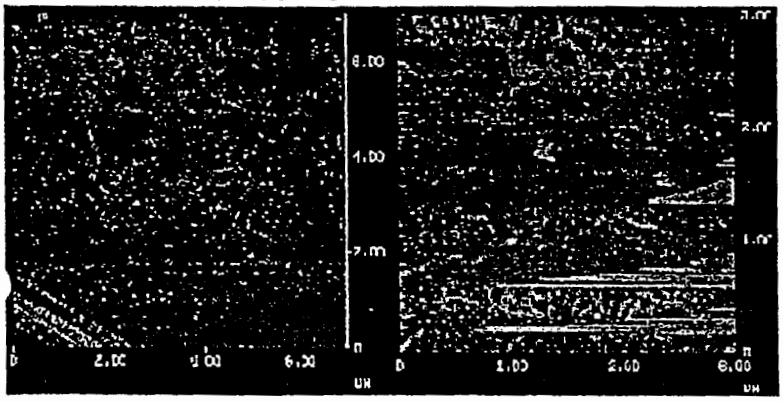


Fig. 22

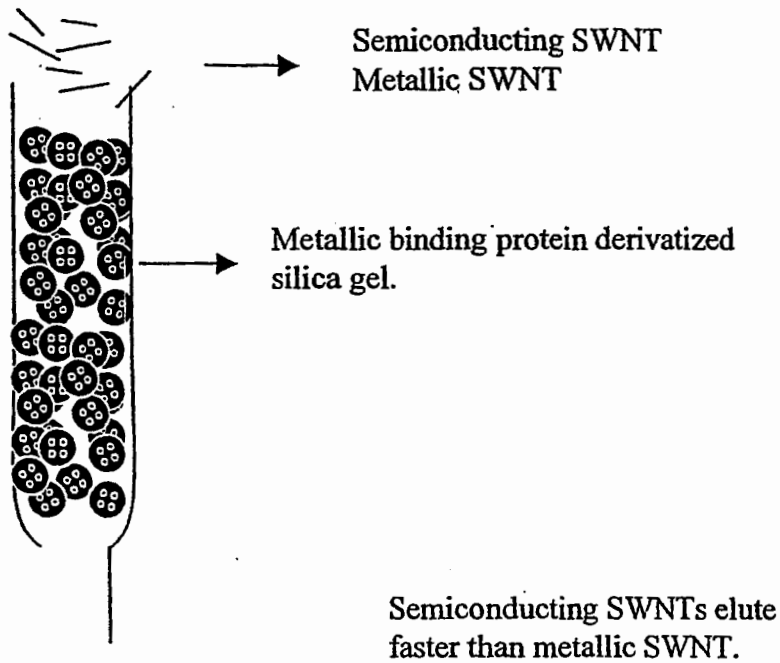

Semiconducting SWNT
Metallic SWNT
Metallic binding protein derivatized silica gel.
Semiconducting SWNTs elute faster than metallic SWNT.

Fig. 23.

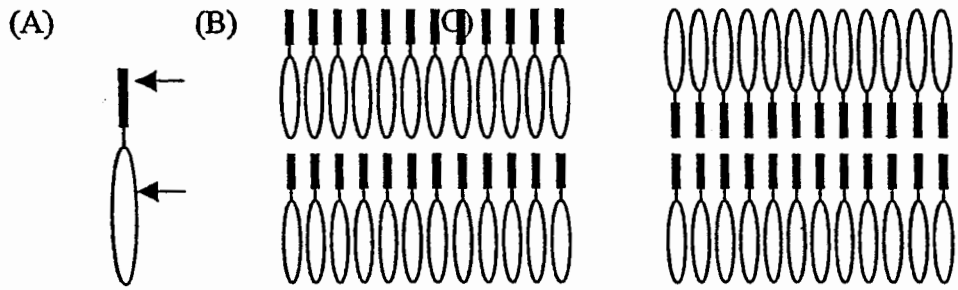


Fig. 24

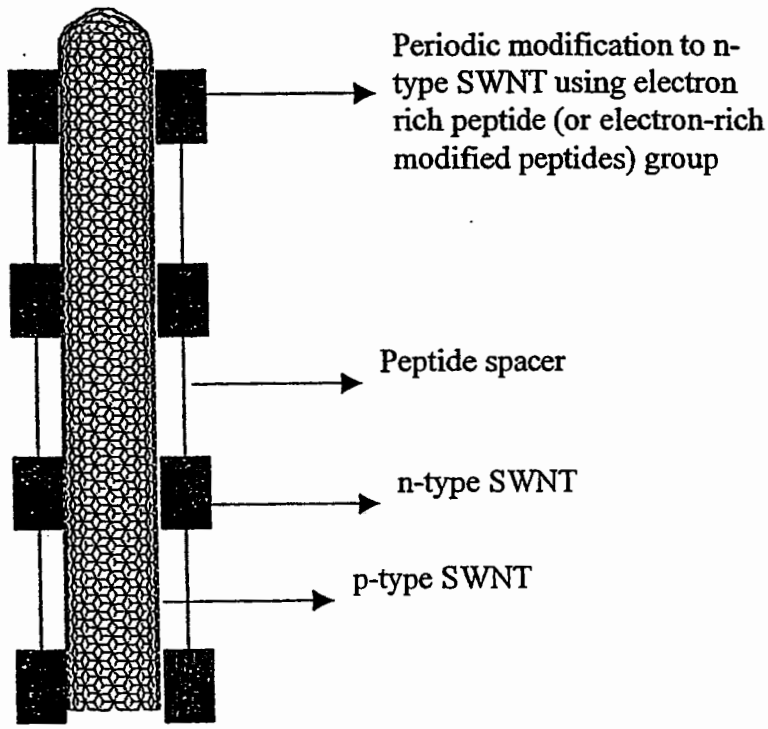

Periodic modification to n-type SWNT using electron rich peptide (or electron-rich modified peptides) group
Peptide spacer
n-type SWNT
p-type SWNT

Fig. 25

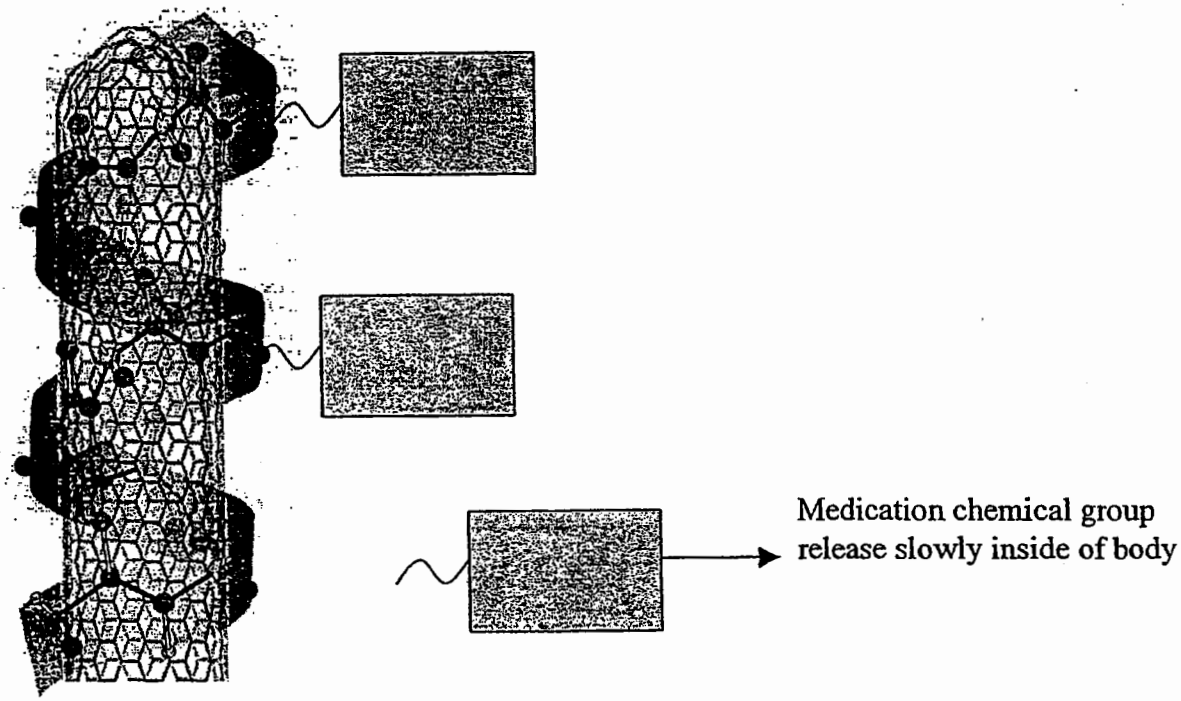


Fig. 26

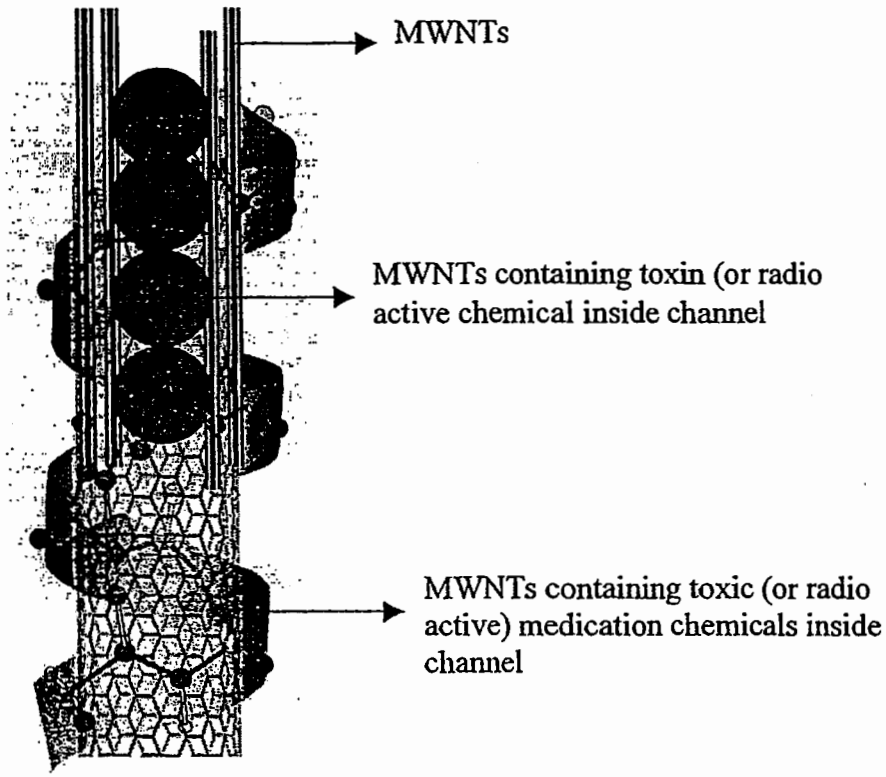

MWNTs
MWNTs containing toxin (or radio active chemical inside channel
MWNTs containing toxic (or radio active) medication chemicals inside channel

Fig. 27

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<110> Belcher, Angela M
Smalley, Richard E.
Ryan, Esther
Lee, Seung-Wuk

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