

FIG. 1A

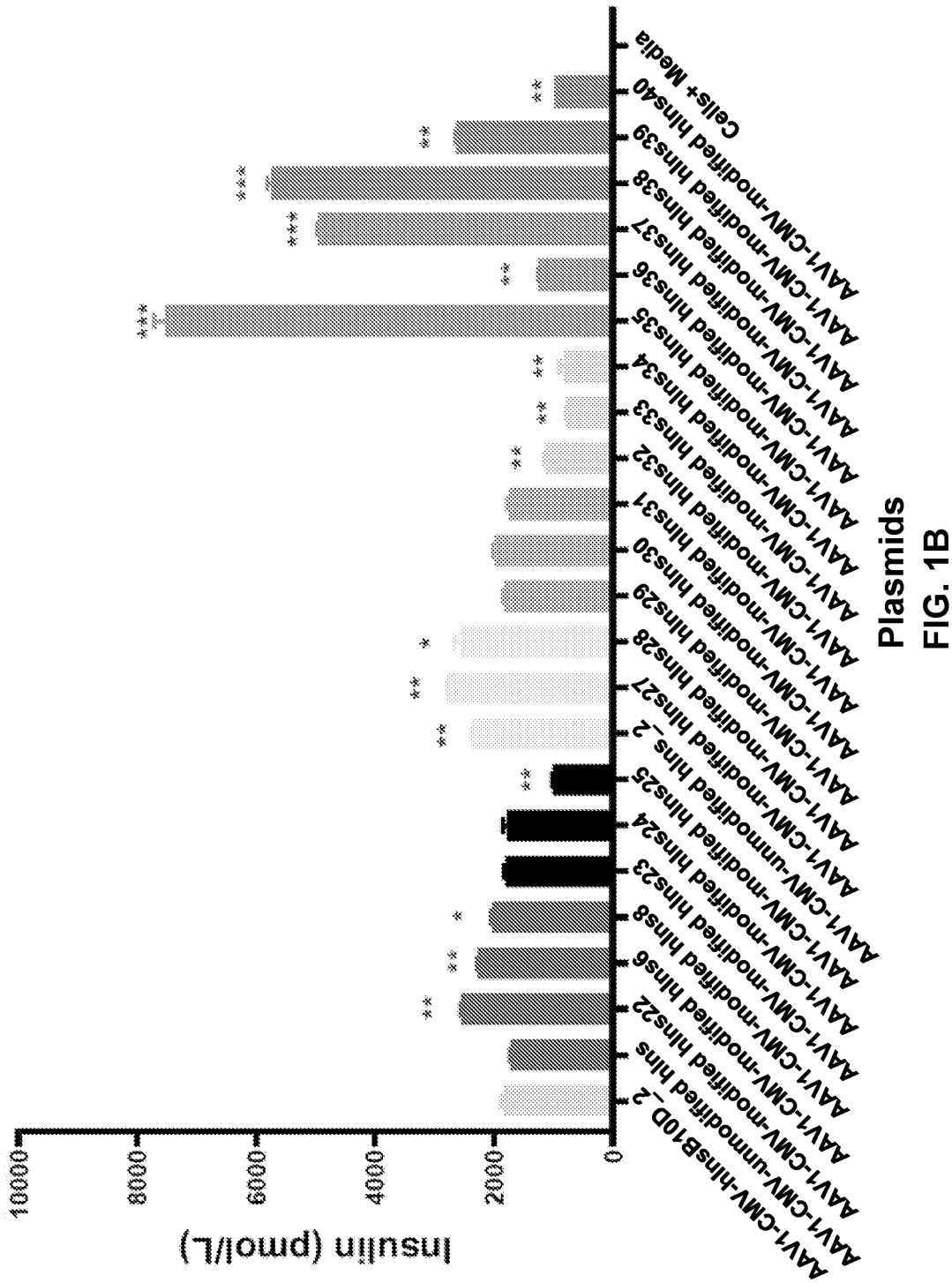
Insulin (SEQ ID NOs: 1-16, 84-88, 123-141, 160)			Exemplary Vector
SEQ ID NO:	Brief Summary of Full Sequence		
1	unmodified hins – 1 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R)		AAV1-CMV-unmodified hins
2	Modified hins – 2		
3	Modified hins-3		
4	Modified hins - 4		
5	Modified hins - 5		
6	Modified hins – 6 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R); modified coding 1		AAV1-CMV-modified hins6
7	Modified hins - 7		
8	Modified hins – 8 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R); modified coding 2		AAV1-CMV-modified hins8
9	Modified hins - 9		
10	Modified hins - 10		
11	Modified hins - 11		
12	Modified hins - 12		
13	Modified hins - 13		
14	Modified hins - 14		

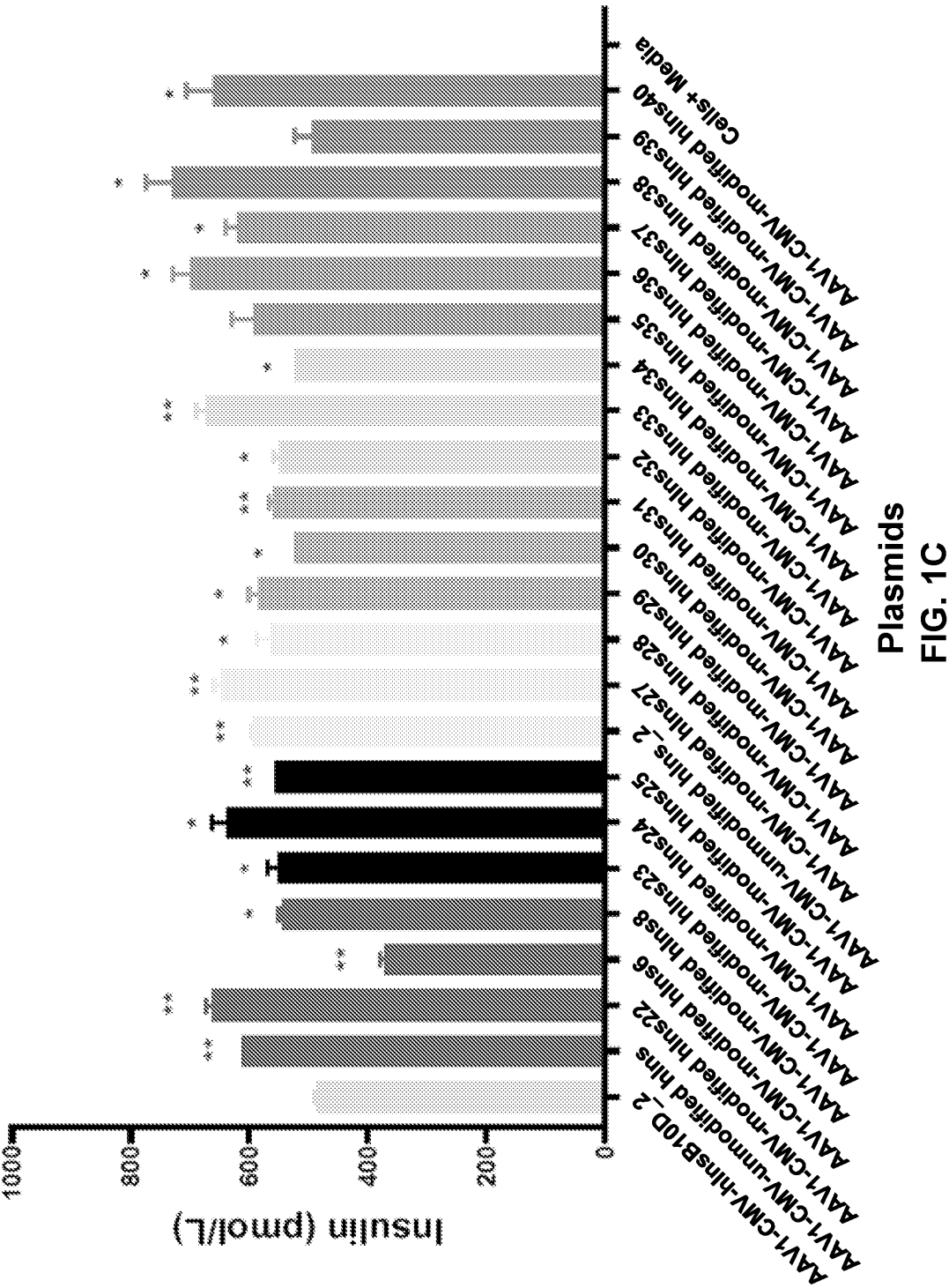
FIG. 1A

15	Modified hns - 15		
16	Modified hns - 16		
84	Modified hns - 17		
85	Modified hns - 18		
86	Modified hns - 19		
87	Modified hns - 20		
88	Modified hns - 21		
123	Modified hns - (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R)	AAV1-CMV-modified hns22	
124	Modified hns - 23 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) with IRES, and encodes 4 mutations (H34D, K53R, R55K, L86R) reverse engineered	AAV1-CMV-modified hns23	
125	Modified hns - 24 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) modified coding 1 with IRES, and encodes 4 mutations (H34D, K53R, R55K, L86R) reverse engineered modified coding 1	AAV1-CMV-modified hns24	
126	Modified hns - 25 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) modified coding 2 with IRES, and encodes 4 mutations (H34D, K53R, R55K, L86R) reverse engineered modified coding 2	AAV1-CMV-modified hns25	
127	unmodified hns - 2 (B10H) encodes 3 mutations (K53R, R55K, L86R)	AAV1-CMV-unmodified hns 2	
128	Modified hns - 27 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 1	AAV1-CMV-modified hns27	
129	Modified hns - 28 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 2	AAV1-CMV-modified hns28	
130	Modified hns - 29 (B10H) encodes 3 mutations (K53R, R55K, L86R) with IRES, and encodes 3 mutations (K53R, R55K, L86R) reverse engineered	AAV1-CMV-modified hns29	

FIG. 1A

131	Modified hlns – 30 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 1 with IRES, and encodes 3 mutations (K53R, R55K, L86R) reverse engineered modified coding 1	AAV1-CMV-modified hlns30
132	Modified hlns – 31 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 2 with IRES, and 3 mutations (K53R, R55K, L86R) reverse engineered modified coding 2	AAV1-CMV-modified hlns31
133	Modified hlns – 32 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) with IL6 signaling peptide	AAV1-CMV-modified hlns32
134	Modified hlns – 33 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) modified coding 1 with IL6 signaling peptide	AAV1-CMV-modified hlns33
135	Modified hlns – 34 (B10D) encodes 4 mutations (H34D, K53R, R55K, L86R) modified coding 2 with IL6 signaling peptide	AAV1-CMV-modified hlns34
136	Modified hlns – 35 (B10H) encodes 3 mutations (K53R, R55K, L86R) with IL6 signaling peptide	AAV1-CMV-modified hlns35
137	Modified hlns – 36 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 1 with IL6 signaling peptide	AAV1-CMV-modified hlns36
138	Modified hlns – 37 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 2 with IL6 signaling peptide	AAV1-CMV-modified hlns37
139	Modified hlns – 38 (B10H) encodes 3 mutations (K53R, R55K, L86R) with IL6 signaling peptide with IRES, and encodes 3 mutations (K53R, R55K, L86R) with signaling peptide	AAV1-CMV-modified hlns38
140	Modified hlns – 39 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 1 with IL6 signaling peptide with IRES, and 3 mutations (K53R, R55K, L86R) reverse engineered modified coding 1 with insulin signaling peptide	AAV1-CMV-modified hlns39
141	Modified hlns – 40 (B10H) encodes 3 mutations (K53R, R55K, L86R) modified coding 2 with IL6 signaling peptide with IRES, and encodes 3 mutations (K53R, R55K, L86R) reverse engineered modified coding 2 with insulin signaling peptide	AAV1-CMV-modified hlns40
160	hlnsB10D_2 encodes 4 mutations (H34D, K53R, R55K, L86R)	AAV1-CMV-hlnsB10D_2



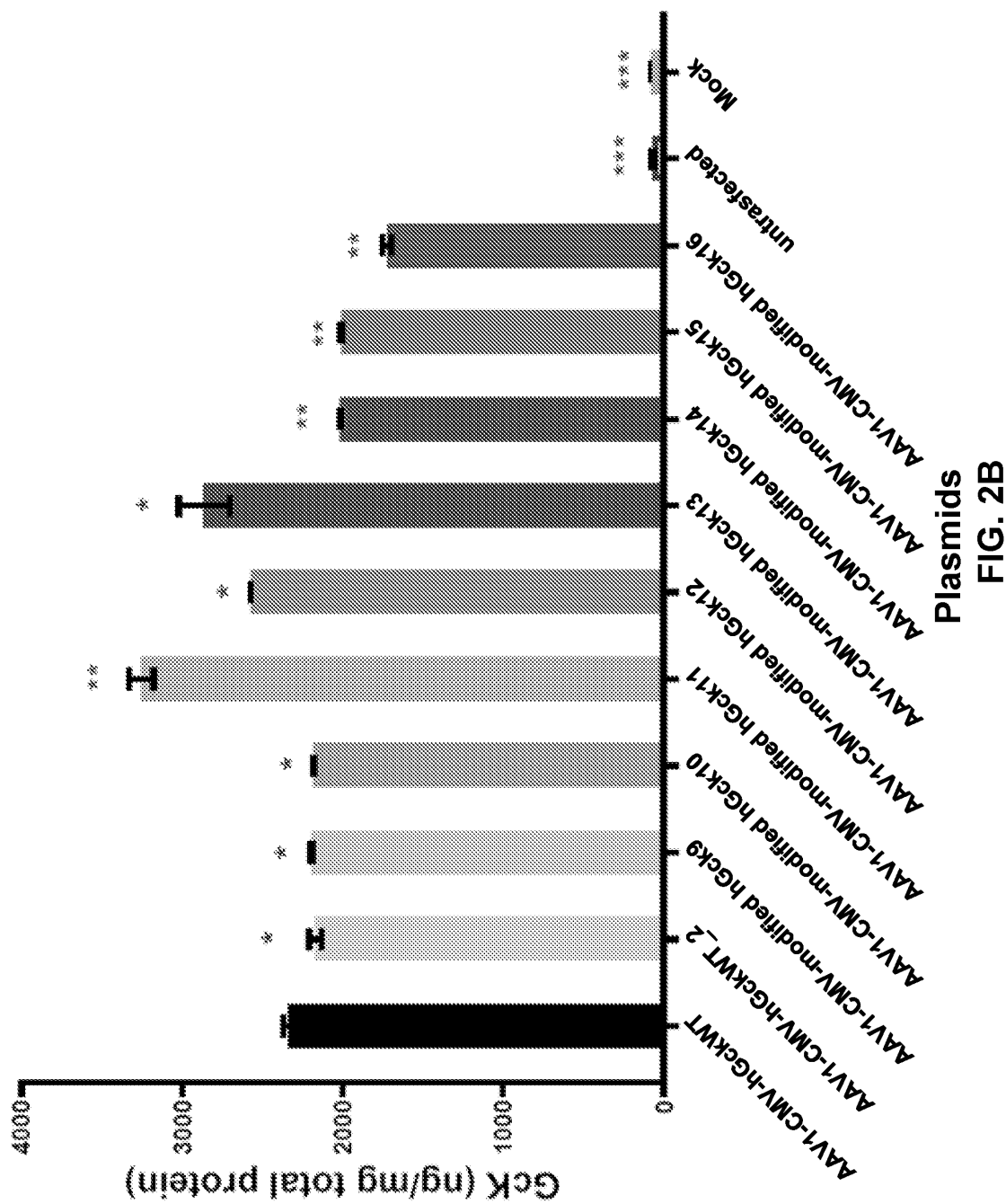


Glucokinase (SEQ ID NOs: 19-33, 68-75, 89-96, 163)		
SEQ ID NO:	Brief Summary of Full Sequence	Exemplary Vector
19	Wild-type hGck	AAV1-CMV-hGckWT
20	Modified hGck - 2	
21	Modified hGck - 3	
22	Modified Gck - 4	
23	Modified hGck - 5	
24	Modified hGck - 6	
25	Modified hGck - 7	
26	Modified hGck - 8	
27	Modified hGck - 9	AAV1-CMV-modified hGck9
28	Modified hGck - 10	AAV1-CMV-modified hGck10
29	Modified hGck 11	AAV1-CMV-modified hGck11
30	Modified hGck - 12	AAV1-CMV-modified hGck12
31	Modified hGck - 13	AAV1-CMV-modified hGck13
32	Modified hGck - 14	AAV1-CMV-modified hGck14
33	Modified hGck - 15	AAV1-CMV-modified hGck15
34	Modified hGck - 16	AAV1-CMV-modified hGck16
35	Modified hGck - 17	
36	Modified hGck - 18	
37	Modified hGck - 19	
38	Modified hGck - 20	

FIG. 2A

89	Modified hGck - 21	
89	Modified hGck - 22	
90	Modified hGck - 23	
91	Modified hGck - 24	
92	Modified hGck - 25	
93	Modified hGck - 26	
94	Modified hGck - 27	
95	Modified hGck - 28	
96	Modified hGck - 29	
163	Wildtype Gck	AAV1-CMV-hGckWT_2

FIG. 2A



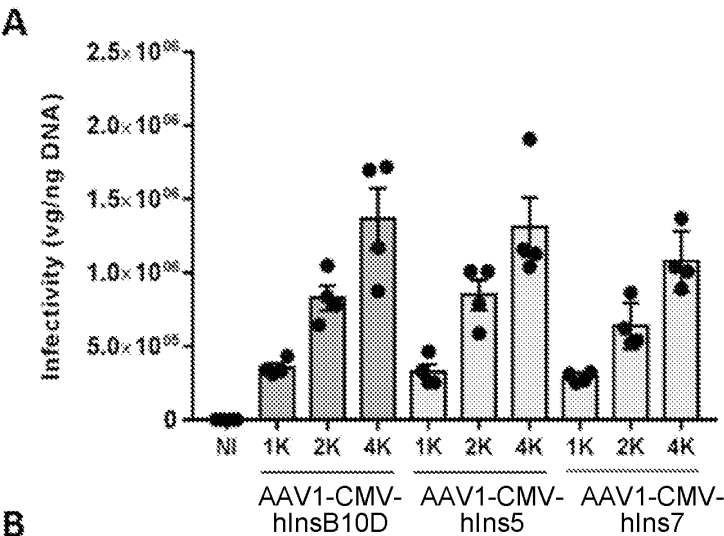


FIG. 3A

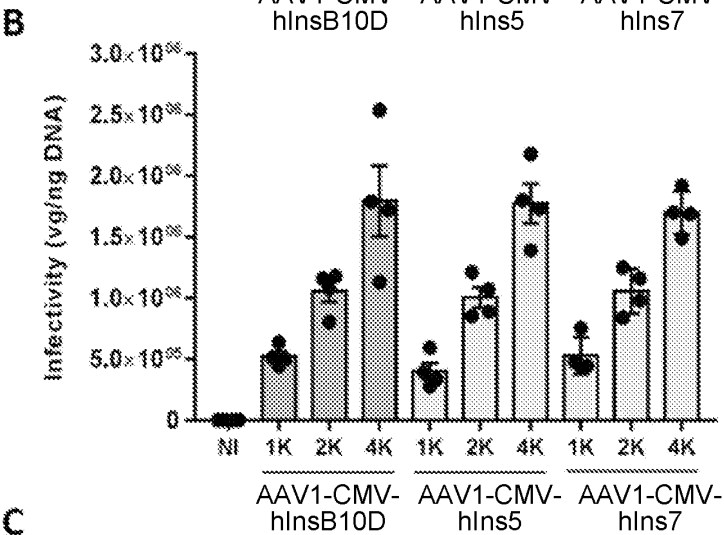


FIG. 3B

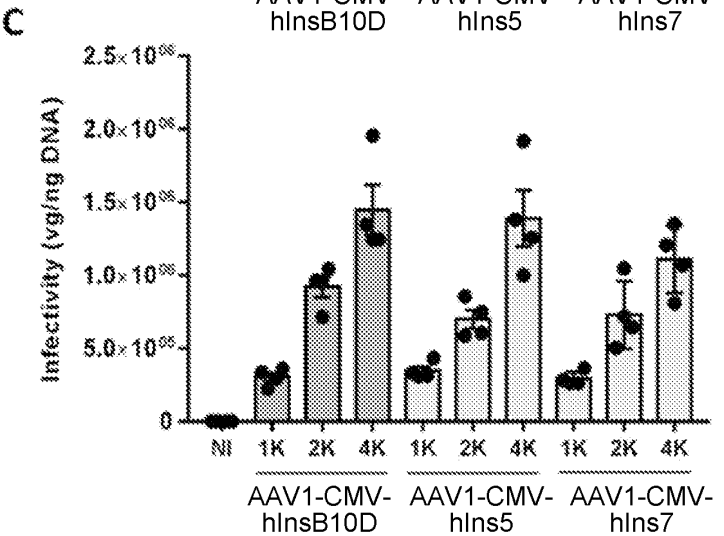


FIG. 3C

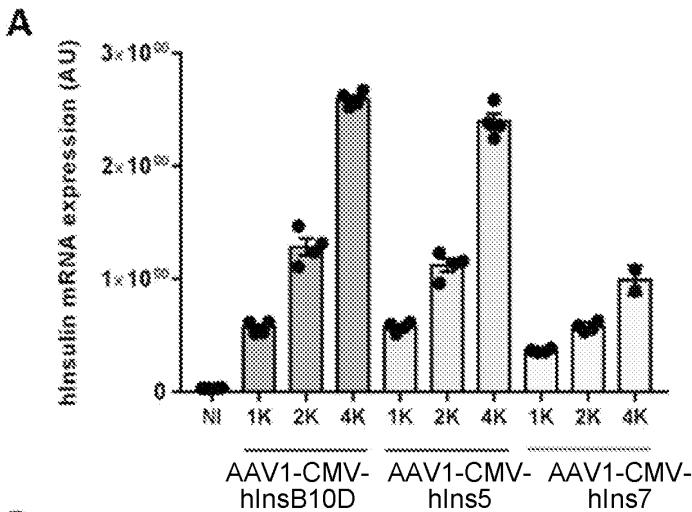


FIG. 4A

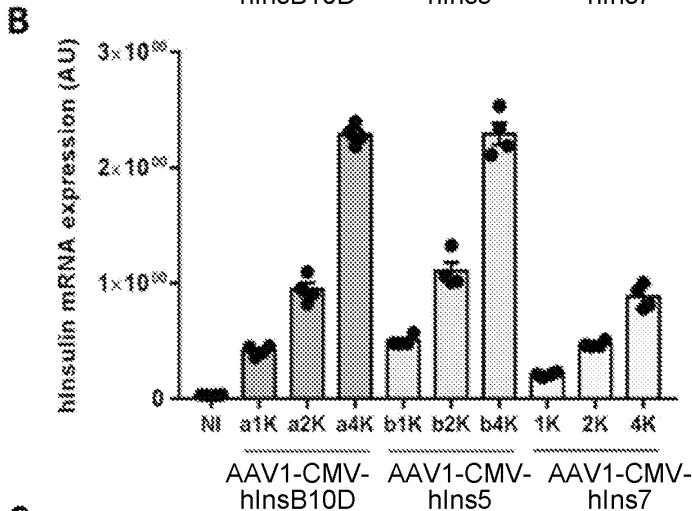


FIG. 4B

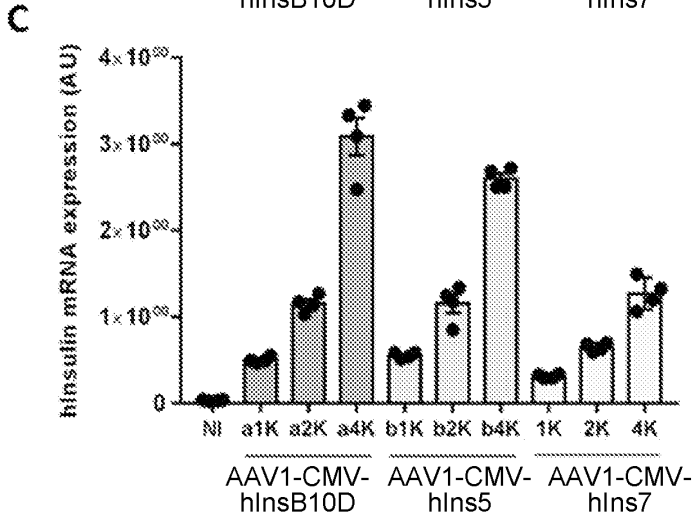


FIG. 4C

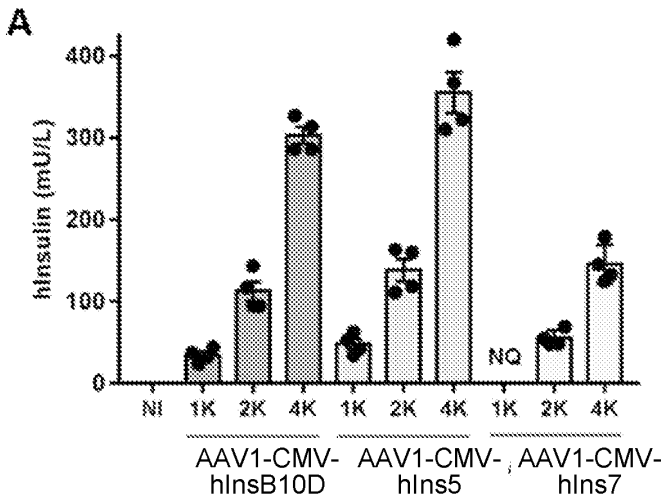


FIG. 5A

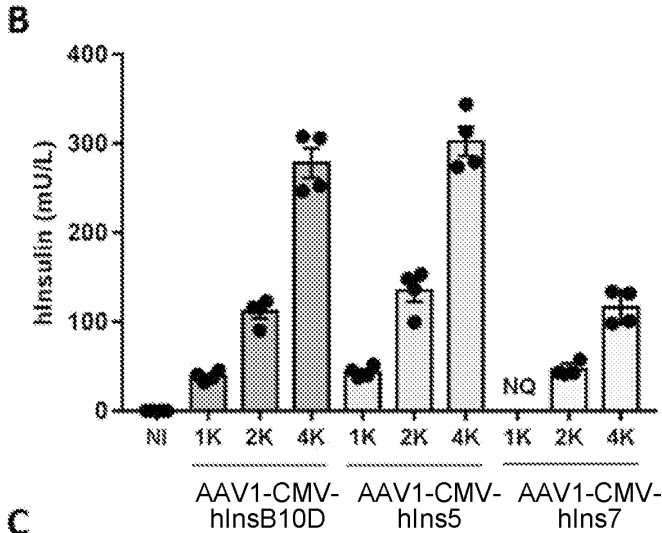


FIG. 5B

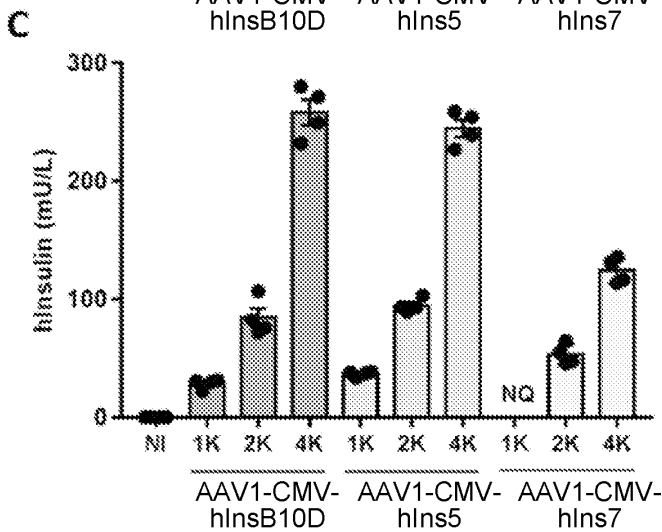


FIG. 5C

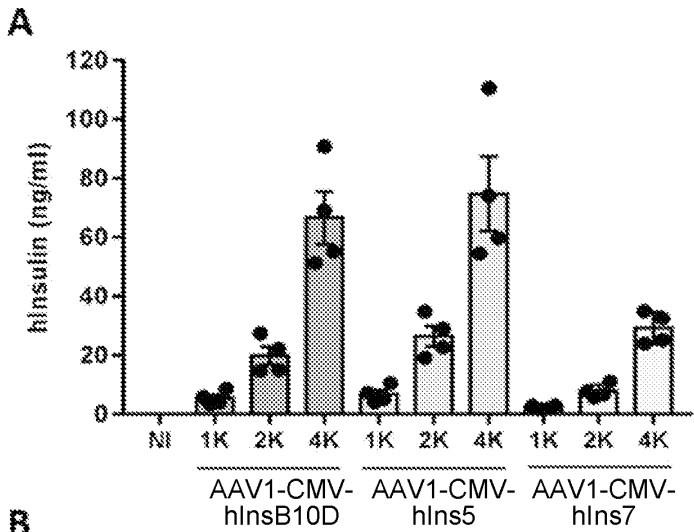


FIG. 6A

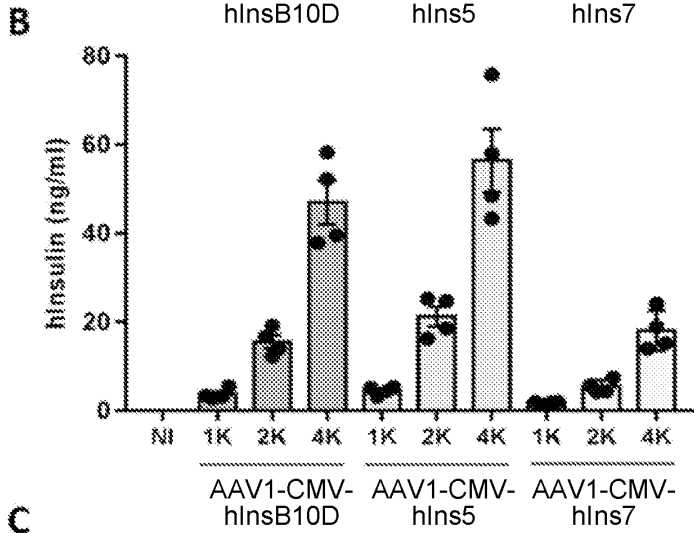


FIG. 6B

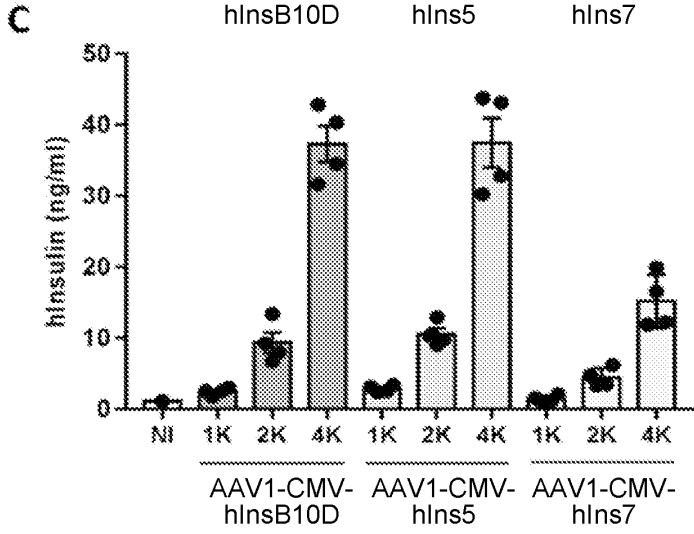


FIG. 6C

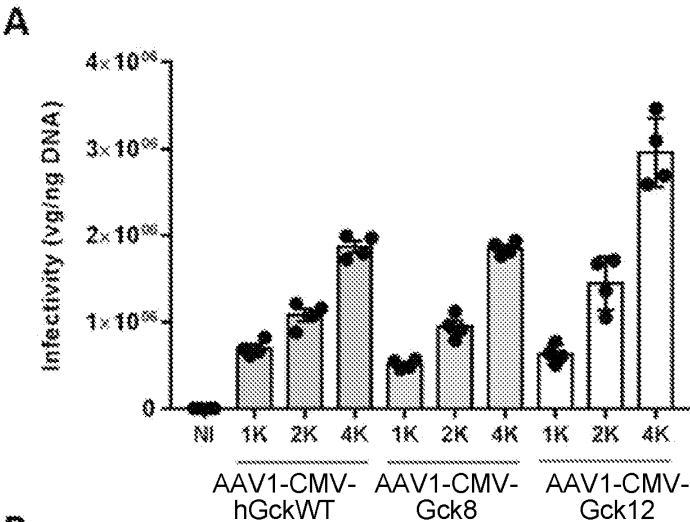


FIG. 7A

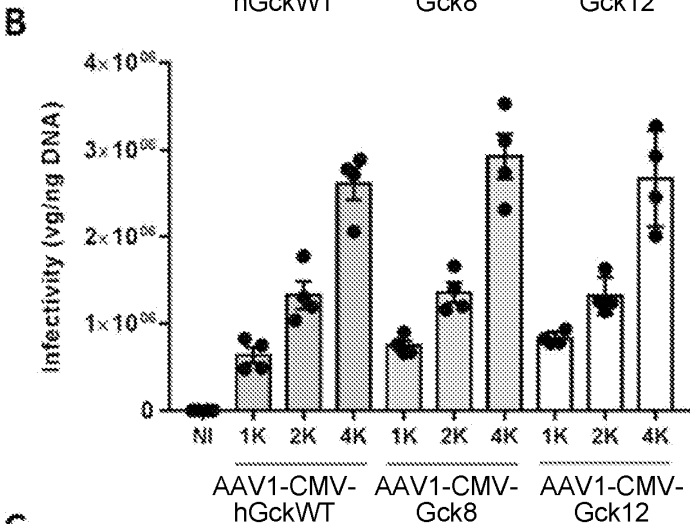


FIG. 7B

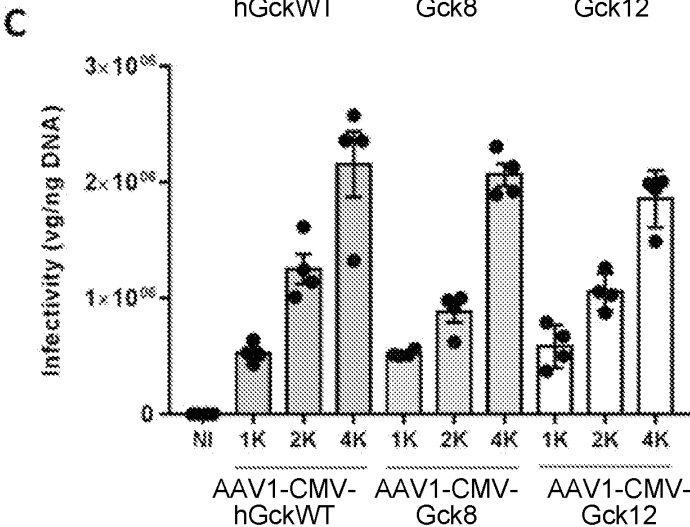


FIG. 7C

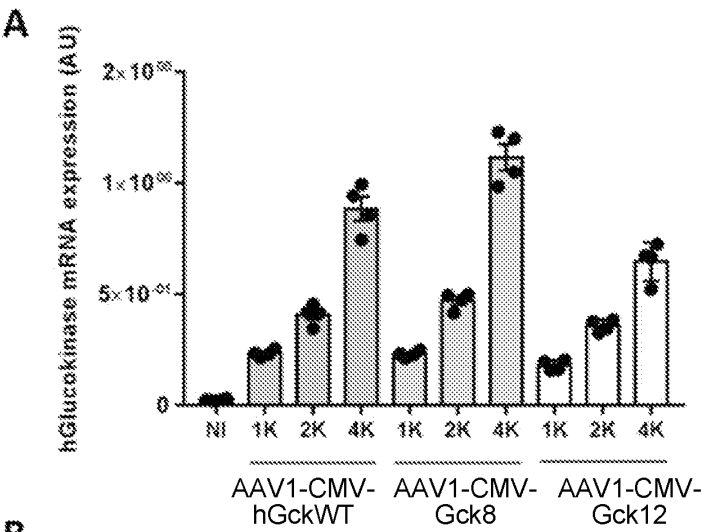


FIG. 8A

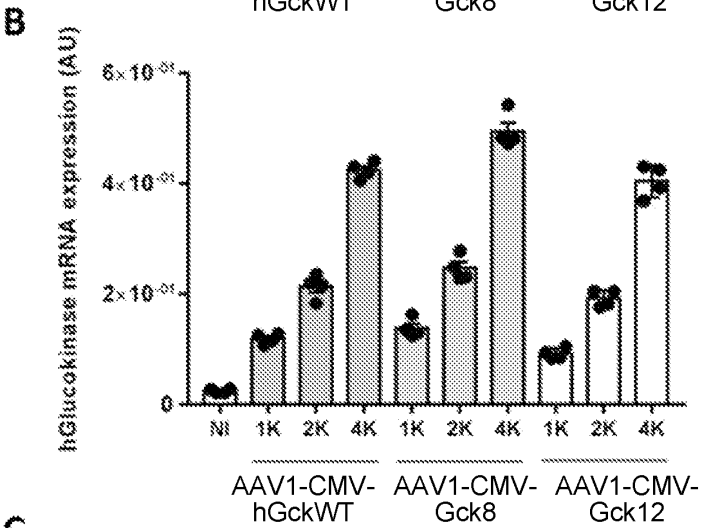


FIG. 8B

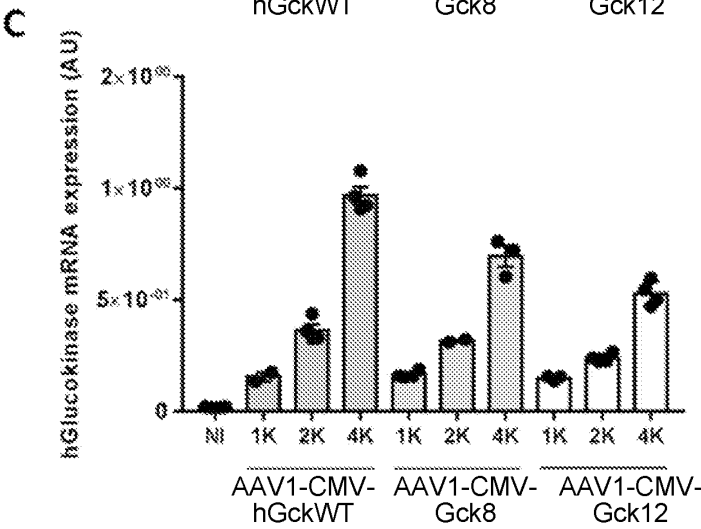


FIG. 8C

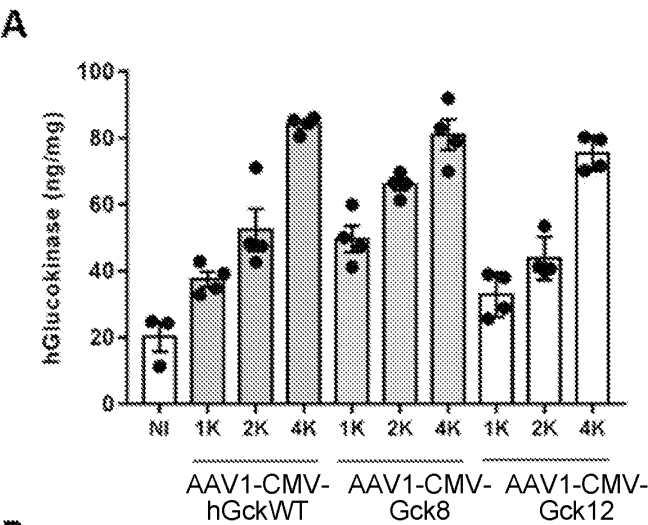


FIG. 9A

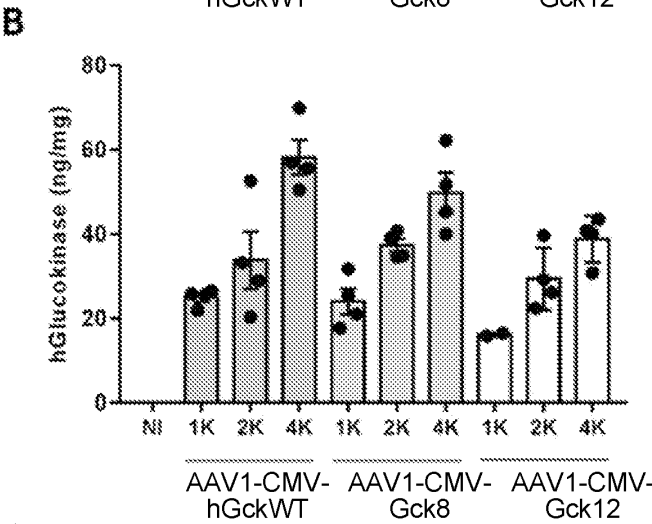


FIG. 9B

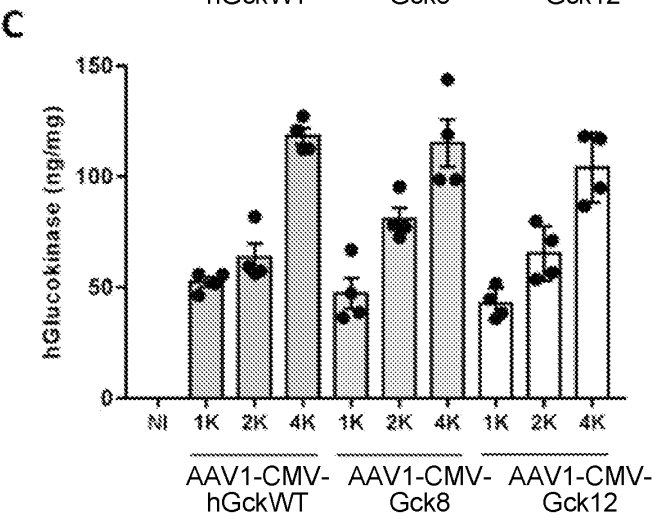


FIG. 9C

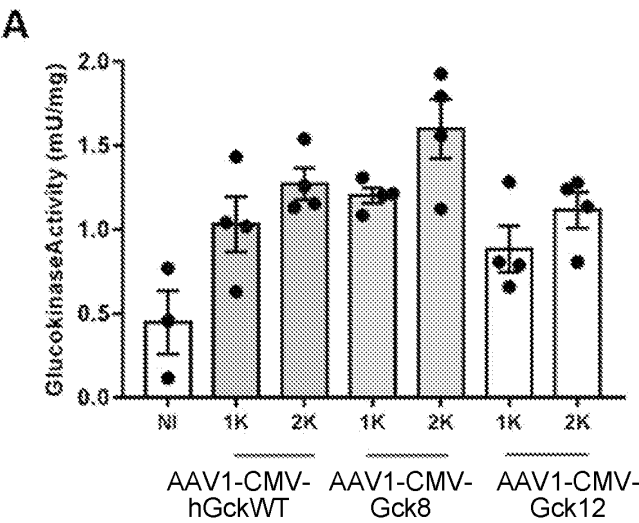


FIG. 10A

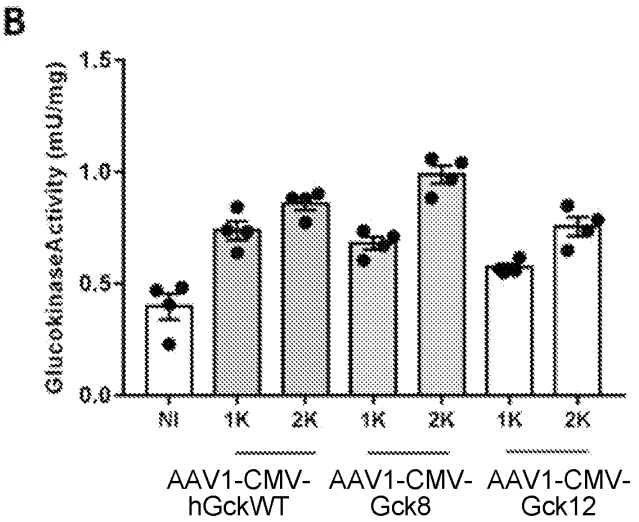


FIG. 10B

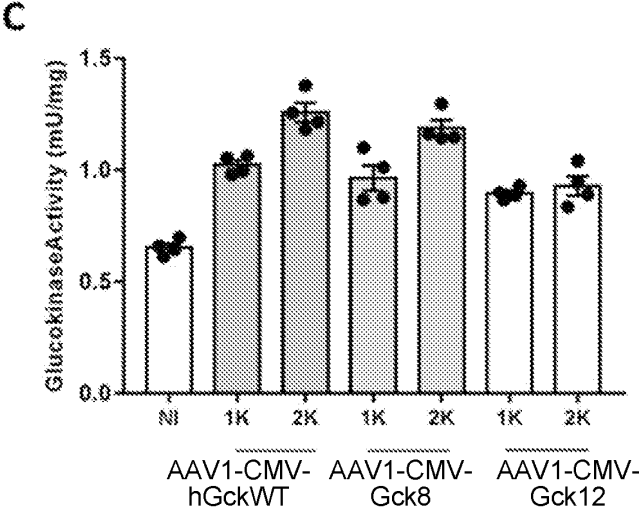


FIG. 10C

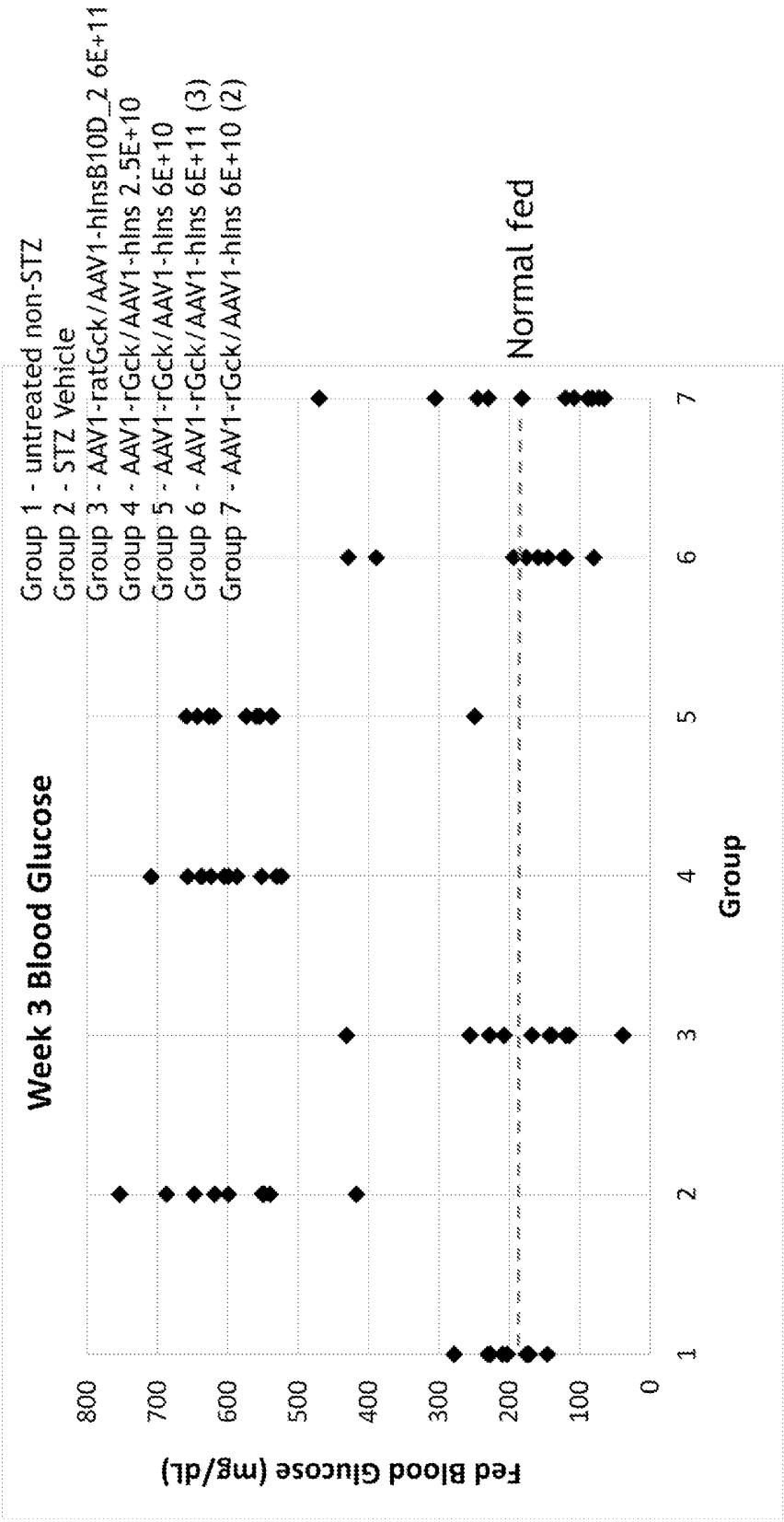


FIG. 11A

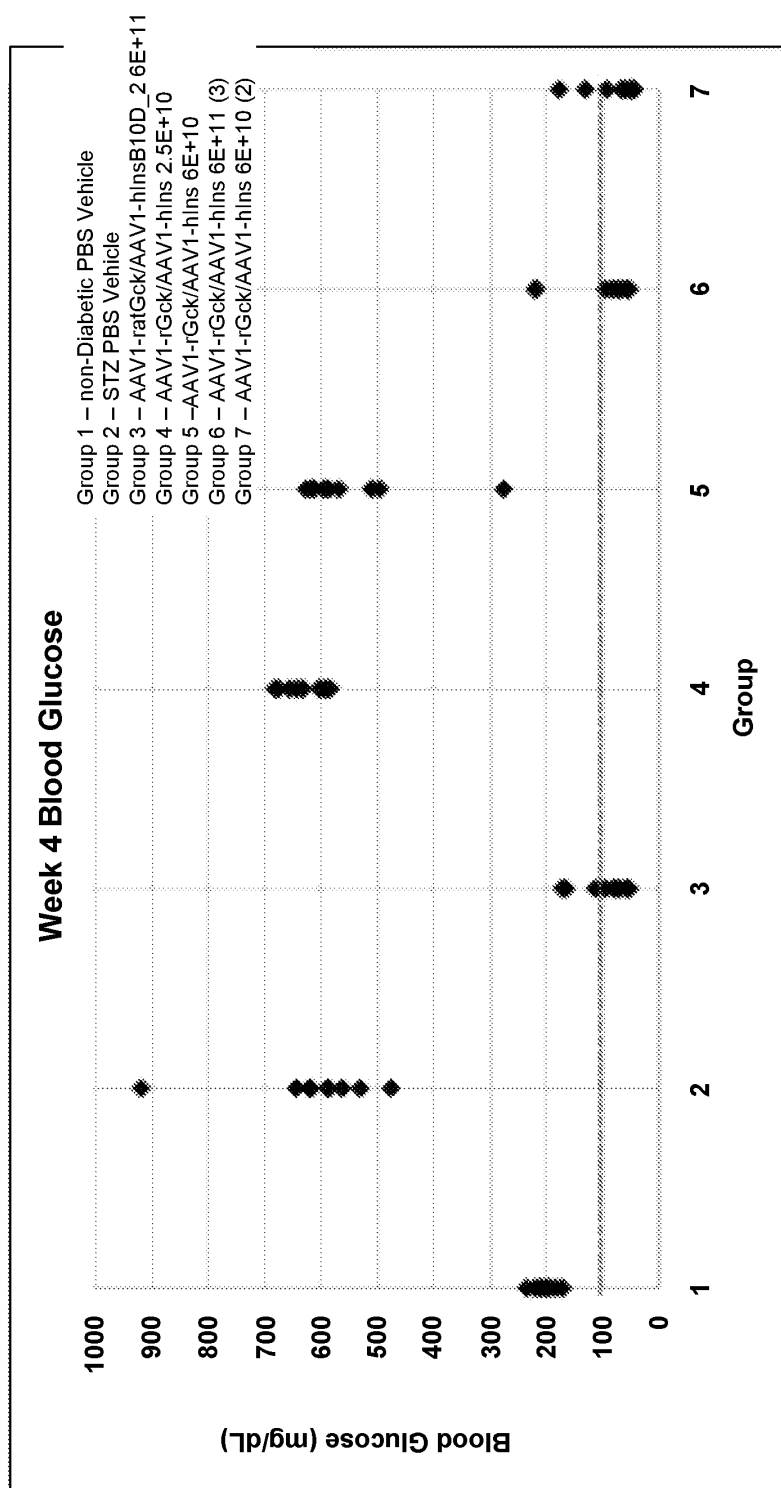


FIG. 11B

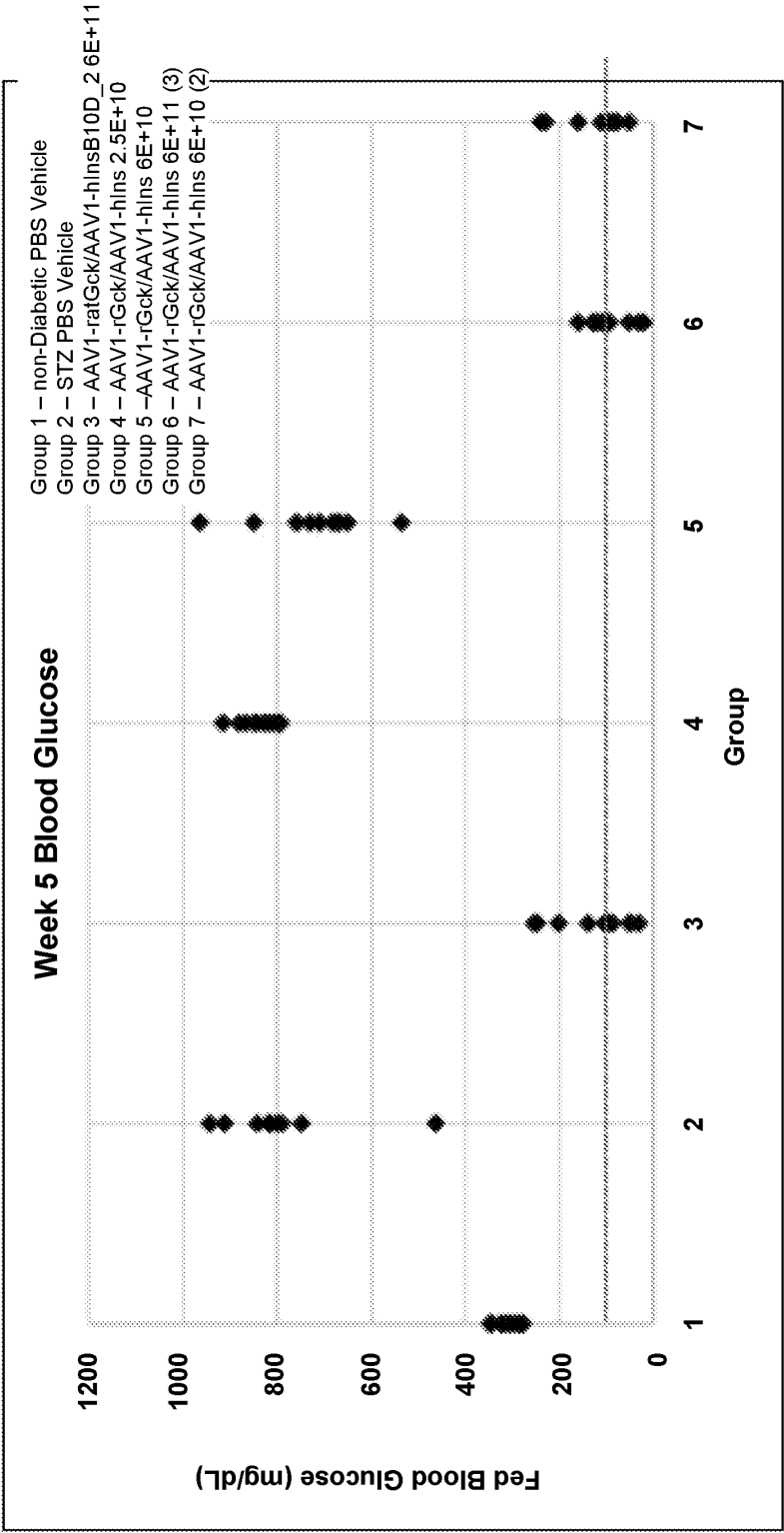


FIG. 11C

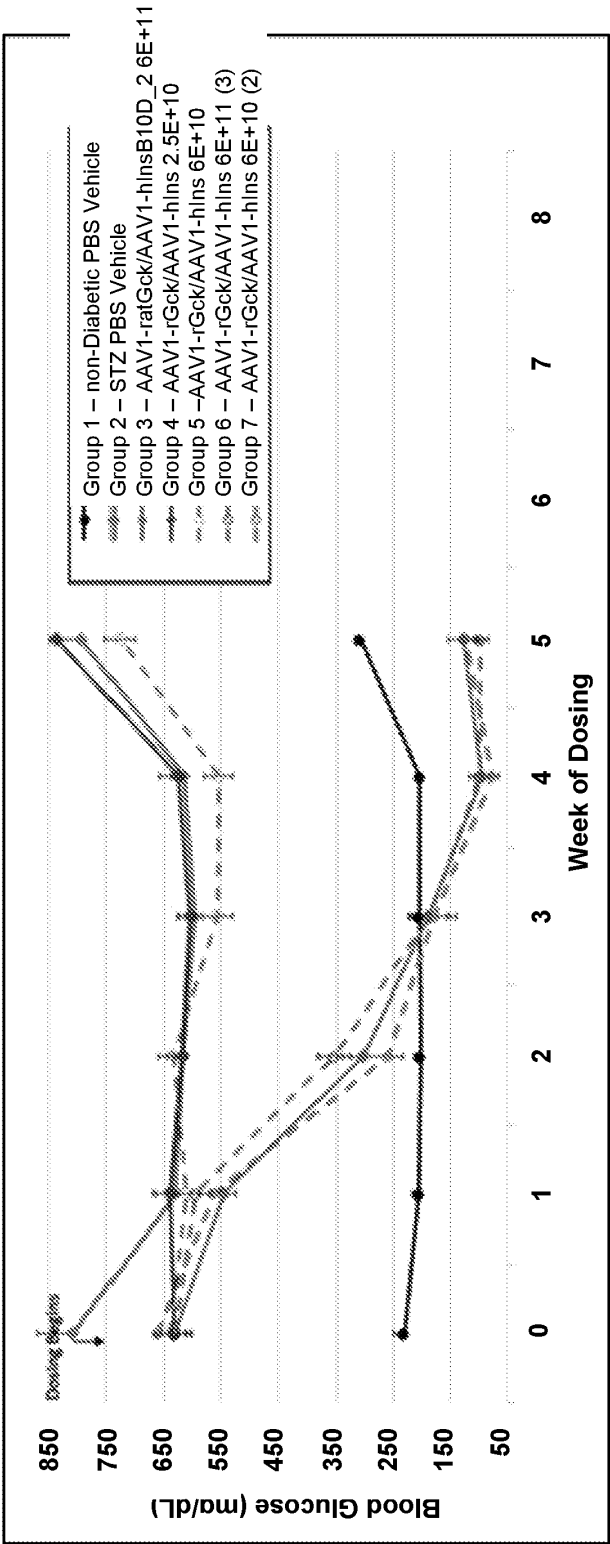


FIG. 12

FIG. 13A

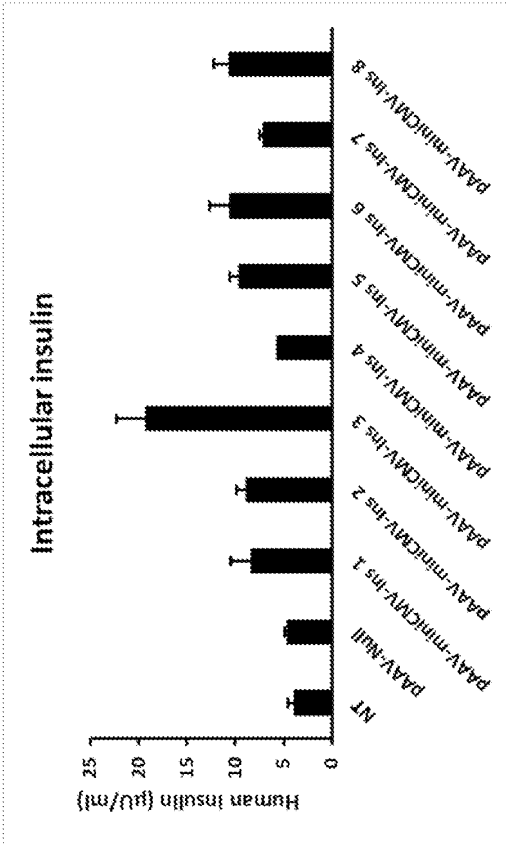


FIG. 13B

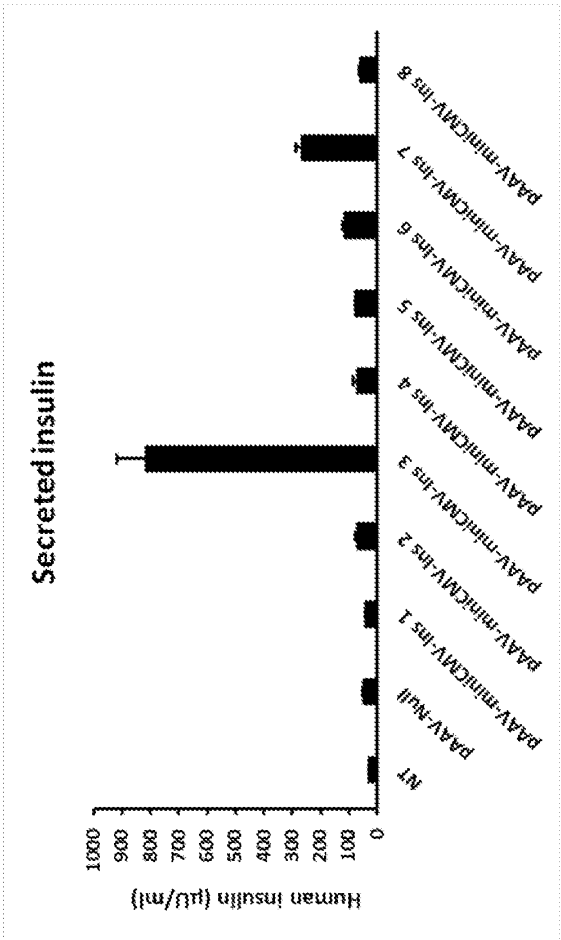


FIG. 14A

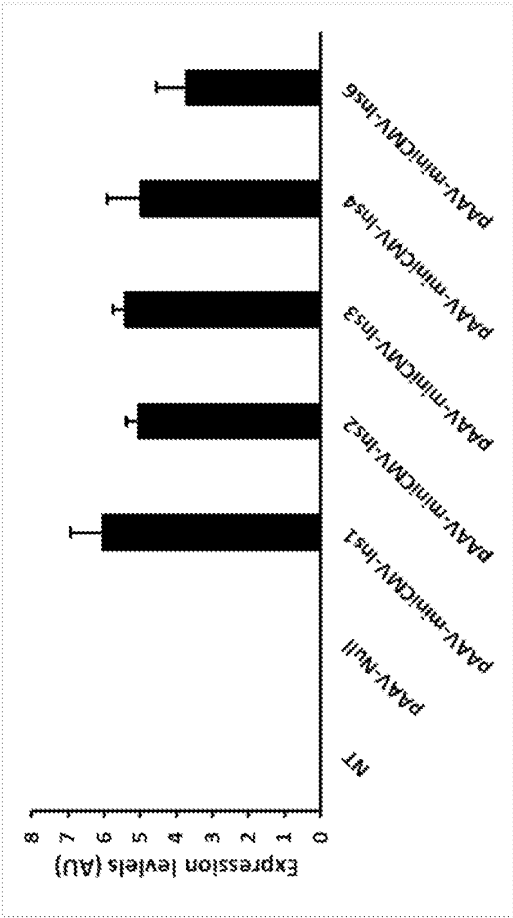


FIG. 14B

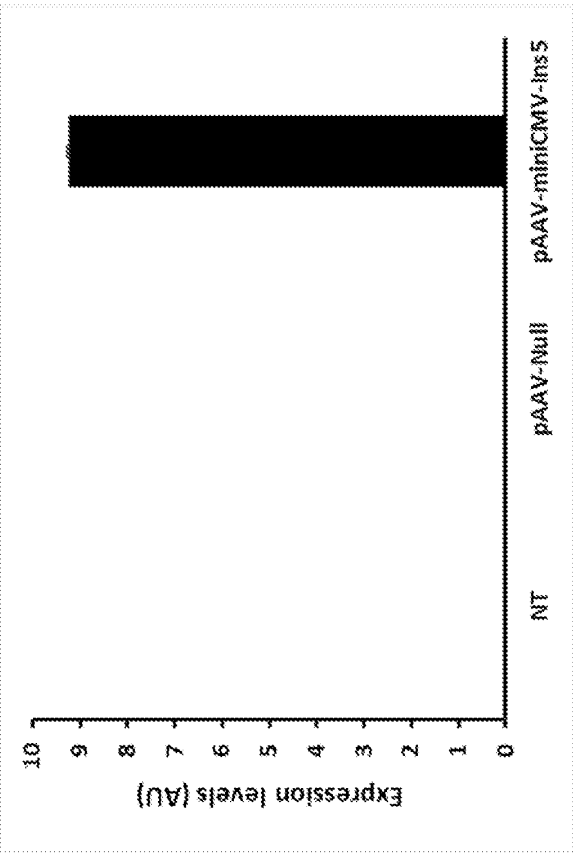


FIG. 14C

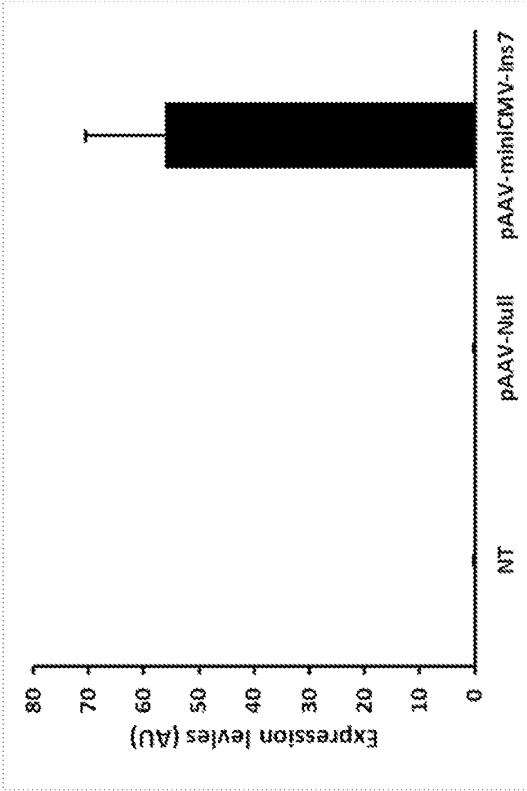
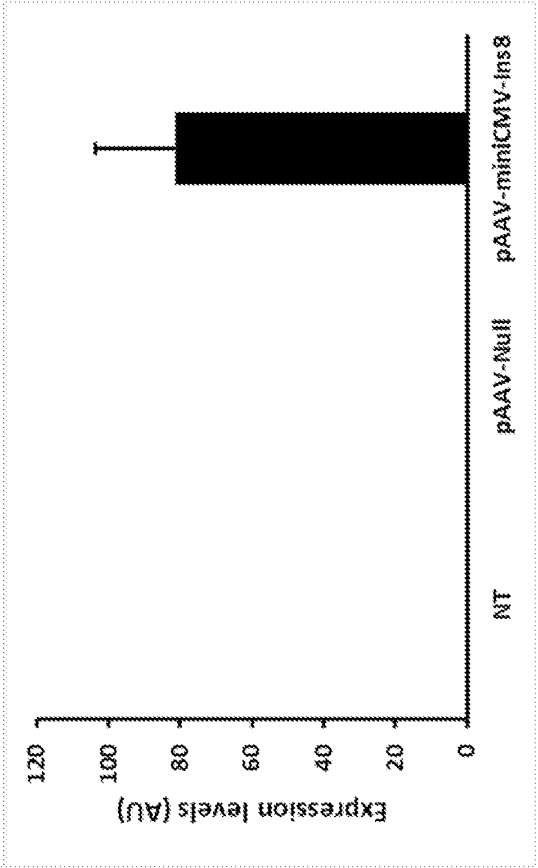


FIG. 14D



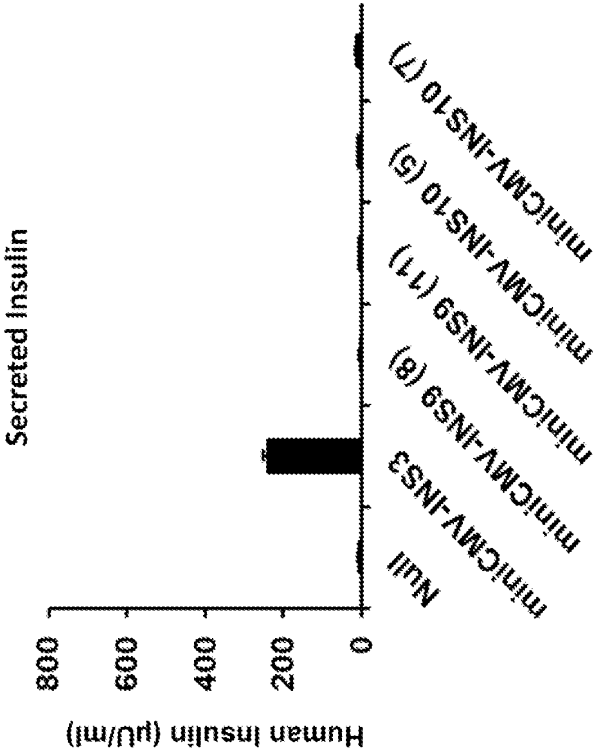


FIG. 15

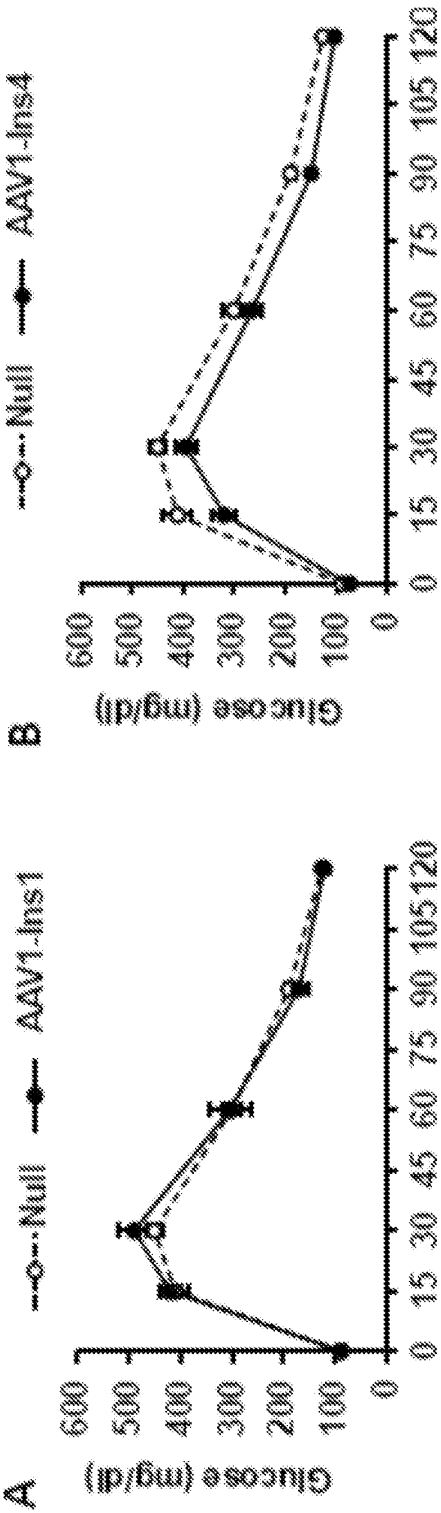


FIG. 16B

FIG. 16A

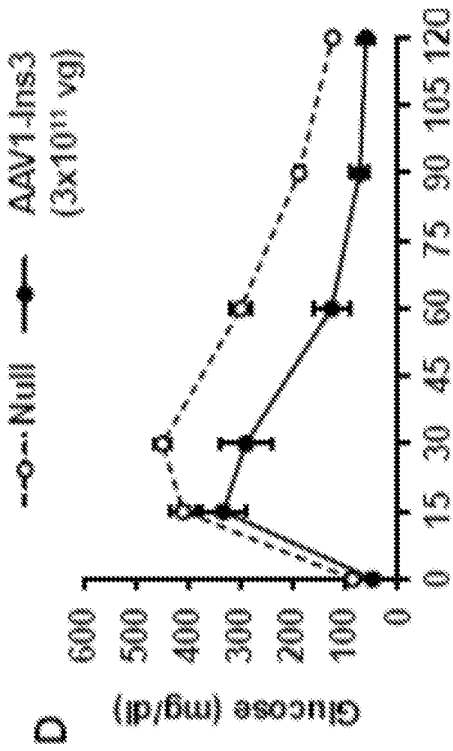


FIG. 16D

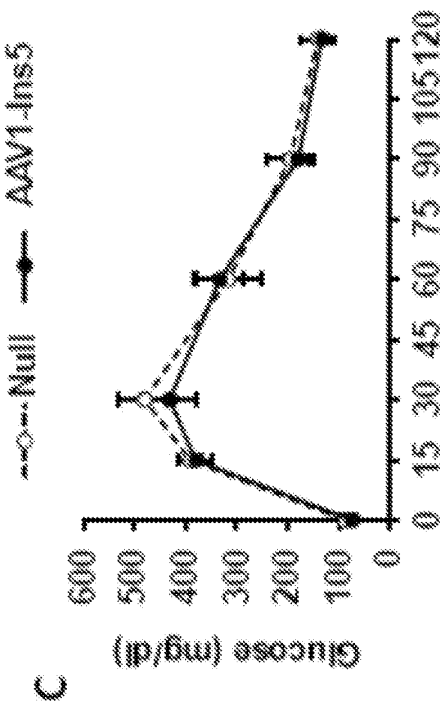


FIG. 16C

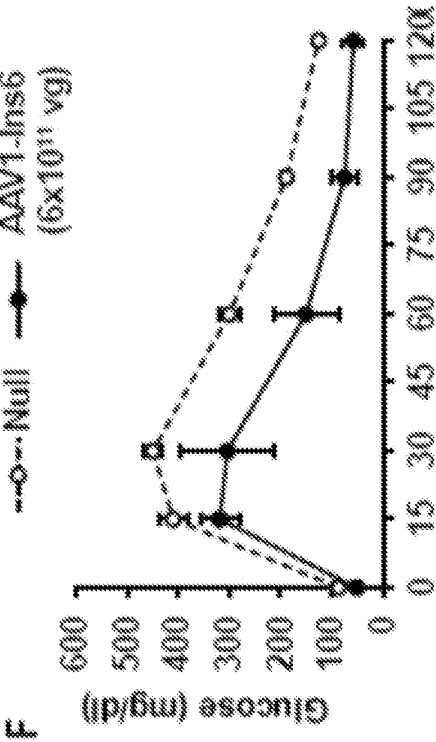


FIG. 16F

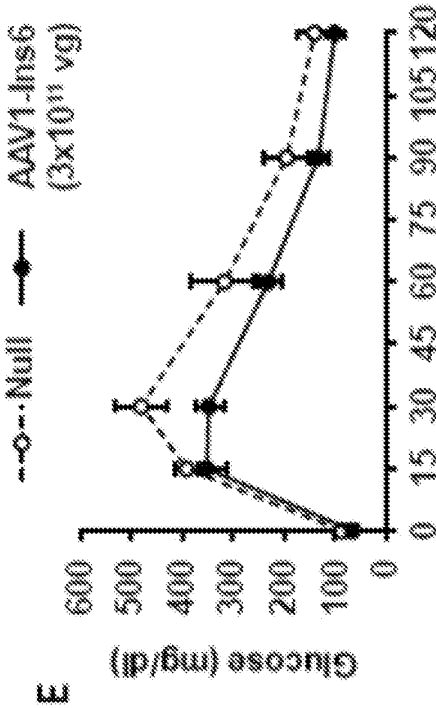


FIG. 16E

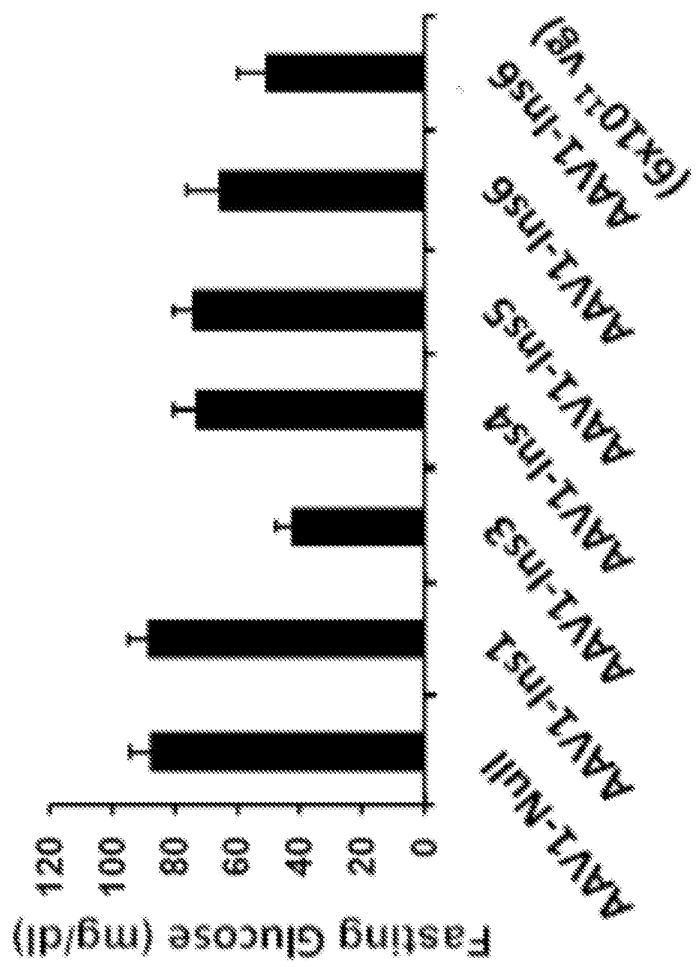


FIG. 17

FIG. 18A

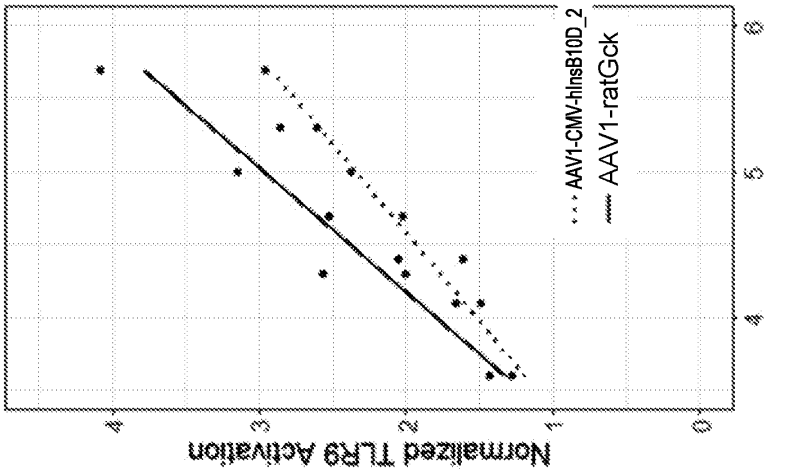


FIG. 18B

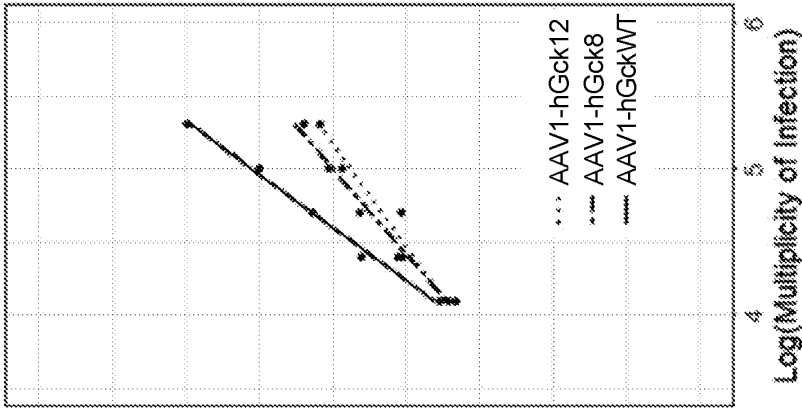
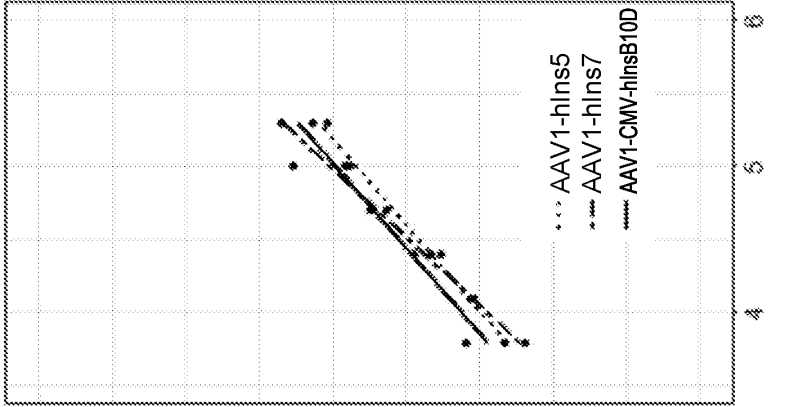


FIG. 18C



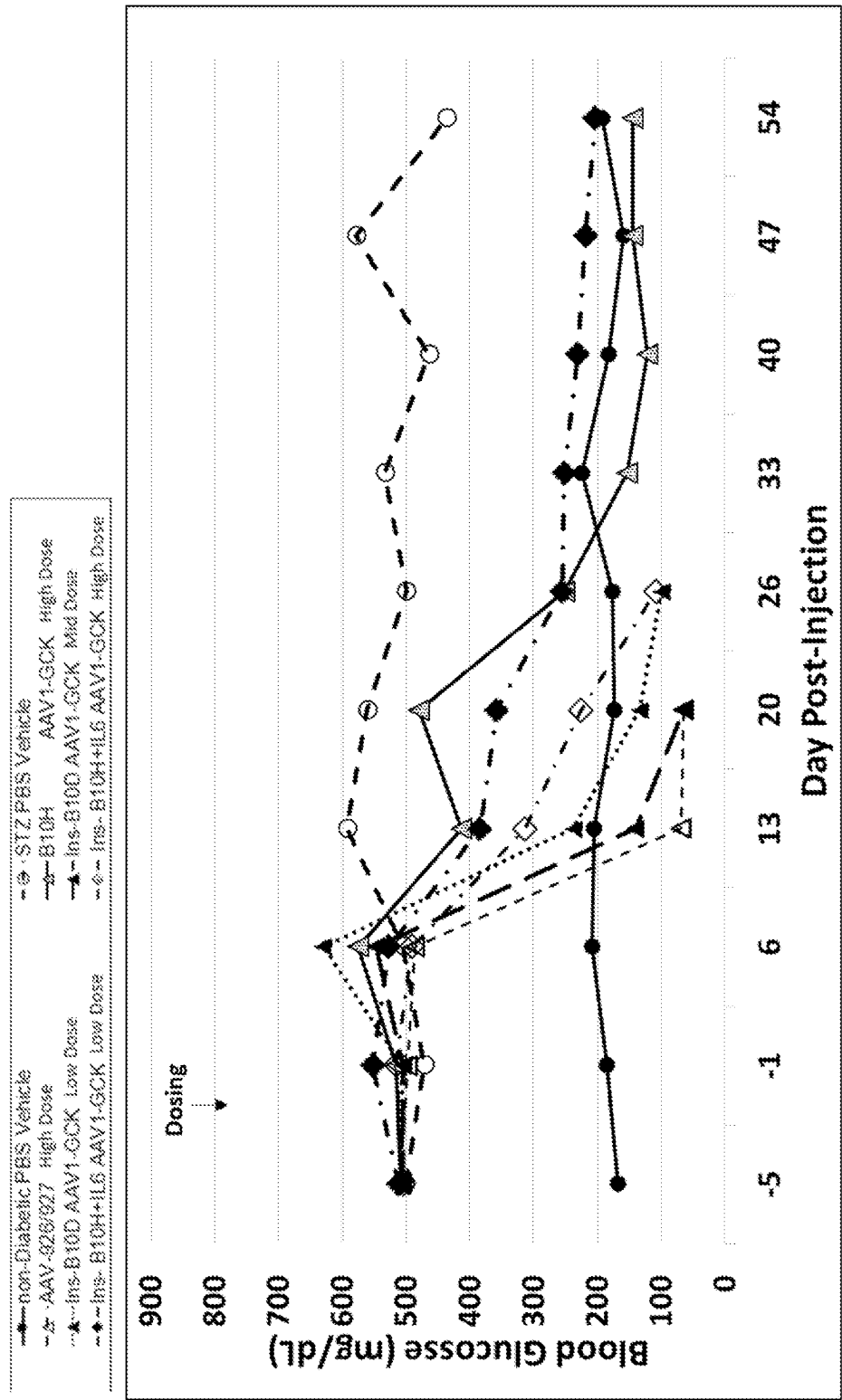


FIG. 19

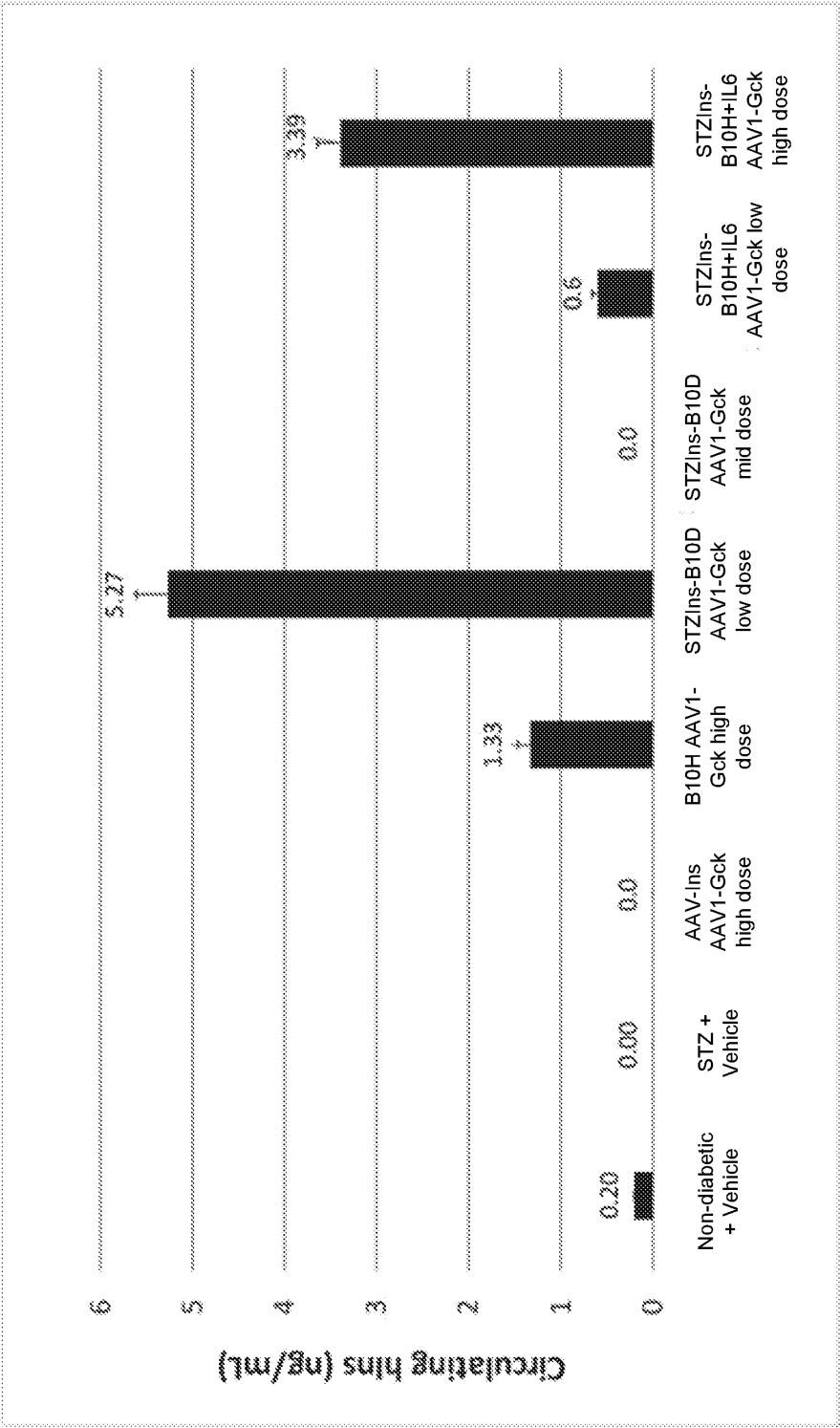


FIG. 20A

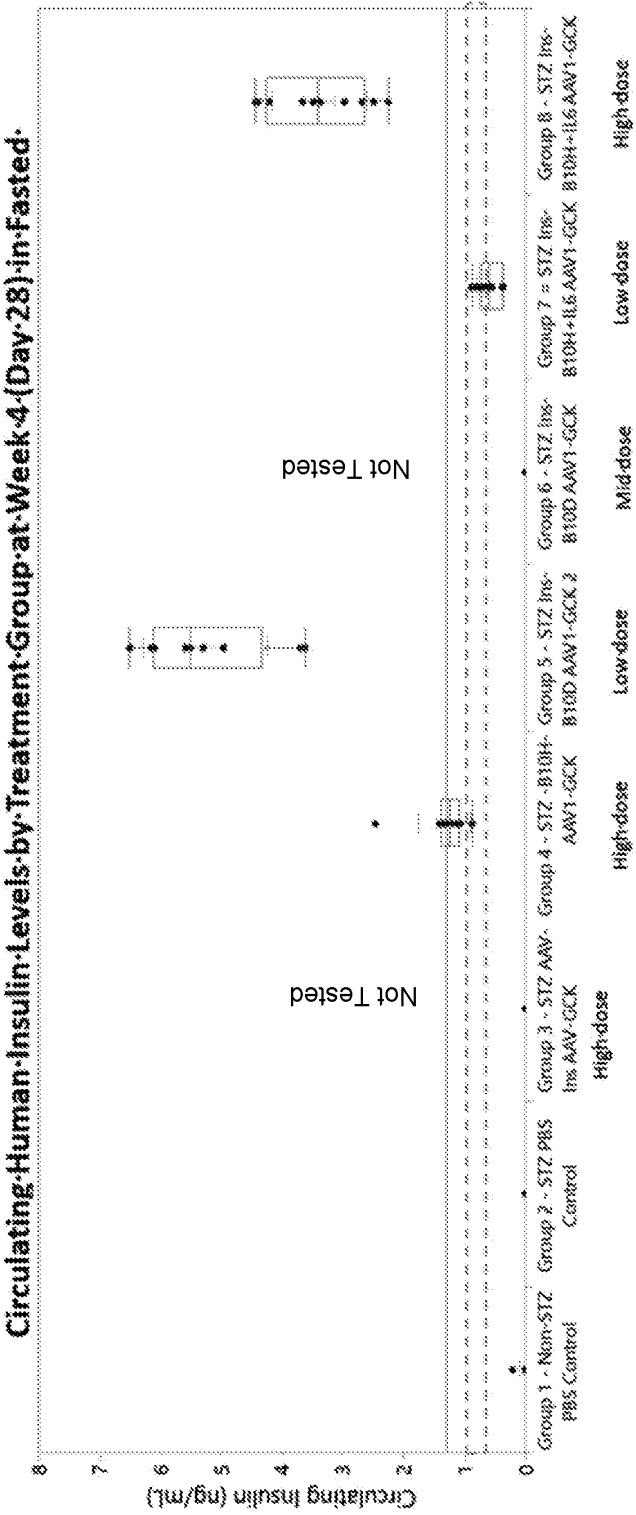


FIG. 20B

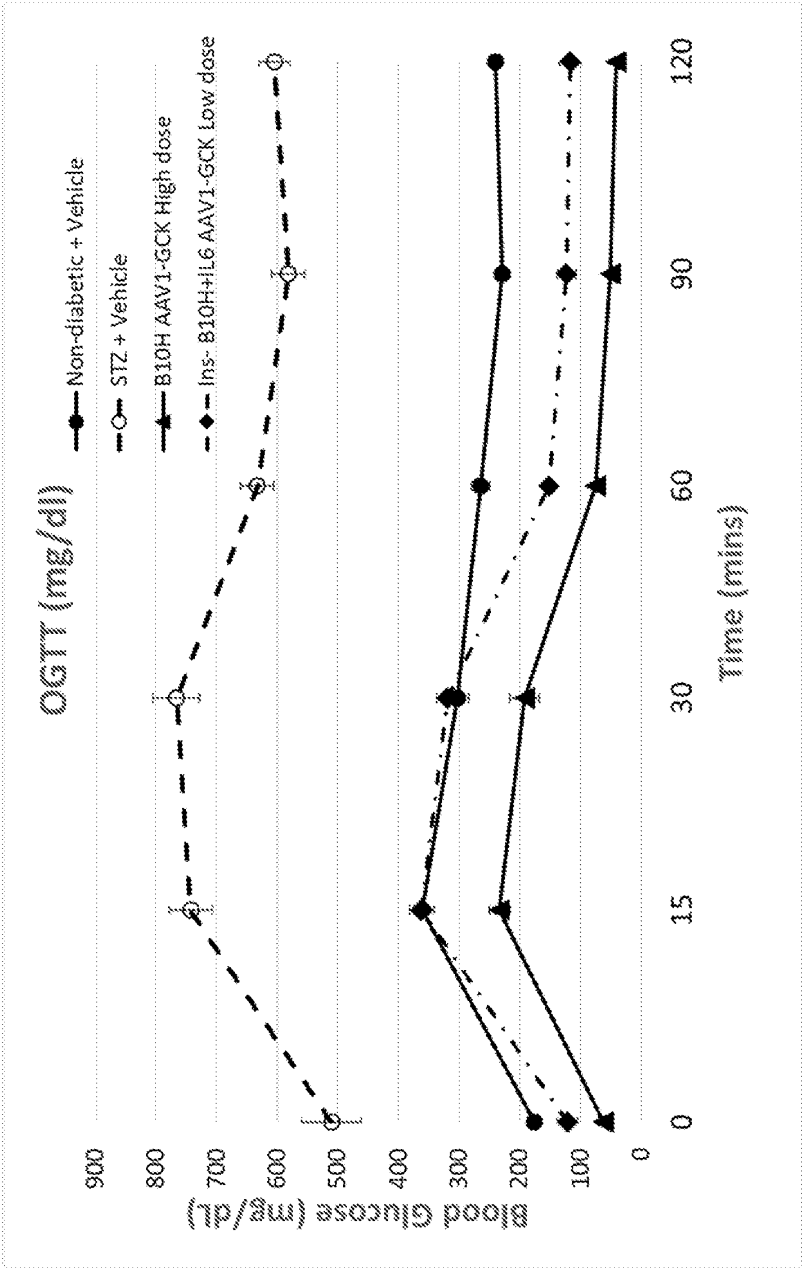


FIG. 21

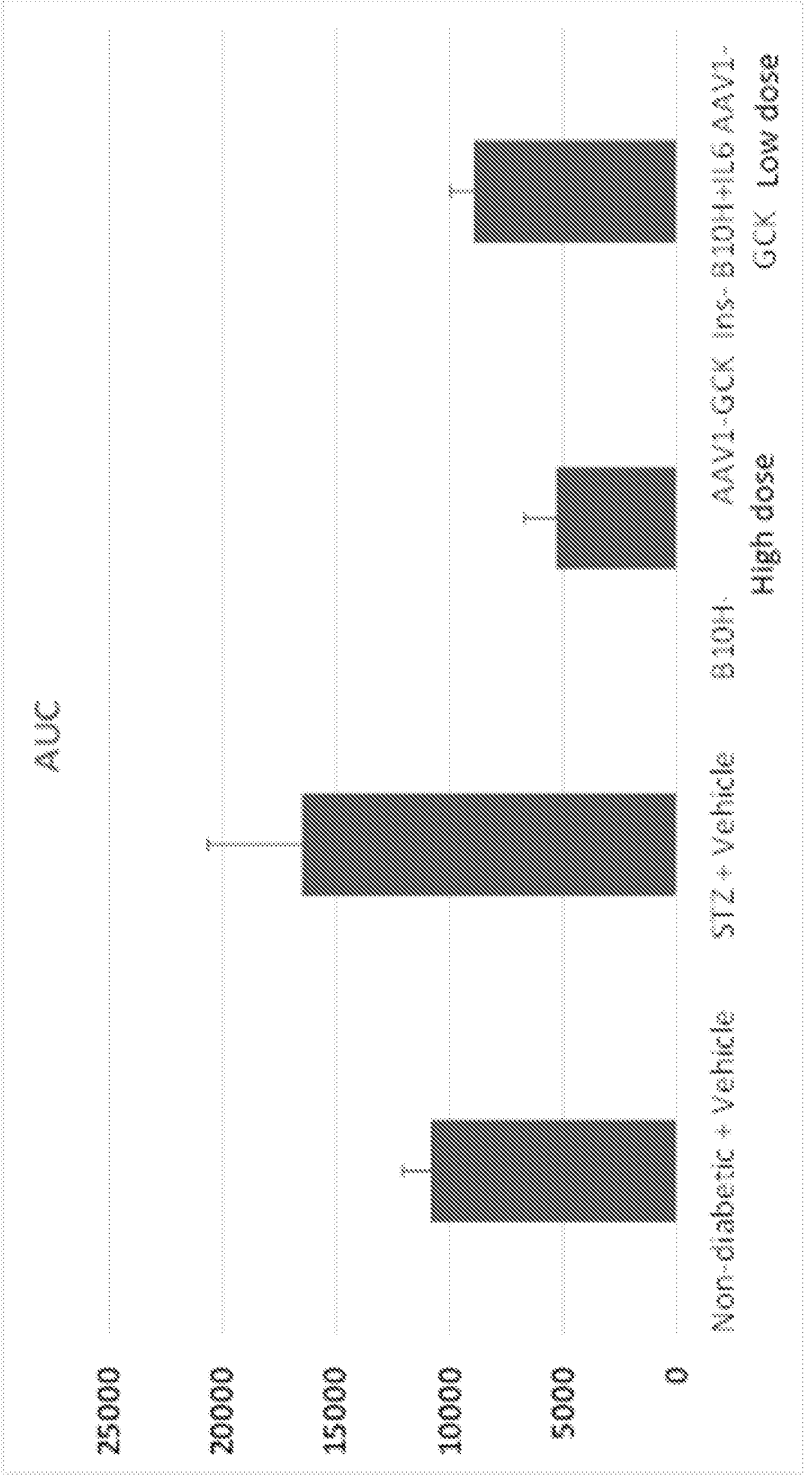


FIG. 22

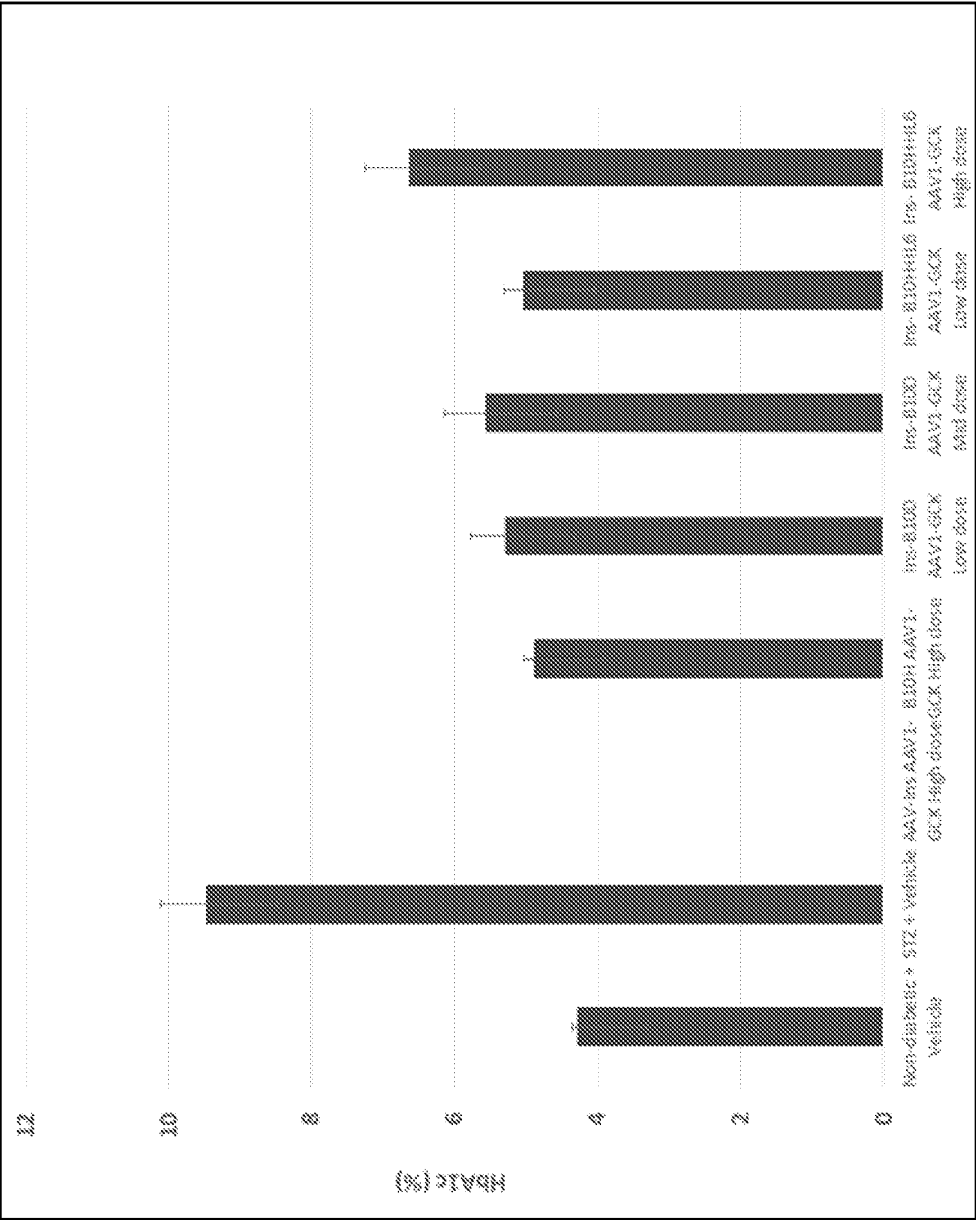


FIG. 23A

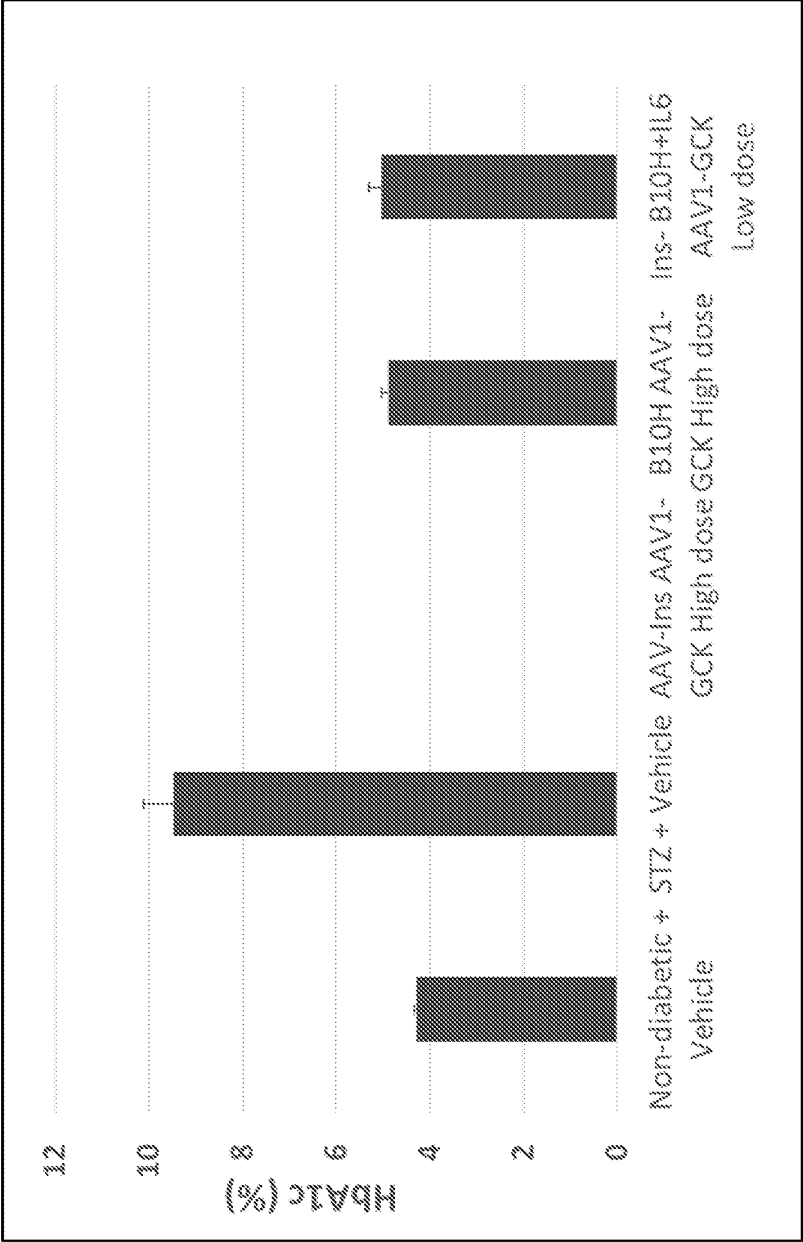


FIG. 23B

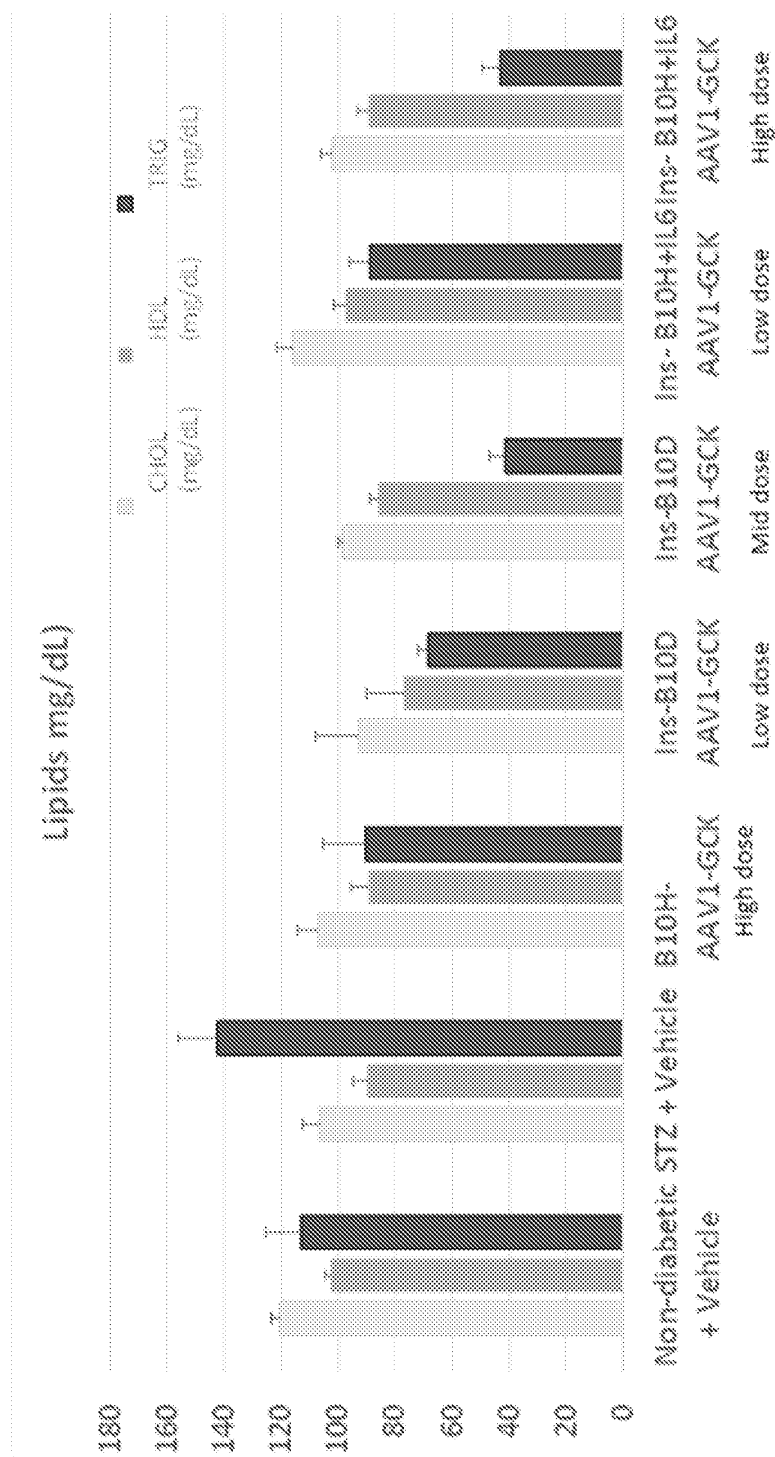


FIG. 24A

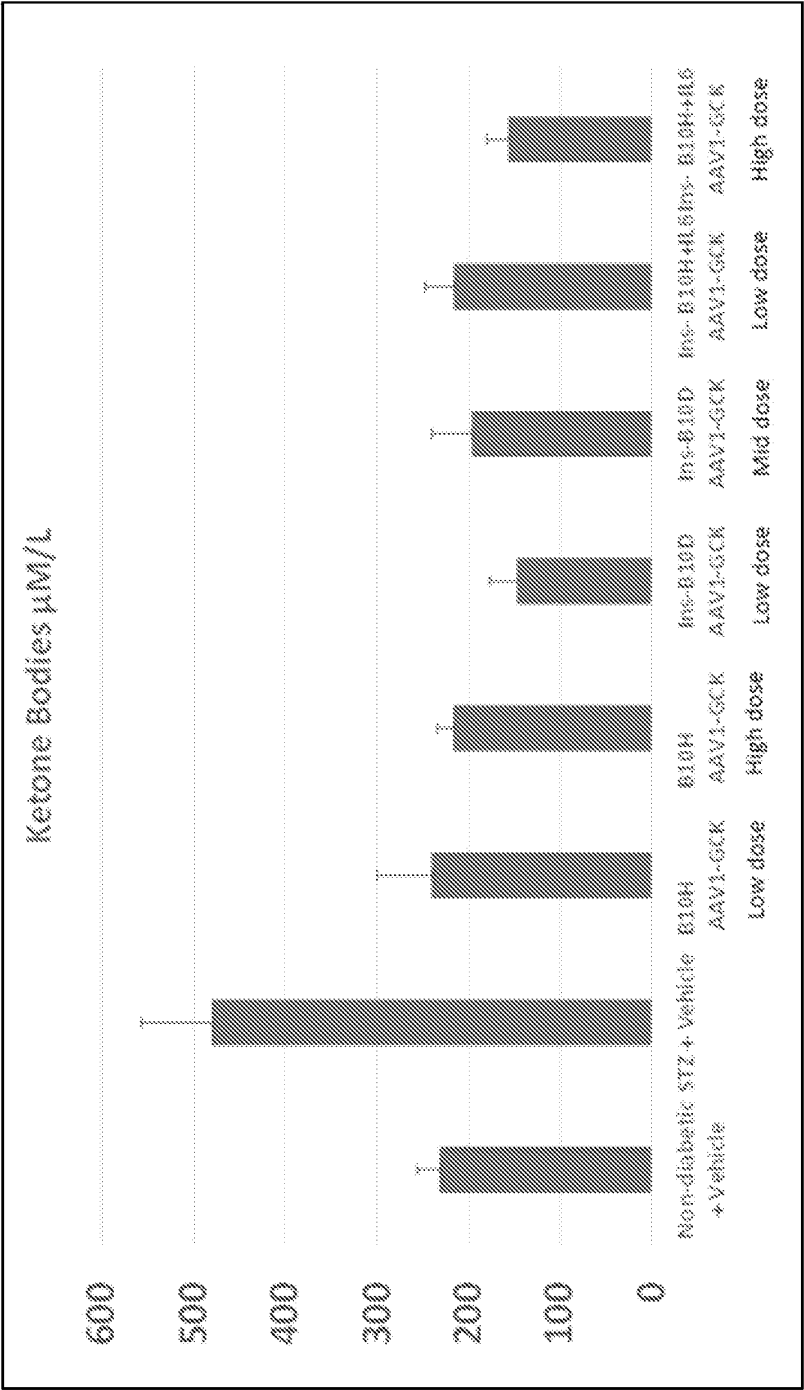


FIG. 24B

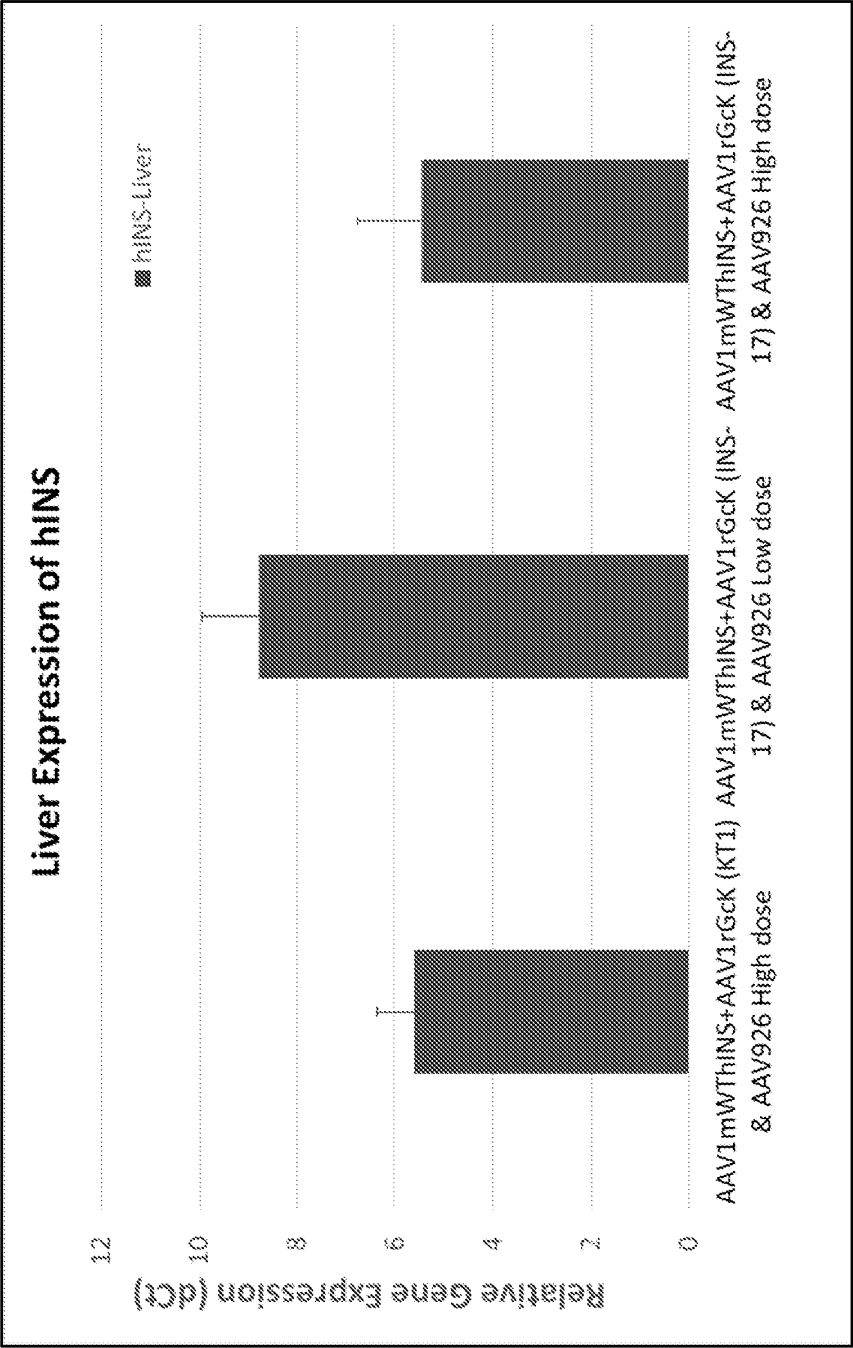


FIG. 25