Mimicking Neuroligin-2 Functions in β-cells by Functionalized Nanoparticles as a Novel Approach for Antidiabetic Therapy

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1. Scheme S1. Synthesis of HSA-112

Reagents and conditions: (a) succinic anhydride C₄H₆O₃, dry tetrahydrofuran (THF), 3% dry pyridine C₆H₅N, nitrogen pressure, 80°C, 24h; (b) N-hydroxysuccinimide C₇H₇NO₅, N,N'-dicyclohexylcarbodiimide (DCC) C₇H₁₄N₂, dry THF, room temperature, 8h; (c) HSA-28 peptide, solution of 15% NaHCO₃/dioxane 1:1, room temperature, 48h.
2. Figure S1. Analytical data for synthesized peptides

Figure S1a. HSA-28 (MH$^+$=1112.4)

Mass spectrum (ESI$^+$)

HPLC analysis
Figure S1b. EEIQYSDFN (scrambled peptide)

Mass spectrum (ESI$^+$)

EEIQYSDFN (scrambled peptide) (MNa$^+$=1168.0)

HPLC analysis
**Figure S1c.** SEGNRWSNSTKGLFQRA (CNSP1)

Mass spectrum (MALDI)
SEGNRWSNSTKGLFQRA (CNSP1) (MH⁺ =1938.0)

HPLC analysis
Figure S1d. HSEGLFQRA (CNSP2)
Mass spectrum (ESI$^+$)
HSEGLFQRA (CNSP2) (MH$^+$ =1044.0)

HPLC analysis
3. **Figure S2.** Analytical data of HSA-112

Mass spectrum (MALDI)

HSA-112 (double substituted by HSA-28 PEG$_{2000}$)(MH$^+\approx$4993.0)

HPLC analysis

A peak in retention time around 23-38 min is monosubstituted by HSA-28 PEG$_{2000}$

A peak in retention time around 55-70 min is disubstituted by HSA-28 PEG$_{2000}$
TLC

Eluent: Diethylether/Ethanol (80/20)
4. **Figure S3.** Calibration curve of HSA-28

![Calibration curve of HSA-28](image)

\[ y = -135.3x + 528 \]

\[ R^2 = 0.6324 \]

5. **Figure S4**

![Evaluation of possible HSA-28P stimulatory effect on proliferation rate of PC-3 and PC-12 cell lines](image)

**Fig. S4.** *Evaluation of possible HSA-28P stimulatory effect on proliferation rate of PC-3 and PC-12 cell lines.* PC-3 cells or PC-12 cells were incubated for 24h with the medium
supplemented with HSA-28P (2.76µM), or NP (0.76 µg/ml). After the incubation time cells were detached by trypsin, colored by trypan blue and counted as described in Methods, n=6. MEAN±SE.