

Supplementary Information

Linear and dendrimeric antiviral peptides: design, chemical synthesis and activity against human respiratory syncytial virus

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Additional experimental information

Content:

Linear peptides: NC-783, SA-35

Lipopeptides: NC-810

Peptide dendrimers: TA-11, KK-16, KK-18, LTP

HPLC: preparative RP-HPLC was conducted on a HPLC system consisted of 321-H binary pump (Gilson), C18 Grace Vydac 218 TP1022 column (20 × 250 mm), Spectroflow 757 photometric detector (Kratos Analytical), 2210 recorder (LKB) and Multirac 2111 fraction collector (LKB). A linear gradient of 0–70% eluent B ran for 25 min at 10 mL/min with detection at 226 nm. Eluent A contained 0.1% TFA in H₂O; eluent B contained pure acetonitrile (Sigma-Aldrich).

MS: The peptide structures were confirmed by matrix assisted laser desorption/ionization and time-of-flight analysis (MALDI-TOF, Microflex™ LT MALDI-TOF, Bruker Daltonics) mass spectrometry.

1. **NC-783:** KRRGGGKLLKLLKLLKLLK (Lys-Arg-Arg-Gly-Gly-Gly-Lys-Leu-Leu-Lys-Leu-Leu-Leu-Lys-Leu-Leu-Lys-Cys), Cationic amphipathic linear peptide.

Mw = 2505 g/mol (380 mg, 31 %), net charge +9, HPLC (t = 22,73), MS (MALDI-TOF) m/z 2505,312 (M⁺) (Fig. S1).

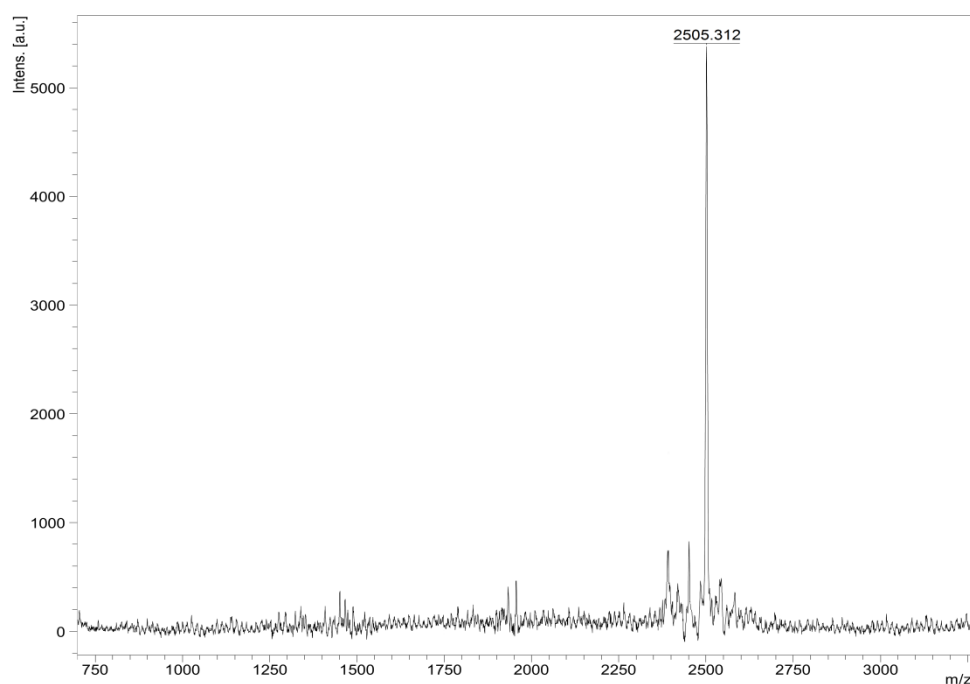


Fig. S1. Mass spectrum (MALDI-TOF) of NC-783

2. **SA-35:** MITHGICYTRTRHKHKLKTL (Met-Ile-Thr-His-Gly-Cys-Tyr-Thr-Arg-Thr-Arg-His-Lys-His-Lys-Leu-Lys-Lys-Thr-Leu), Cationic amphipathic linear peptide.

Mw = 2450 g/mol (343 mg, 28 %), net charge +10, HPLC (t = 12,17), MS (MALDI-TOF) m/z 2450,884 (M+) (Fig. S2).

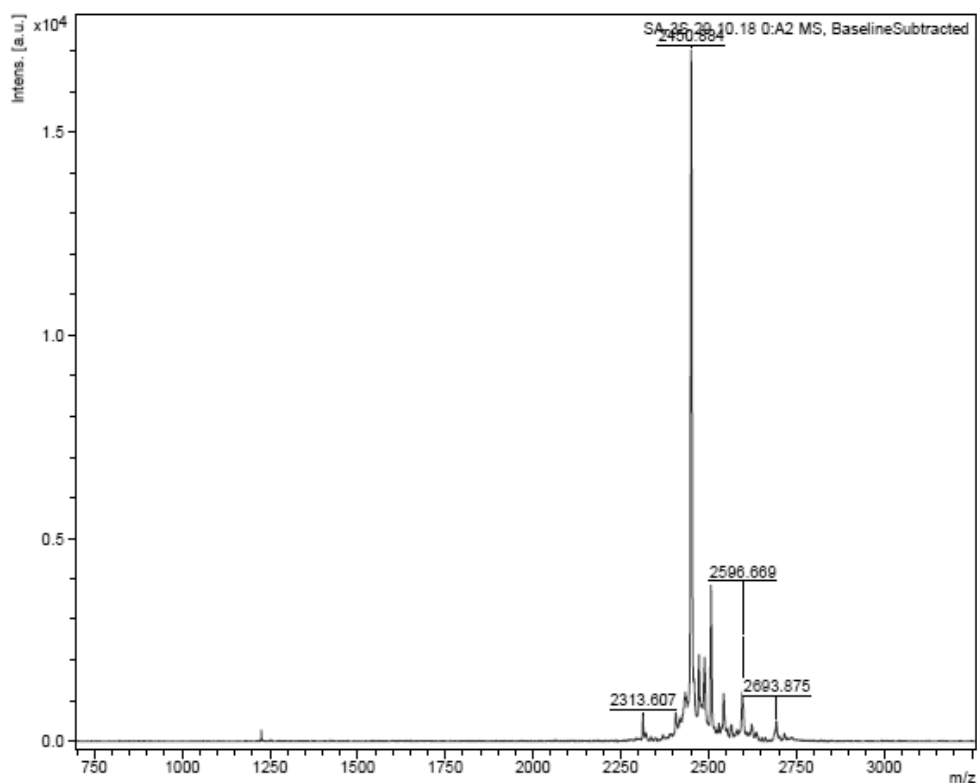


Fig. S2. Mass spectrum (MALDI-TOF) of SA-35

3. **NC-810:** Palm-CKRRRRRRRRRRR (Palmitoyl-Cys-Lys-Arg-Arg-Arg-Arg-Arg-Arg-Arg-Arg-Arg-Arg), Cationic linear peptide with hydrophobic chain

Mw = 2207 g/mol (340 mg, 31 %), net charge +12, HPLC (t = 19,32), MS (MALDI-TOF) m/z 2206,828 (M+) (Fig. S3).

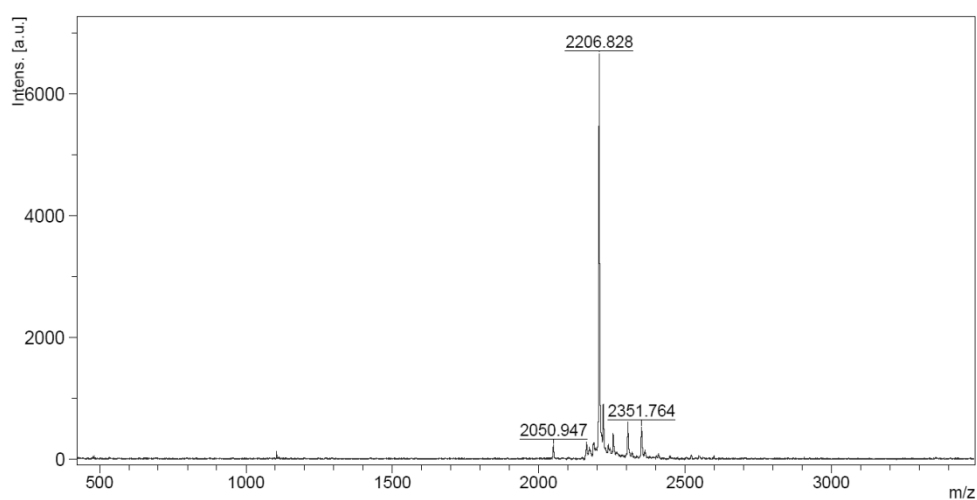


Fig. S3. Mass spectrum (MALDI-TOF) of NC-810

4. **TA-11:** R₈K₄K₂KARGDP, (((Arg)₂Lys)₂Lys)₂Lys-Ala-Arg-Gly-Asp-Pro), Cationic peptide dendrimer (high charge density)

Mw = 2660g/mol (293 mg, 22 %), net charge +17, HPLC (t = 12,39), MS (MALDI-TOF) m/z 2659,661 (M⁺) (Fig. S4).

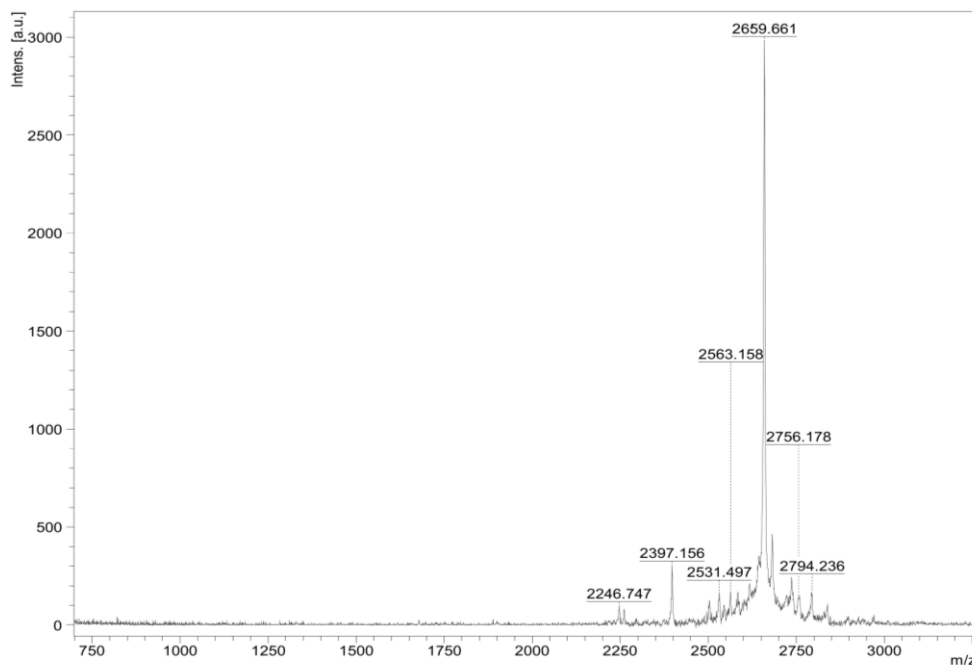


Fig. S4. Mass spectrum (MALDI-TOF) of TA-11

5. **KK-16:** (RGD)₄K₂KAC, ((Arg-Gly-Asp)₄Lys)₂Lys-Ala-Cys), Cationic dendrimeric peptide (low charge density)

Mw = 1887 g/mol (236 mg, 25 %), net charge +4, HPLC (t = 11,21), MS (MALDI-TOF) m/z 1885,090 (M⁺) (Fig. S5).

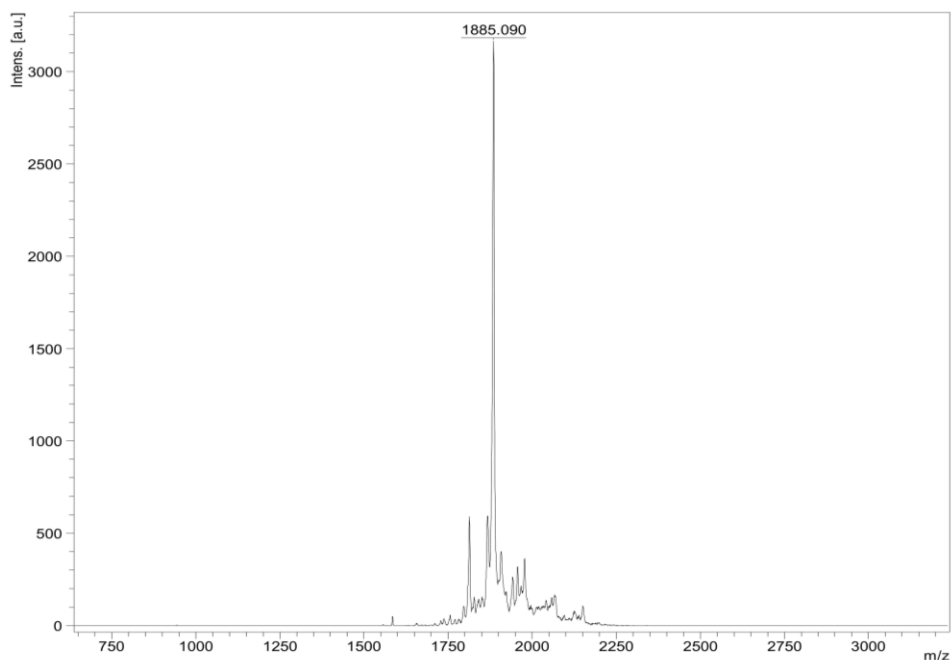


Fig. S5. Mass spectrum (MALDI-TOF) of KK-16

6. **KK-18:** $R_4K_2G_2KAWWC$, $((Arg)_2Lys-Gly)_2Lys-Ala-Trp-Trp-Cys$, Cationic dendrimeric peptide (medium charge density)

Mw = 1687 g/mol (270 mg, 32 %), net charge +8, HPLC (t = 16,57), MS (MALDI-TOF) m/z 1686,671 (M+) (Fig. S6).

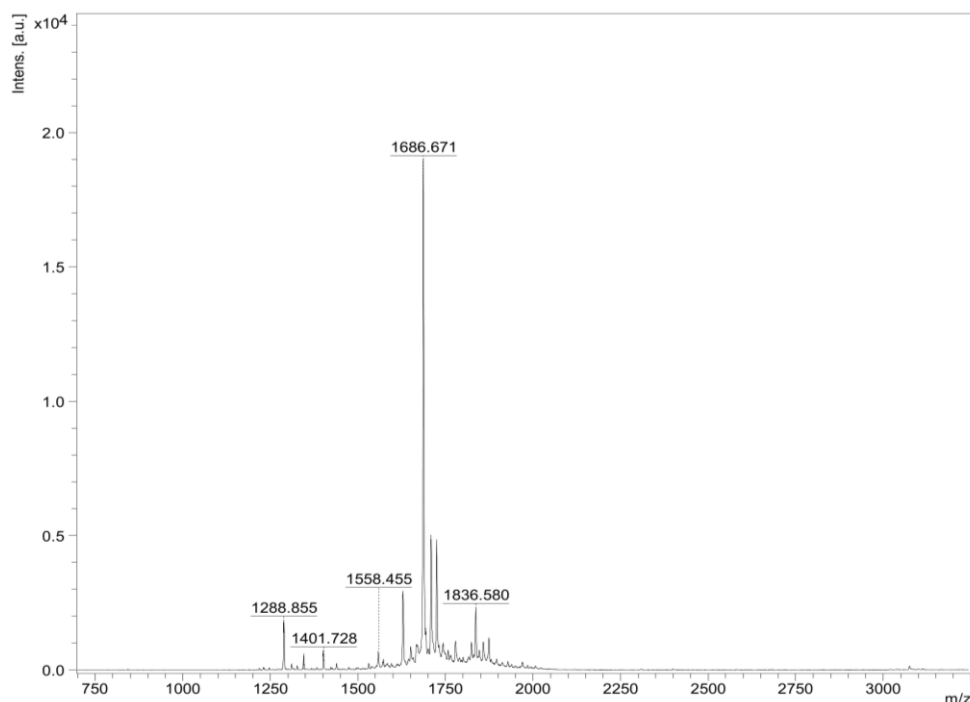


Fig. S6. Mass spectrum (MALDI-TOF) of KK-18

7. **LTP:** $((R)_2K)_2KAC$, $((((Arg)_2Lys)_2Lys)_2Lys-Ala-Cys)$, Cationic peptide dendrimer (high charge density)

Mw = 2338 g/mol (460 mg, 40 %), net charge +16, HPLC (t = 9,908), MS (MALDI-TOF) m/z 2337,291 (M+) (Fig. S7), MS (ESI) m/z 390.6 (M+6), 468.5 (M+5), 585.3 (M+4), and 780.3 (M+3) (Fig. S8)

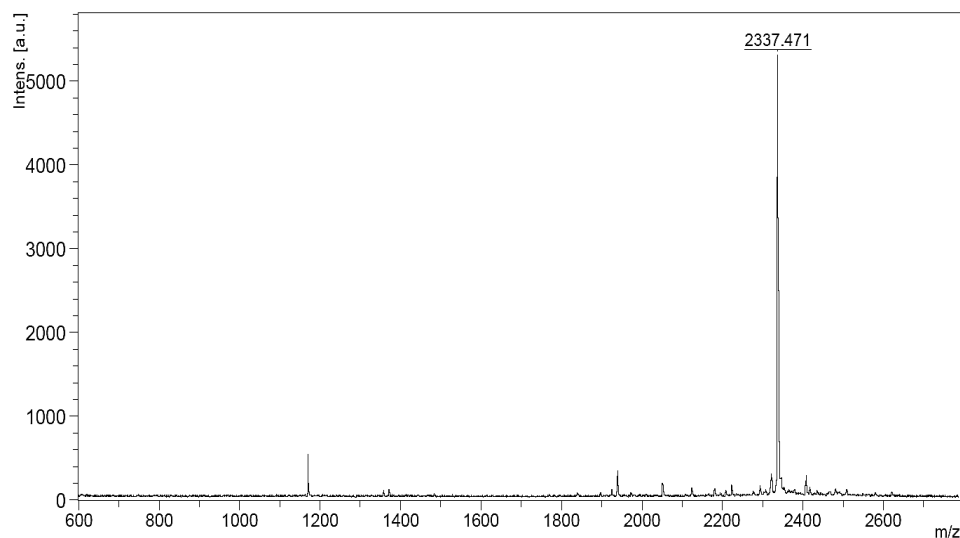


Fig. S7. Mass spectrum (MALDI-TOF) of LTP

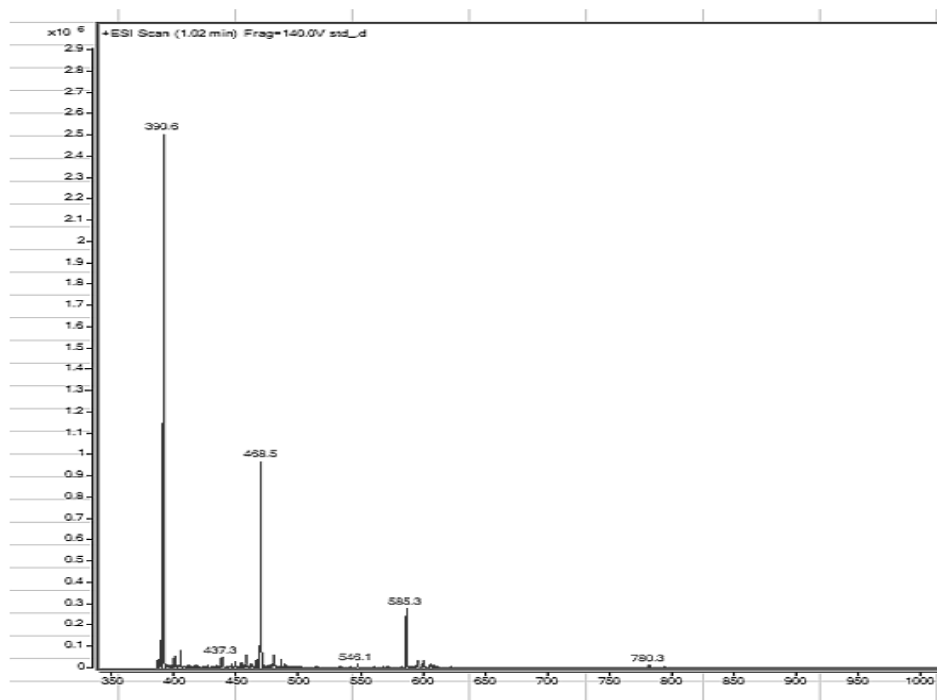


Fig. S8. Mass spectrum (ESI) of LTP. The ESI spectrum contains ion peaks with m/z: 390.6 (six-charged ion), 468.5 (five-charged ion), 585.3 (four-charged ion), and 780.3 (three-charged ion). Thus, the molecular weight of the peptide is 2338 Da, that corresponds to the calculated data.