SUPPLEMENTARY INFORMATION

Structure-Based Epitope Design: Toward A Greater Antibody-SARS-CoV-2 - RBD Affinity

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(Supplementary Information)

HPLC Analyses

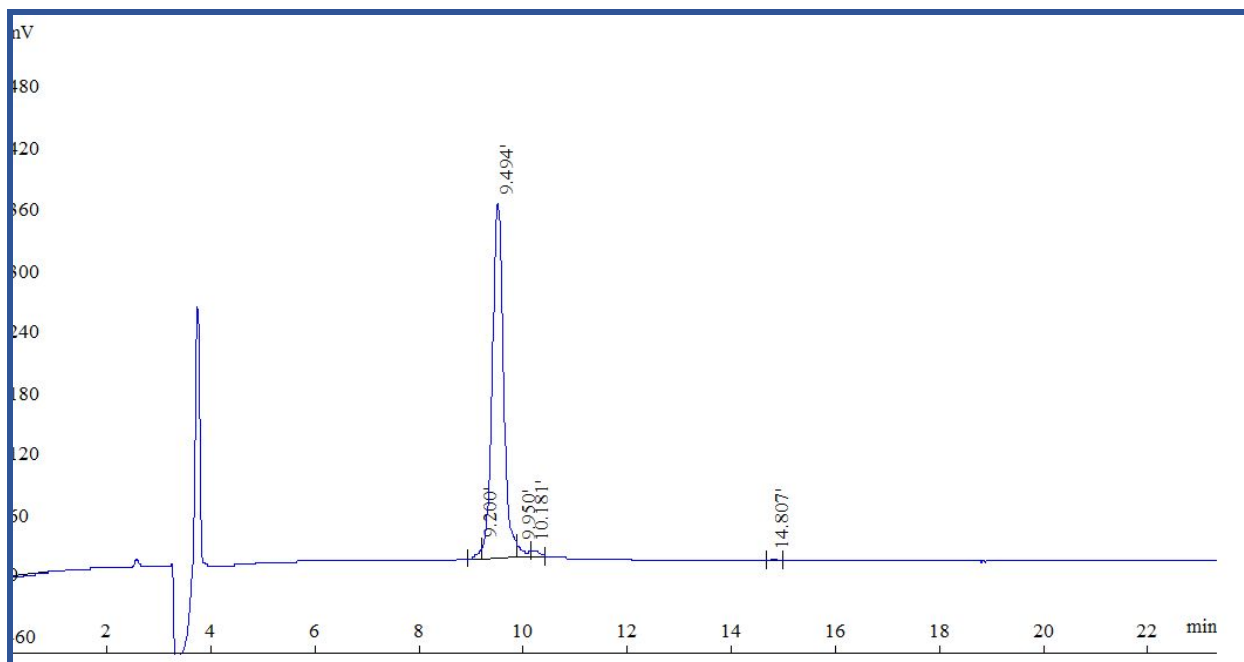The mobile phase consisted of 0.1%Trifluoroacetic in 100%, Acetonitrile and 0.1%Trifluoroacetic in 100% Water with a detection wavelength of 220 nm, Flow rate: 1.0 ml/min and volume: 20 µl.
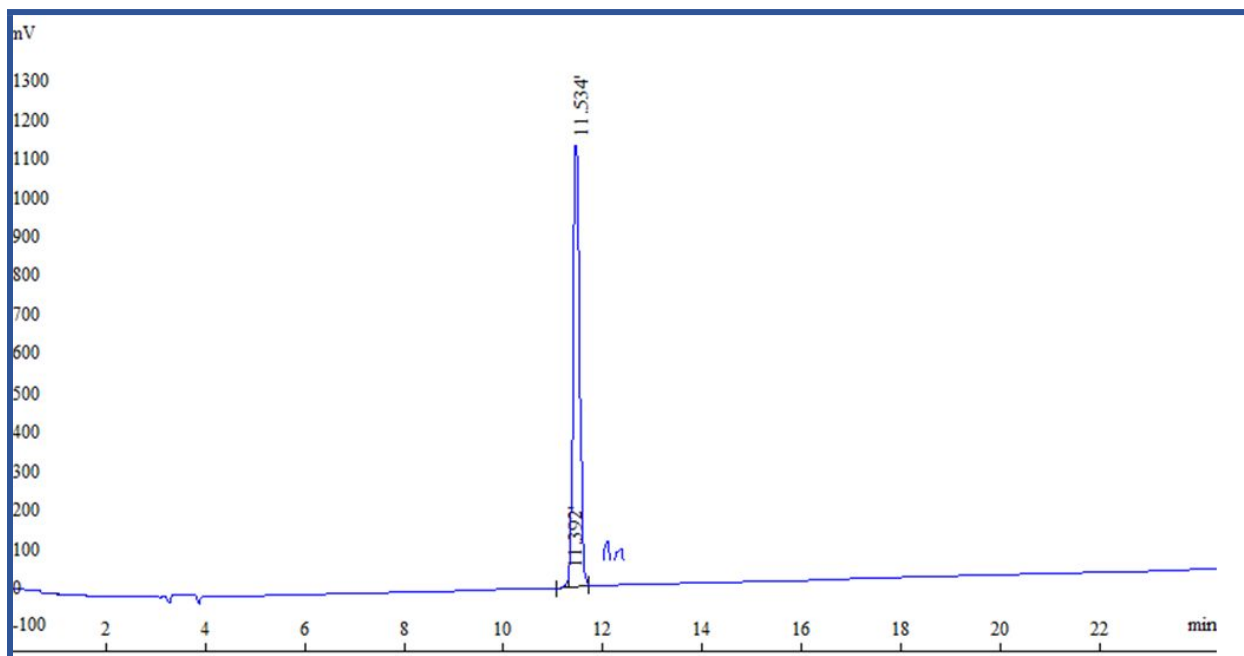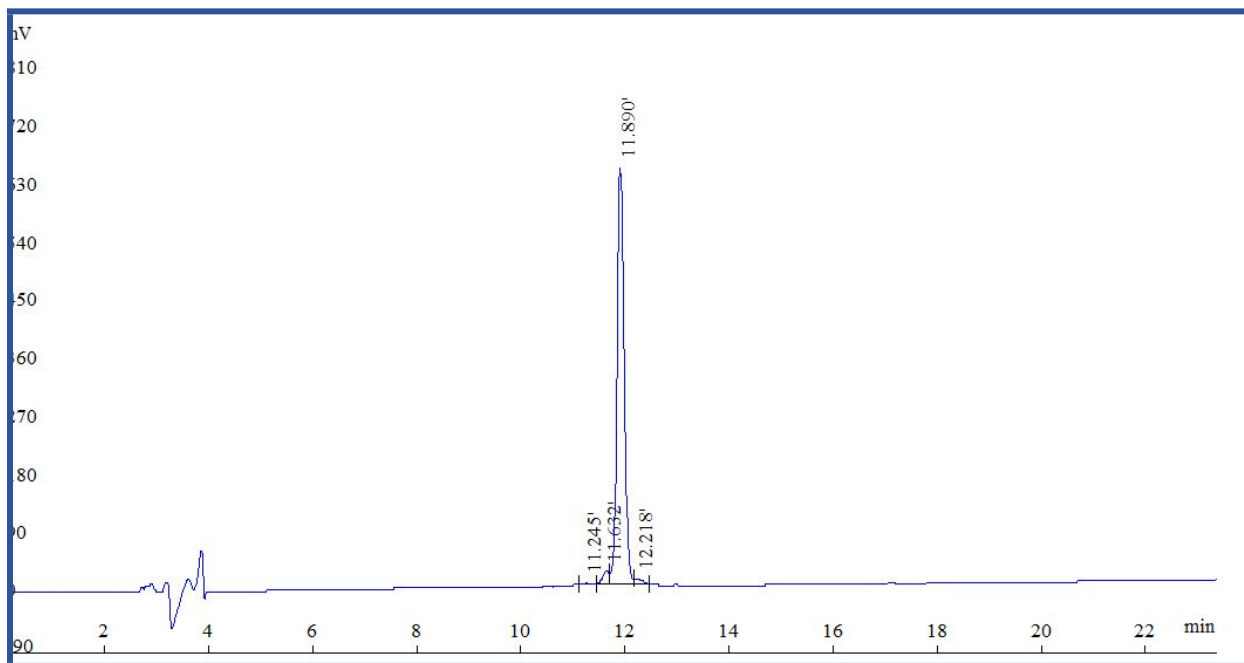

Figure S 1: HPLC characterization performed on peptide **(1)**
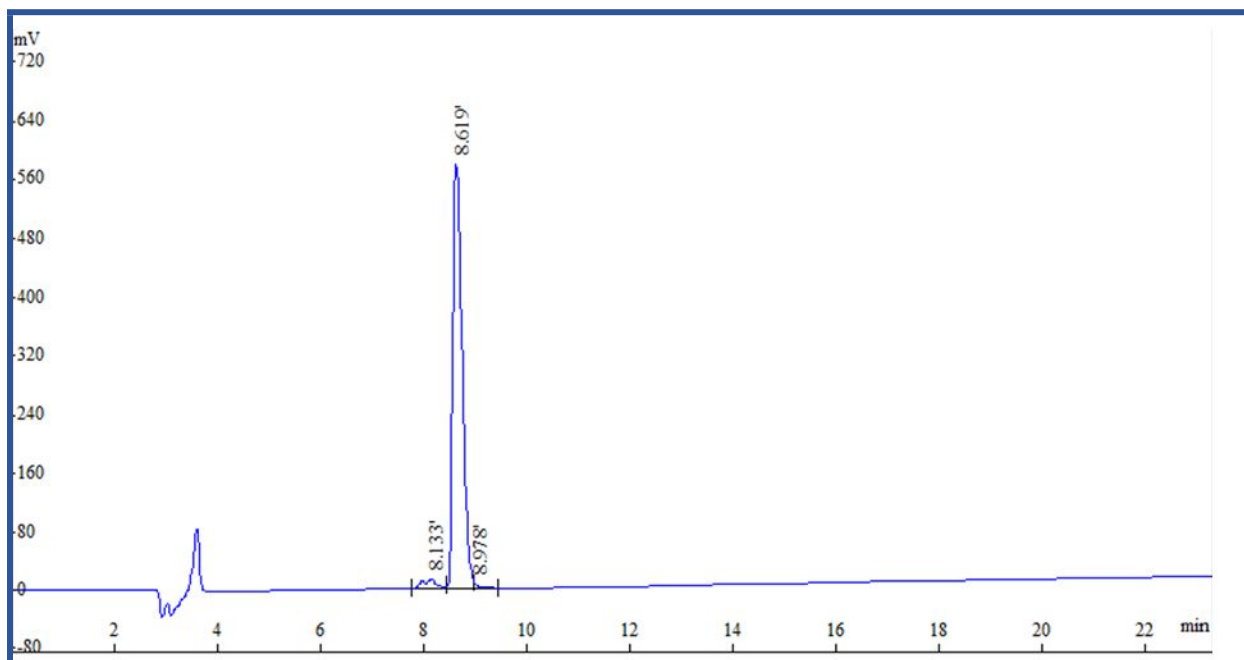
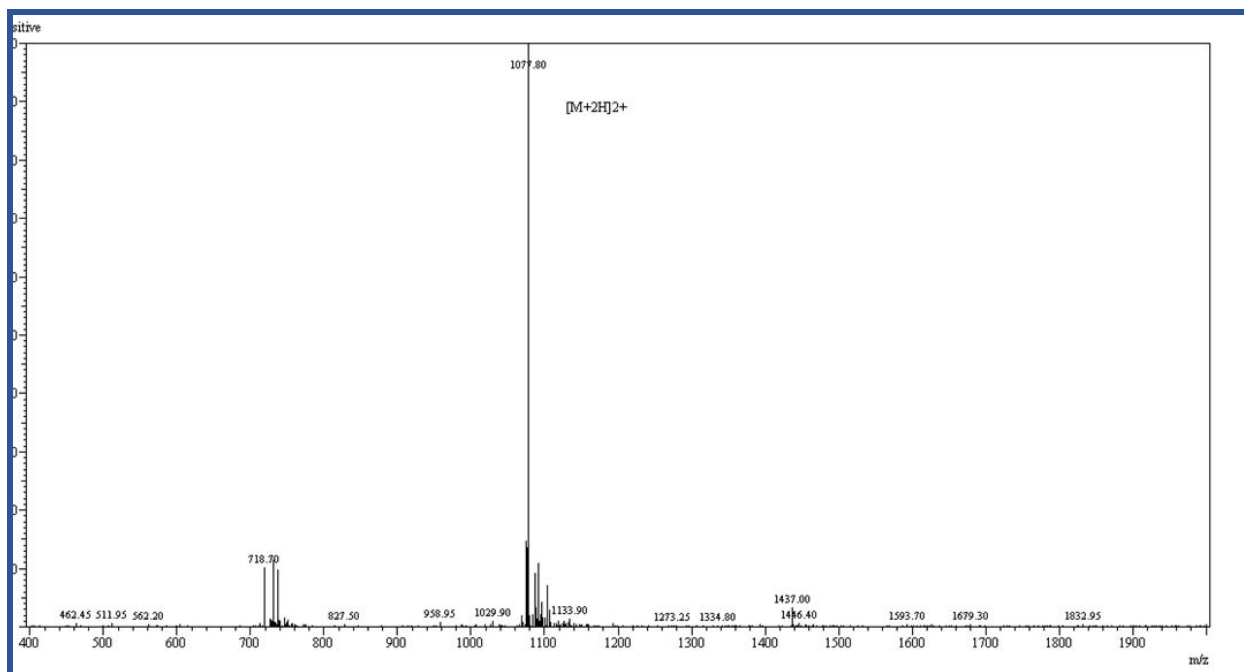**Figure S 2**: HPLC characterization performed on peptide **(2)**

Figure S 3: HPLC characterization performed on peptide **(3)**
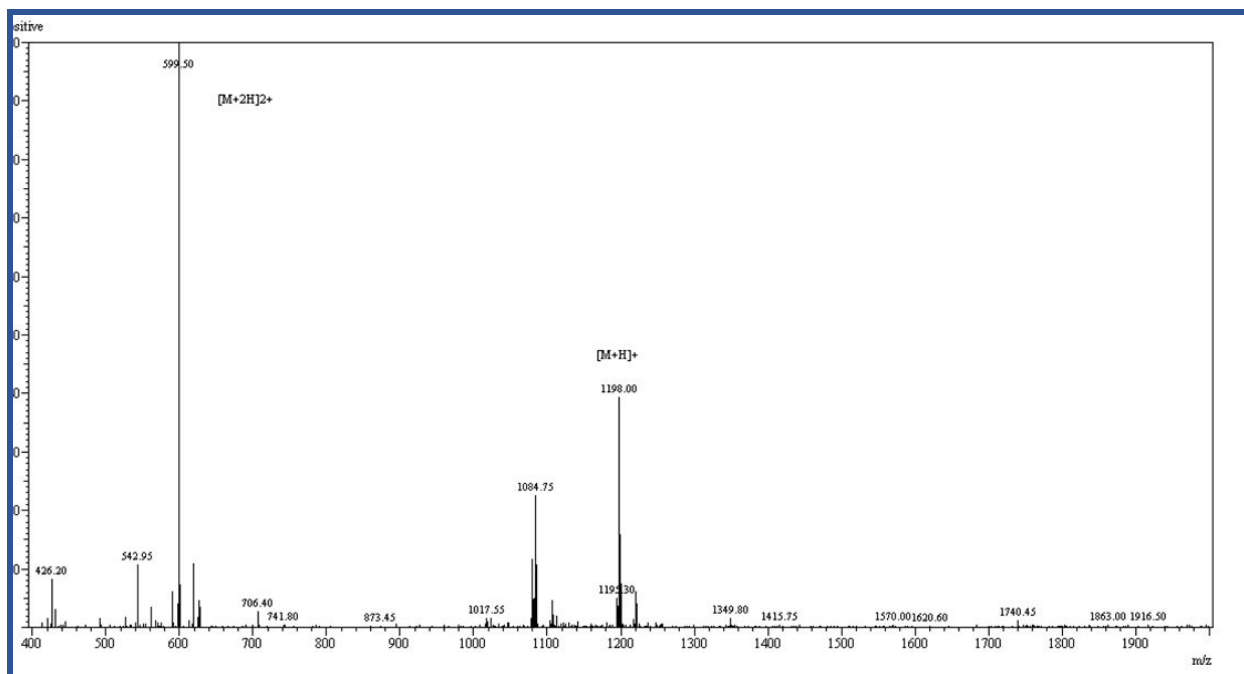

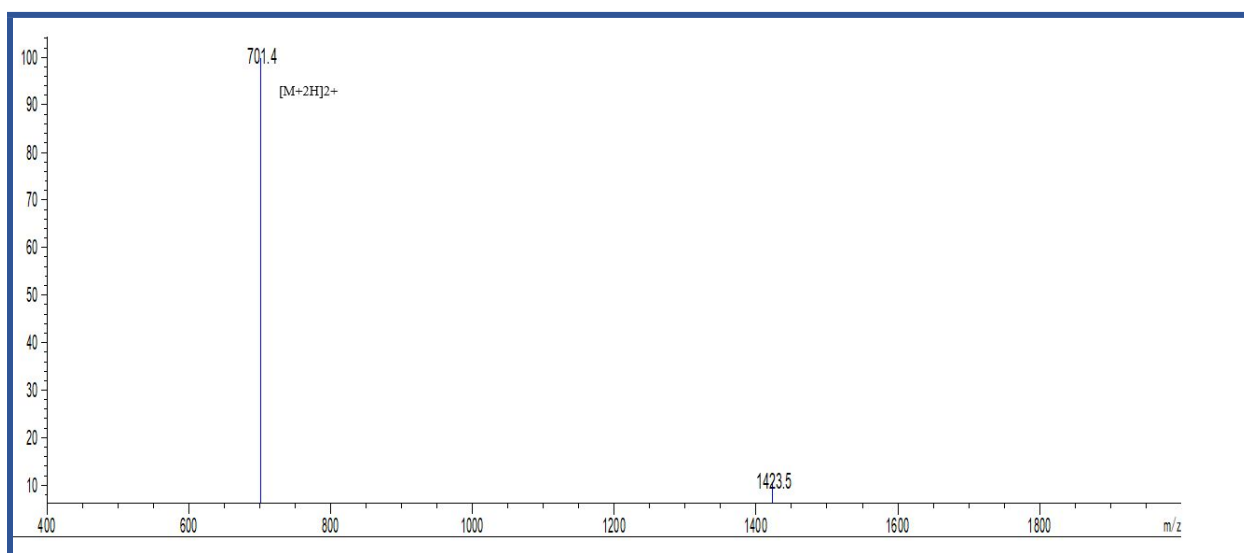**Figure S 4:** HPLC characterization performed on peptide **(4)**

LC-MS Analyses

The analyses were conducted using Agilent 6125B (ESI) LC/MS. The detection was monitored out by an MS equipped with a V electrospray ionization (ESI) source, with the application of the following parameters: Nebulizer Gas Flow: 1.5L/min ; CDL: -20.0 v CDL Probe Bias: +4.5kv Detector: 1.5 kv and Flow rate: 0.2 ml/min. The separation of samples was achieved by isocratic elution on a reverse-phase Gemini-NX 5μ C- 18 110A, 4.6*250 mm column, using a mobile phase consisting of 50 % H_2O / 50 % acetonitrile. Agilent Open LAB CDS software was used to control the MS data acquisition and analysis.
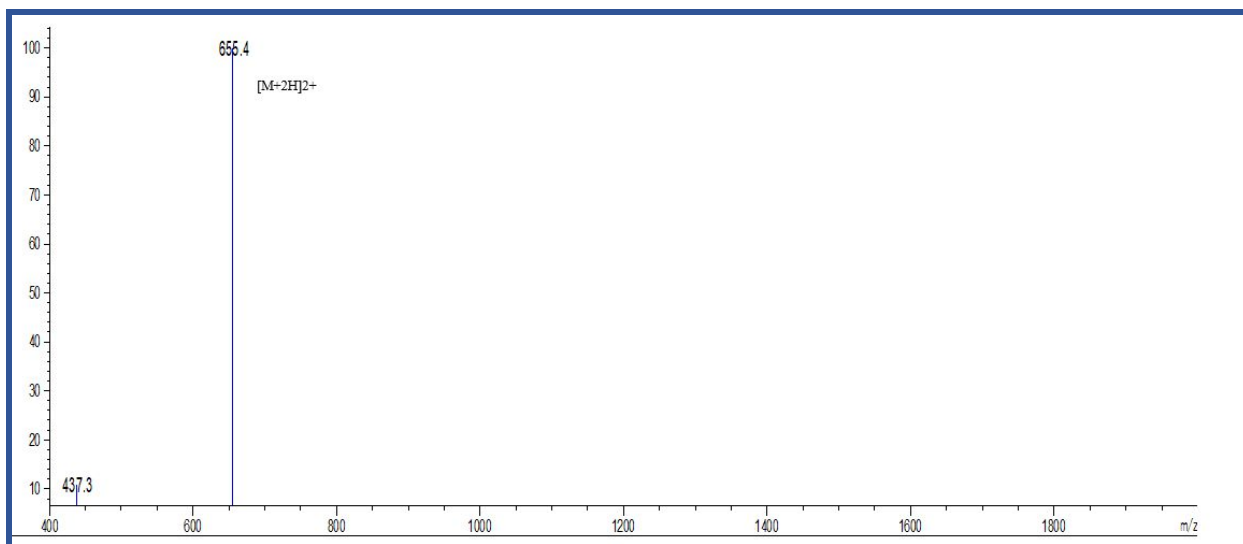

Figure S 5: LC-MS characterization performed on linear peptide **(1).** Sequence of peptide: H-CZYFPLQSYGFQPTNGVGY-NH$_2$. Calculated MW : $[M+2H]^{2+}$ = 1077.7 ; Obtained : $[M+2H]^{2+}$ = 1077.8 $gmol^{-1}$.

Figure S 6: LC-MS characterization performed on linear peptide **(2)**. Sequence of peptide: H-CZFQPTNGVGY-NH$_2$. Calculated MW : [M+H]$^+$ = 1198.3 ; Obtained : [M+H]$^+$ = 1198.3 gmol^{-1}
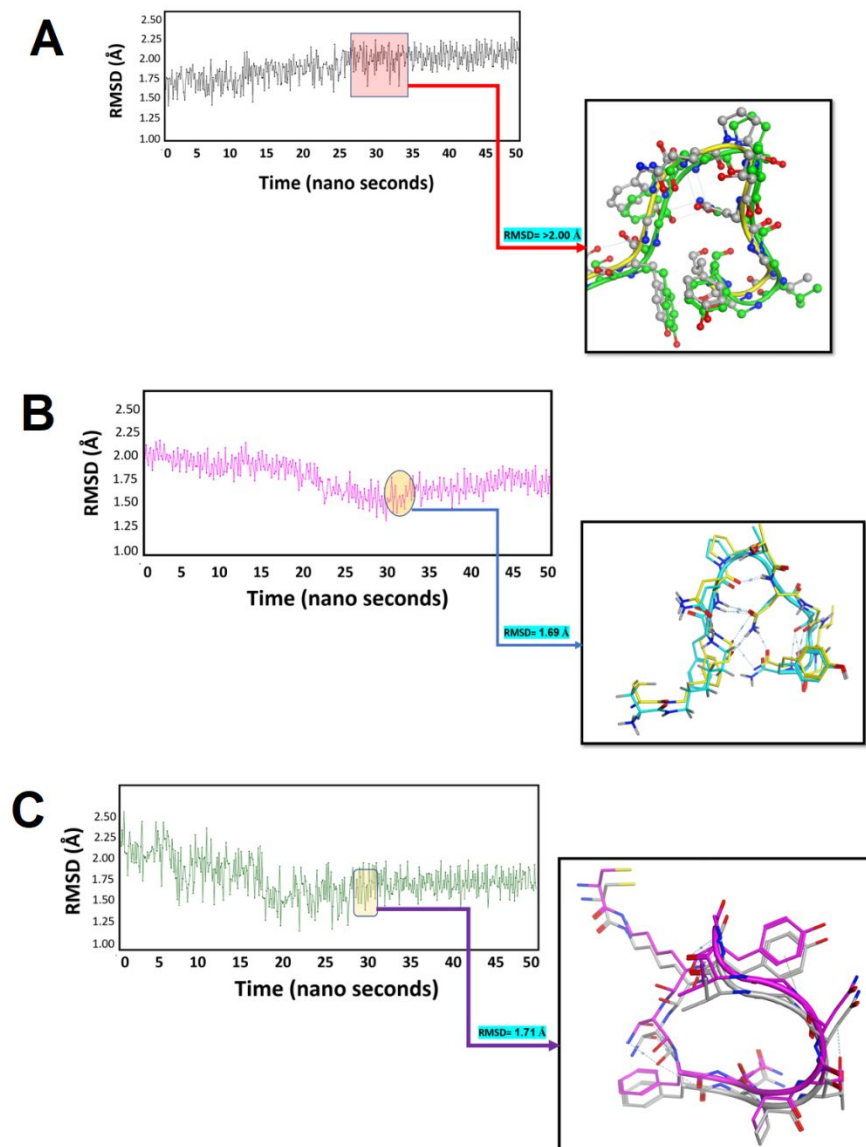

Figure S 7: LC-MS characterization performed on macrocyclic peptide **(3)**. Sequence of peptide: H-CZ-[CFQPTNGVGYC]-NH$_2$. Calculated MW : [M+2H]$^{2+}$ = 701.8 ; Obtained : [M+2H]$^{2+}$ = 701.4 gmol^{-1}

Figure S 8: LC-MS characterization performed on macrocyclic peptide **(4)**. Sequence of ppetide: [FQPTNGVGYK(C)N]-NH$_2$. Calculated MW : [M+2H]$^{2+}$ = 655.2 ; Obtained : [M+2H]$^{2+}$ = 655.4 gmol^{-1}.

Molecular Dynamics

Figure S9: A) MD of peptide **(1)** showing the reference peptide (green) and the minimized form after MD (yellow) B) MD of peptide **(2)** showing the reference peptide (yellow) and the minimized form after MD (cyan)C) MD of peptide **(4)** showing the reference peptide (magenta) and the minimized form after MD (grey), over 50 ns and showing the RMSD at equilibrium region.
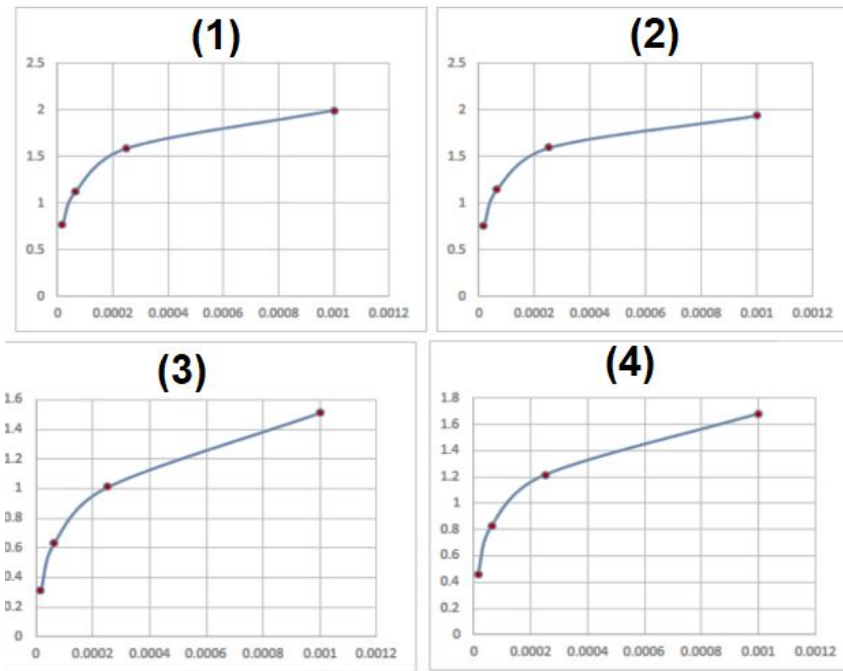
Figure S 4: ELISA data conducted on the sera of rabbits immunized with epitopes **(1)**, **(2)**, **(3) and (4)**