

Supplementary to “Immunogenicity and Antigenicity based T-cell and B-cell Epitopes Identification from Conserved Regions of 10664 SARS-CoV-2 Genomes”

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Particulars	Link
Details of 44583 proteins	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/ProteinSequences.fasta
Details related to 408 CnRs, 85 MHC-I and MHC-II restricted T-cell epitopes and 23 B-cell epitopes	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/Epitope-Details.xlsx
List of proposed epitopes from literature	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/AllPaperSummary.xlsx

Table S1: Link of Supplementary excel files

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Type	Epitope & Allele	Web Link
MHC-I	STFISDEVAR & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/STFISDEVAR-HLA-A-68-01.zip
	DTFCAGSTF & HLA-A*26:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/DTFCAGSTF-HLA-A-26-01.zip
	YTPSKLIEY & HLA-A*26:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/YTPSKLIEY-HLA-A-26-01.zip
	FSAVGNICY & HLA-A*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/FSAVGNICY-HLA-A-01-01.zip
	TVYDDGARR & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/TVYDDGARR-HLA-A-68-01.zip
	ILMTARTVY & HLA-B*15:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/ILMTARTVY-HLA-B-15-01.zip
	TTAAKLMVV & HLA-A*68:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/TTAAKLMVV-HLA-A-68-02.zip
	NIPLTTAAK & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/NIPLTTAAK-HLA-A-68-01.zip
	VENPDILRVY & HLA-B*44:03	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/VENPDILRVY-HLA-B-44-03.zip
	RVYANLGER & HLA-A*31:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/RVYANLGER-HLA-A-31-01.zip
	DTDFVNEFY & HLA-A*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/DTDFVNEFY-HLA-A-01-01.zip
	YVFTGYRVTK & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/YVFTGYRVTK-HLA-A-68-01.zip
	KVNSTLEQY & HLA-A*30:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/KVNSTLEQY-HLA-A-30-02.zip
	IPARARVECF & HLA-B*07:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/IPARARVECF-HLA-B-07-02.zip
	KSAQCFKMF & HLA-B*57:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/KSAQCFKMF-HLA-B-57-01.zip
	KSAQCFKMFY & HLA-B*57:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/KSAQCFKMFY-HLA-B-57-01.zip
	DAPAHISTI & HLA-B*51:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/DAPAHISTI-HLA-B-51-01.zip
	NTVIWYDKR & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/NTVIWYDKR-HLA-A-68-01.zip
	KYTLQCQYL & HLA-A*24:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/KYTLQCQYL-HLA-A-24-02.zip
	EILPVSMTK & HLA-A*68:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/EILPVSMTK-HLA-A-68-01.zip
	ALNTLVKQL & HLA-A*02:03	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/ALNTLVKQL-HLA-A-02-03.zip
	NAQALNTLV & HLA-B*51:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/NAQALNTLV-HLA-B-51-01.zip
	FTSDYQYLY & HLA-A*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/FTSDYQYLY-HLA-A-01-01.zip
	YYQLYSTQL & HLA-A*24:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/YYQLYSTQL-HLA-A-24-02.zip
	KLLEQWNLV & HLA-A*02:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/KLLEQWNLV-HLA-A-02-01.zip
	VIGFLFLTW & HLA-B*57:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/VIGFLFLTW-HLA-A-01-01.zip
	SSDNIALLV & HLA-A*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/SSDNIALLV-HLA-A-01-01.zip
	SSDNIALL & HLA-A*68:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/SSDNIALL-HLA-A-68-02.zip
	GYRRATRR & HLA-A*31:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/GYRRATRR-HLA-A-31-01.zip
	IGYRRATR & HLA-A*31:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-I/IGYRRATR-HLA-A-31-01.zip

Table S2: Docked PDB structures of MHC-I restricted T-cell epitopes

Type	Epitope & Allele	Web Link
MHC-II	FCAGSTFISDEVAR & HLA-DRB3*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/FCAGSTFISDEVAR-HLA-DRB3-01-01.zip
	DTFCAGSTFISDEA & HLA-DQA1*03:01/DQB1*03:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/DTFCAGSTFISDEA-HLA-DQA1-03-01/DQB1-03-02.zip
	VGNYCYTPSKLIEY & HLA-DRB1*07:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/VGNYCYTPSKLIEY-HLA-DRB1-07-01.zip
	ASAVLLILMTARTV & HLA-DRB1*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/ASAVLLILMTARTV-HLA-DRB1-01-01.zip
	LNIPLTTAAKLMVV & HLA-DRB1*08:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/LNIPLTTAAKLMVV-HLA-DRB1-08-02.zip
	ILRVYANLGERVQA & HLA-DRB3*02:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/ILRVYANLGERVQA-HLA-DRB3-02-02.zip
	RNRDVTDFVNEFY & HLA-DQA1*01:01/DQB1*05:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/RNRDVTDFVNEFY-HLA-DQA1-01-01/DQB1-05-01.zip
	YRNRDVTDFVNEFY & HLA-DQA1*01:01/DQB1*05:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/YRNRDVTDFVNEFY-HLA-DQA1-01-01/DQB1-05-01.zip
	NYVFTGYRVTKNSKV & HLA-DRB1*07:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/NYVFTGYRVTKNSKV-HLA-DRB1-07-01.zip
	ECFDKFKVNSTLEQY & HLA-DRB3*02:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/ECFDKFKVNSTLEQY-HLA-DRB3-02-02.zip
	KCSRIIPARARVECF & HLA-DPA1*02:01/DPB1*14:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/KCSRIIPARARVECF-HLA-DPA1-02-01/DPB1-14-01.zip
	AHKDKSAQCFKMFYK & HLA-DPA1*02:01/DPB1*05:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/AHKDKSAQCFKMFYK-HLA-DPA1-02-01/DPB1-05-01.zip
	IWDYKRDPAHISTI & HLA-DRB3*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/IWDYKRDPAHISTI-HLA-DRB3-01-01.zip
	WDYKRDPAHISTIG & HLA-DRB3*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/WDYKRDPAHISTIG-HLA-DRB3-01-01.zip
	PKGIMMNVAKYQQLC & HLA-DRB3*02:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/PKGIMMNVAKYQQLC-HLA-DRB3-02-02.zip
	PVSMTKTSDVCTMYI & HLA-DRB3*01:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/PVSMTKTSDVCTMYI-HLA-DRB3-01-01.zip
	TEILPVSMTKTSDVDC & HLA-DRB1*08:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/TEILPVSMTKTSDVDC-HLA-DRB1-08-02.zip
	QDVVNQNAQALNTLV & HLA-DRB1*13:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/QDVVNQNAQALNTLV-HLA-DRB1-13-02.zip
	DVNVNNAQALNTLVK & HLA-DRB1*13:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/DVNVNNAQALNTLVK-HLA-DRB1-13-02.zip
	LHSYFTSDYQYLYSTQ & HLA-DPA1*01:03/DPB1*04:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/LHSYFTSDYQYLYSTQ-HLA-DPA1-01-03/DPB1-04-01.zip
	HSYFTSDYQYLYSTQ & HLA-DPA1*01:03/DPB1*04:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/HSYFTSDYQYLYSTQ-HLA-DPA1-01-03/DPB1-04-01.zip
	WNLVIGFLFLTWICL & HLA-DPA1*01:03/DPB1*02:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/WNLVIGFLFLTWICL-HLA-DPA1-01-03/DPB1-02-01.zip
	NYKLNTDHSSSDNI & HLA-DRB3*02:02	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/NYKLNTDHSSSDNI-HLA-DRB3-02-02.zip
	IGYRRATRRIRGGD & HLA-DRB1*11:01	http://www.nittrkol.ac.in/indrajit/projects/COVID-EpitopeVaccine-Global/downloads/supplementary/PDB/MHC-II/IGYRRATRRIRGGD-HLA-DRB1-11-01.zip

Table S3: Docked PDB structures of MHC-II restricted T-cell epitopes

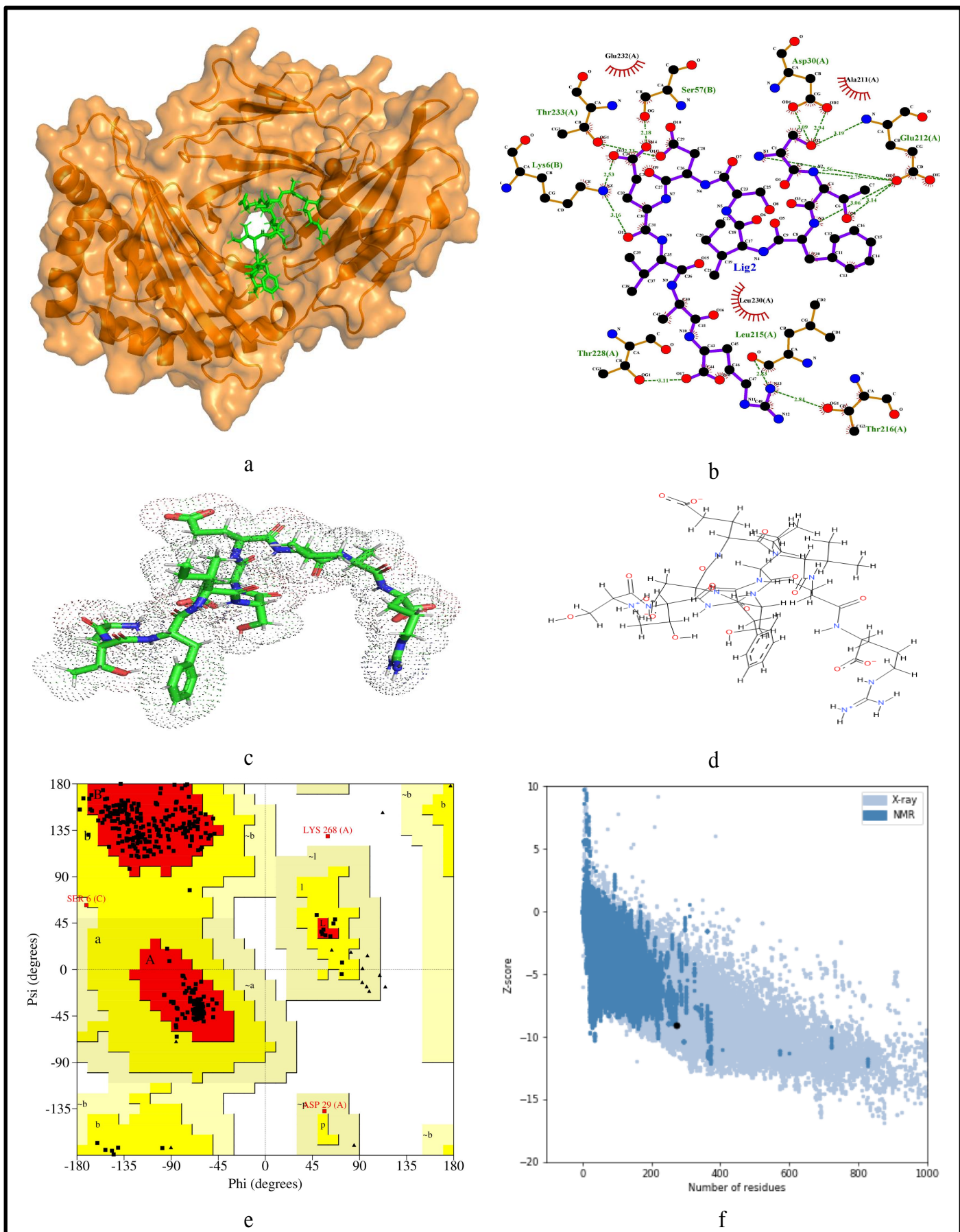


Figure S1: Structural analysis for MHC-I restricted T-cell epitope "STFISDEVAR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

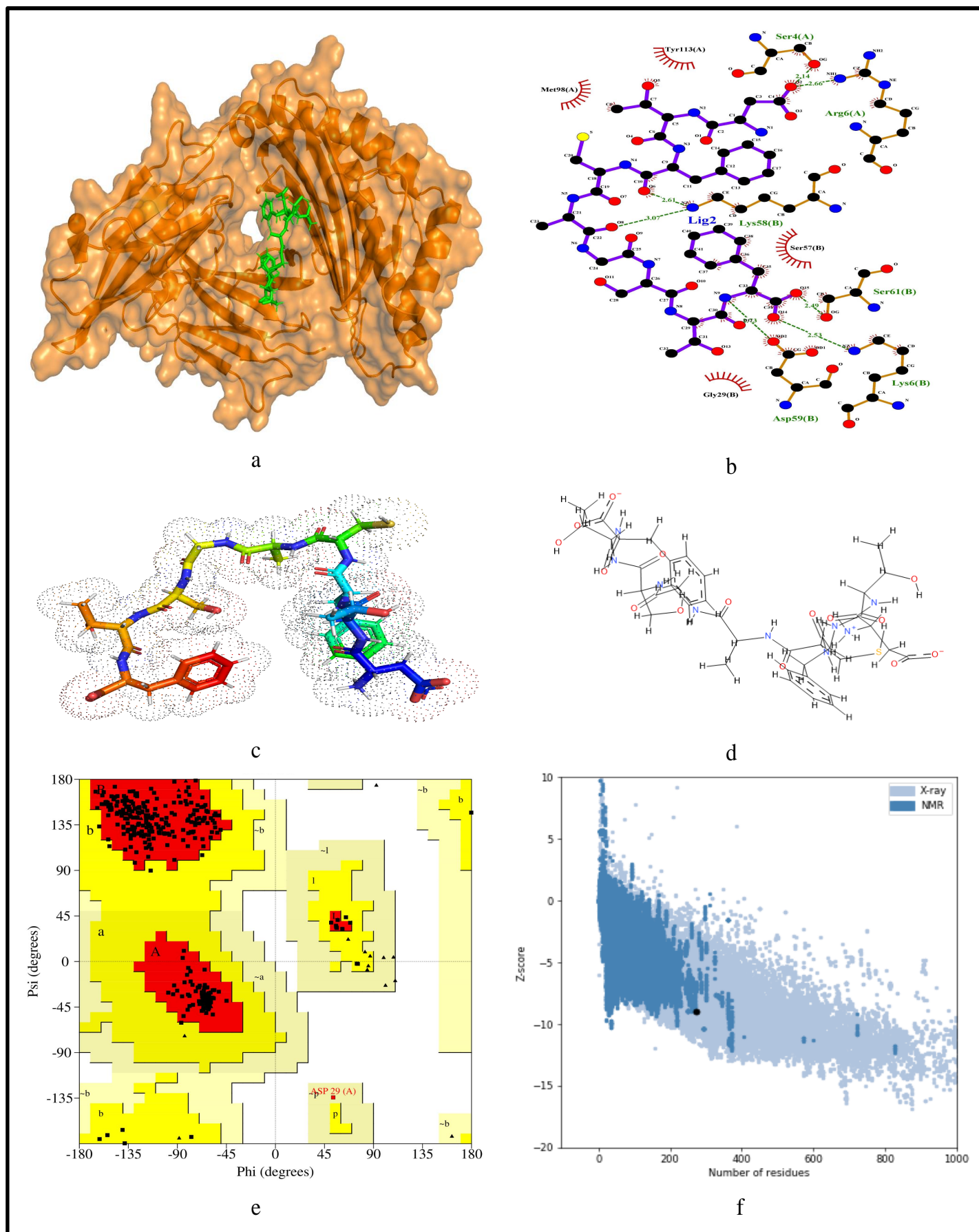


Figure S2: Structural analysis for MHC-I restricted T-cell epitope "DTFCAGSTF" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

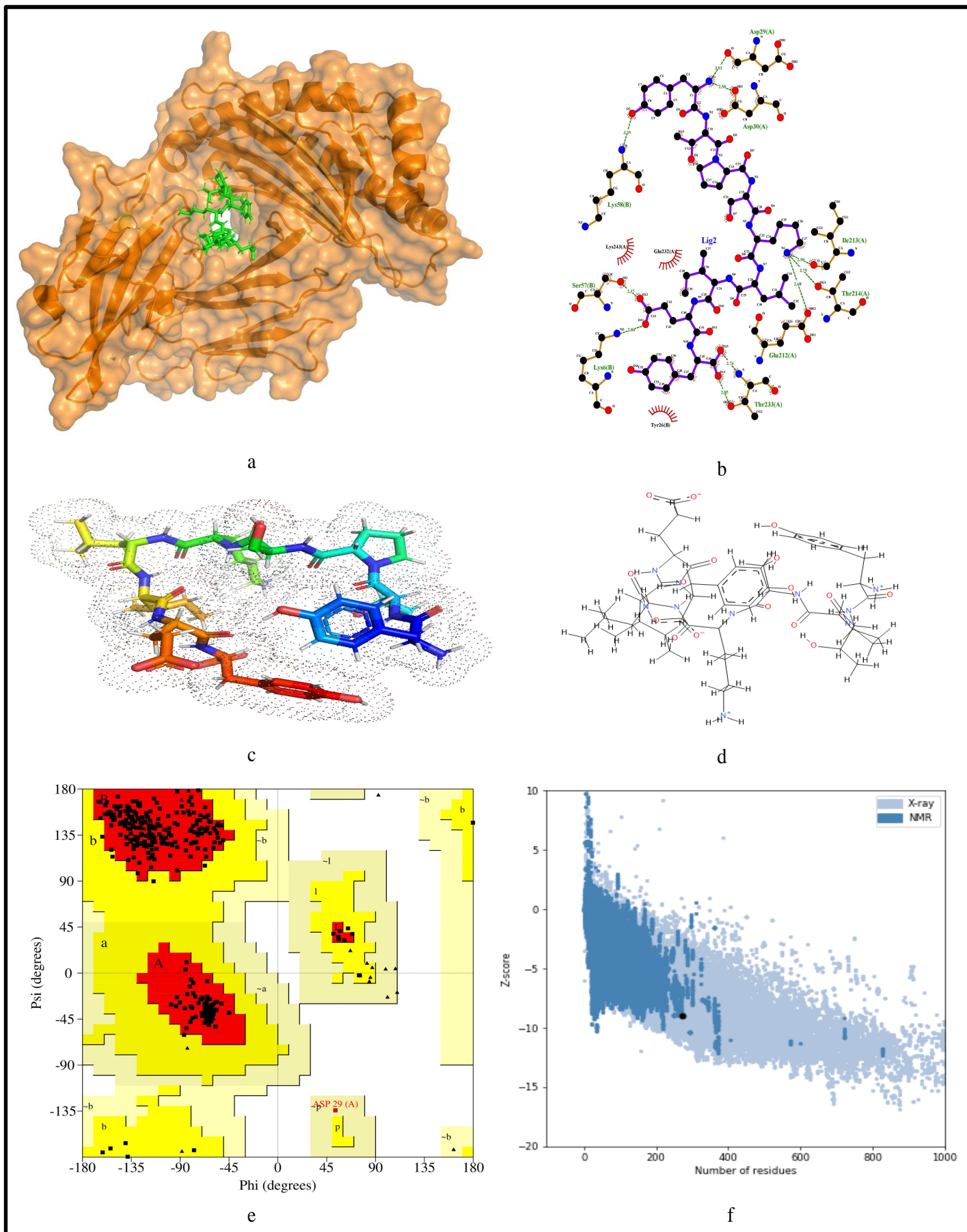


Figure S3: Structural analysis for MHC-I restricted T-cell epitope "YTPSKLIEY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

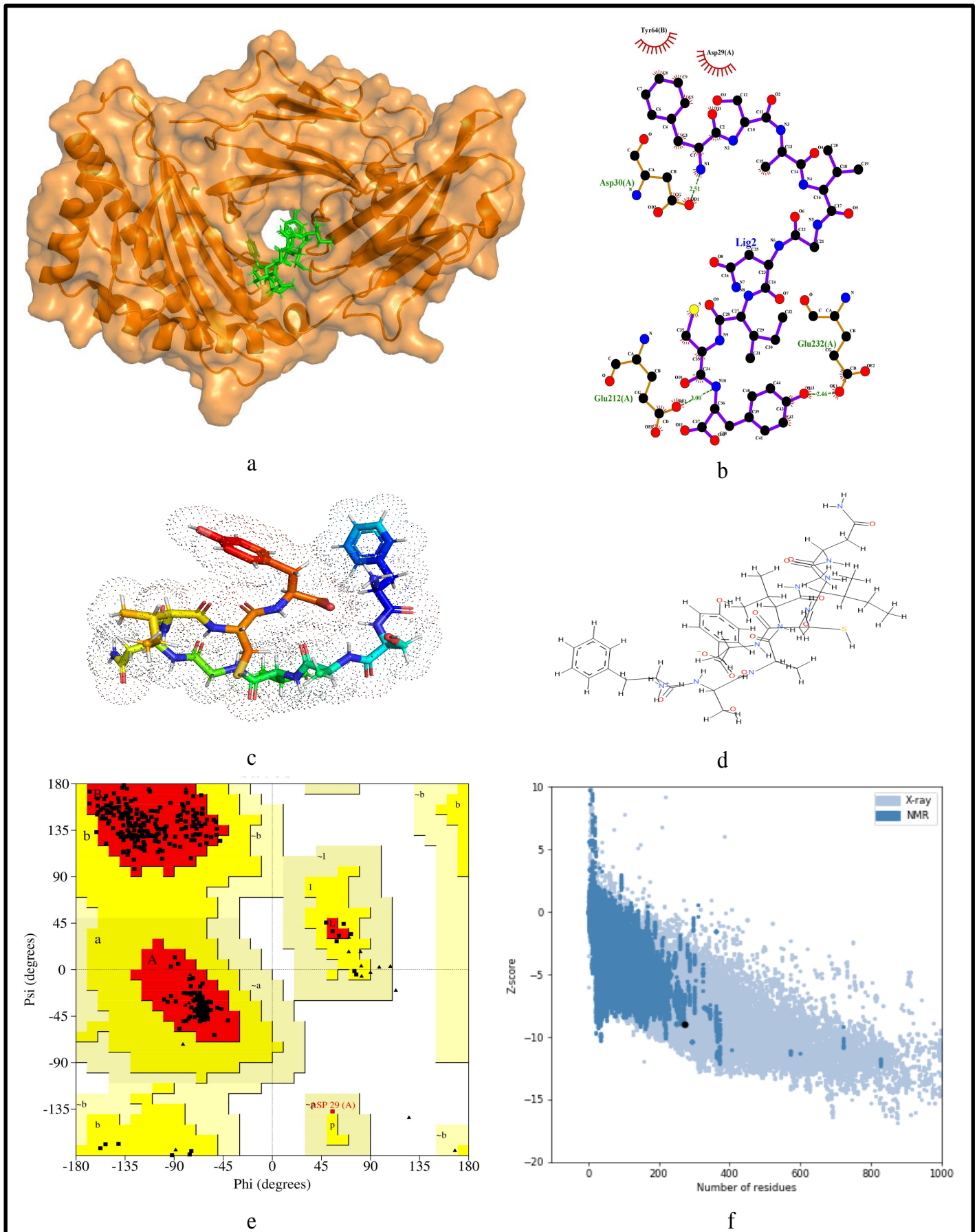


Figure S4: Structural analysis for MHC-I restricted T-cell epitope "FSAVGNICY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

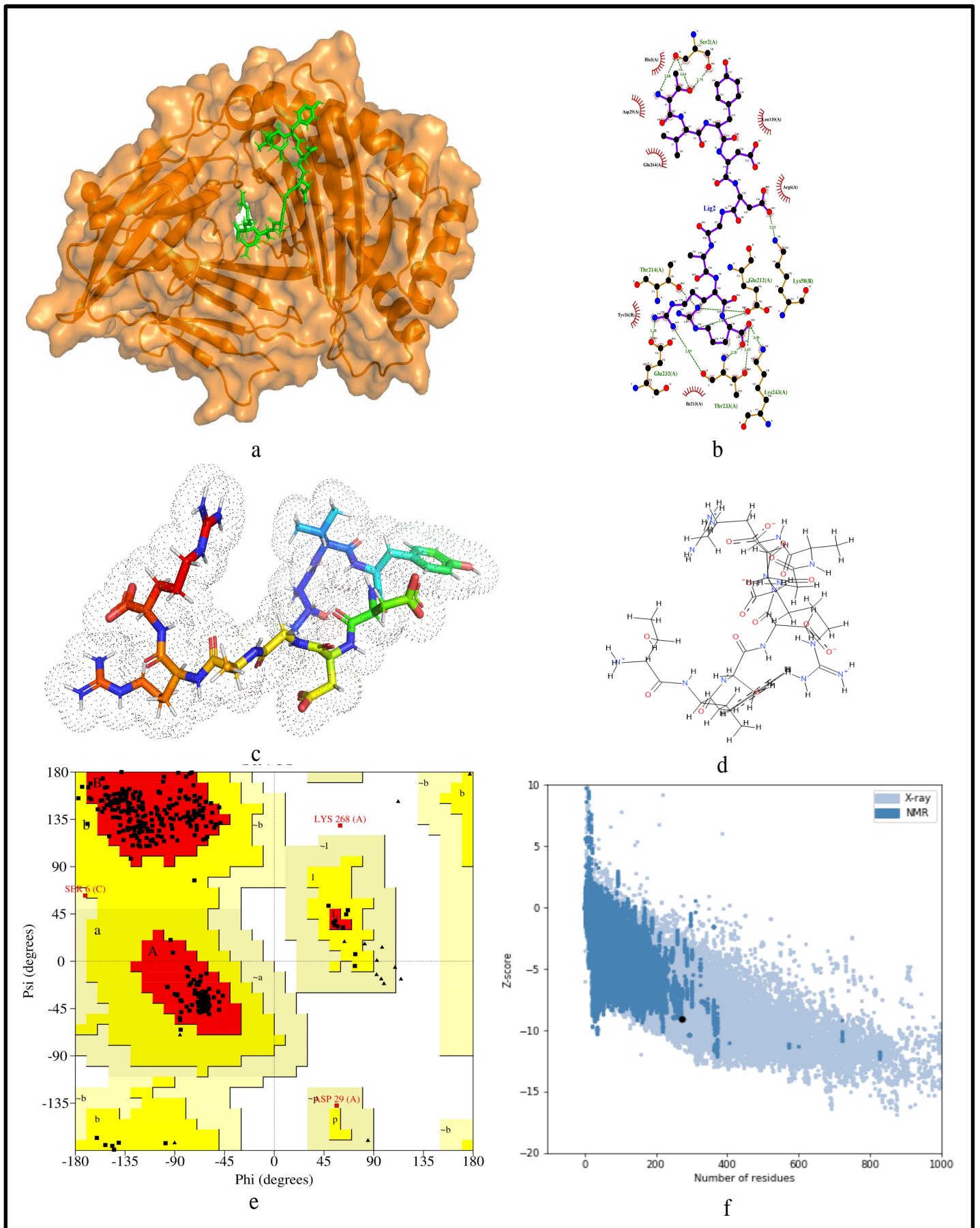


Figure S5: Structural analysis for MHC-I restricted T-cell epitope "TVYDDGARR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

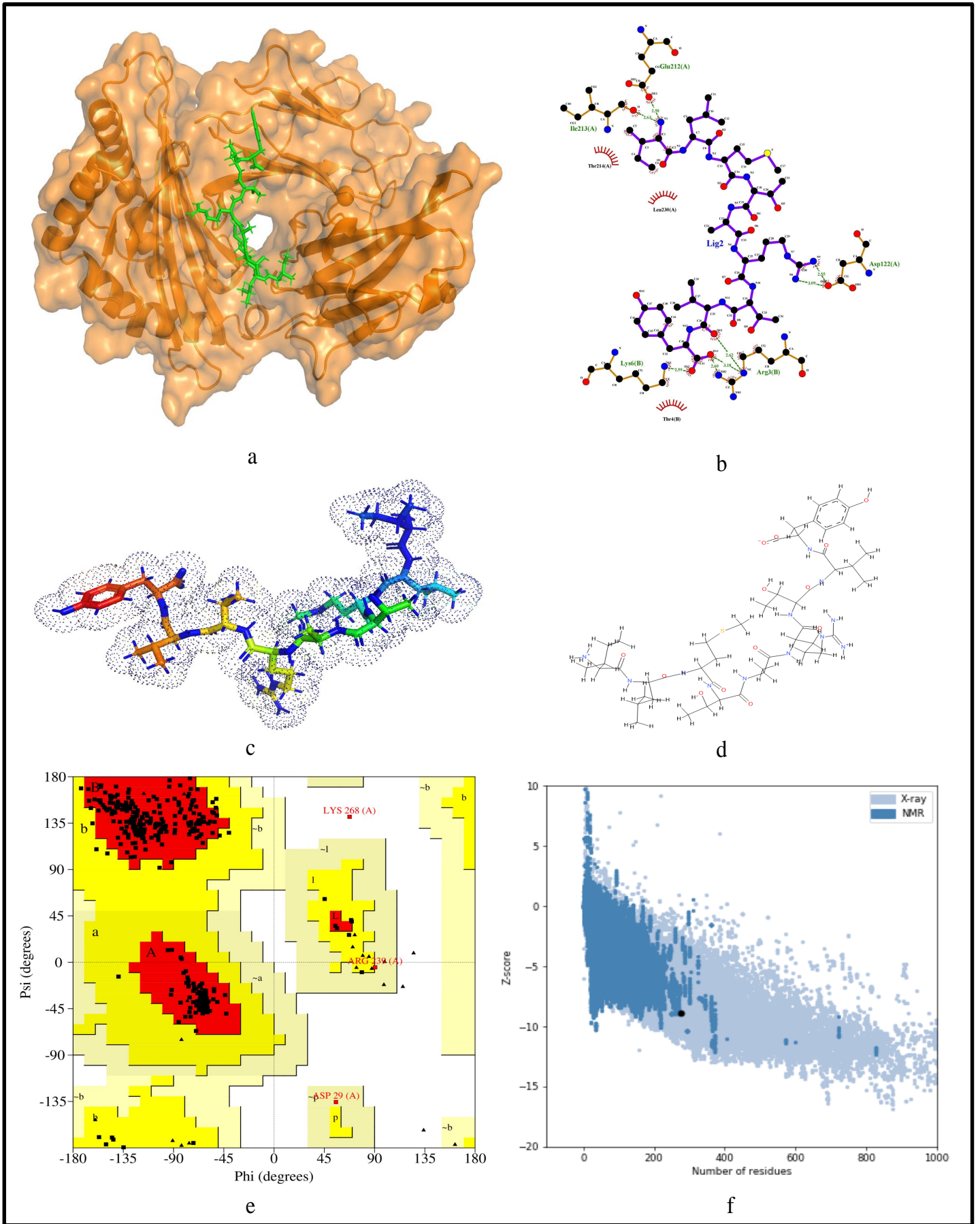


Figure S6: Structural analysis for MHC-I restricted T-cell epitope "ILMTARTVY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

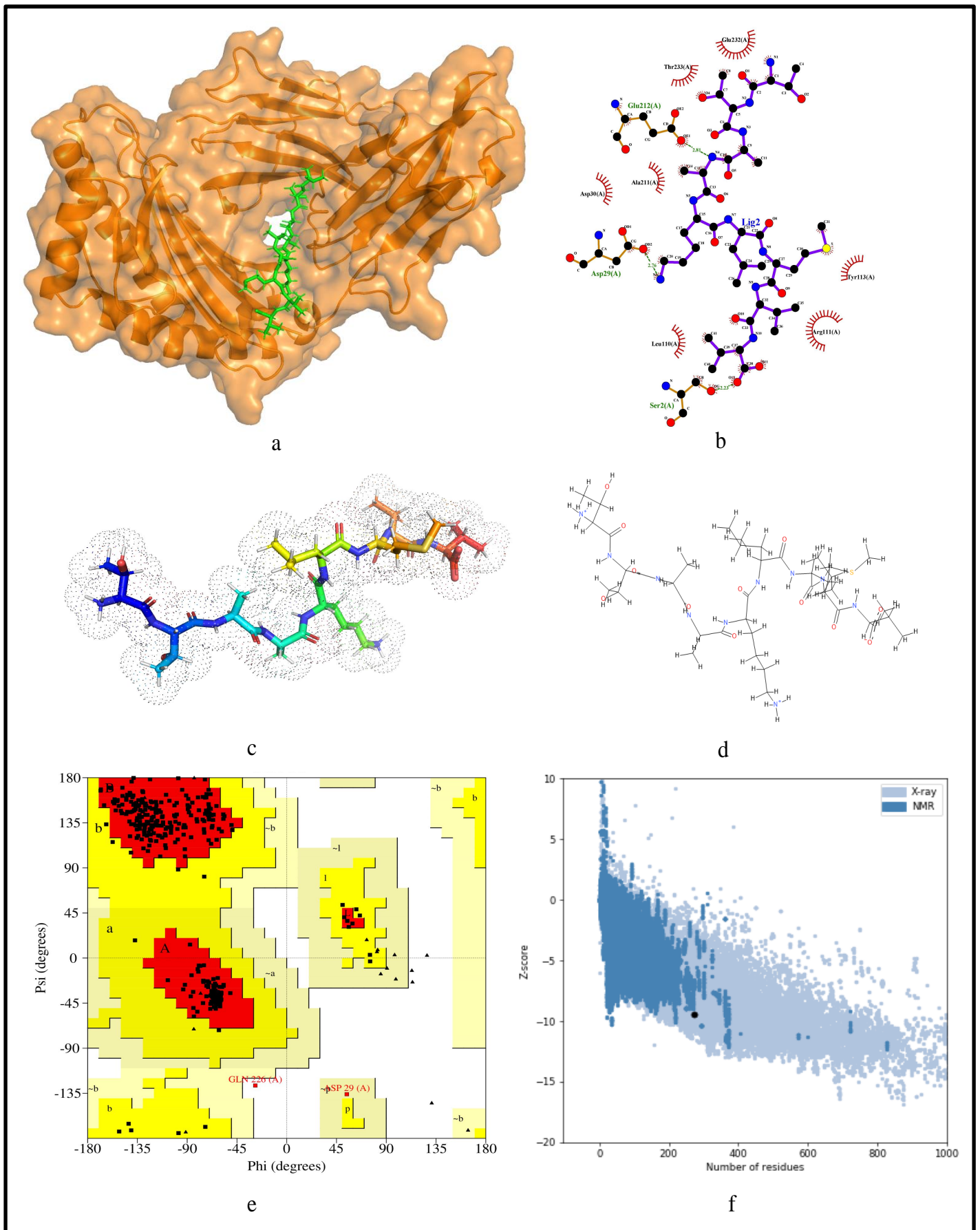


Figure S7: Structural analysis for MHC-I restricted T-cell epitope "TTAAKLMVV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

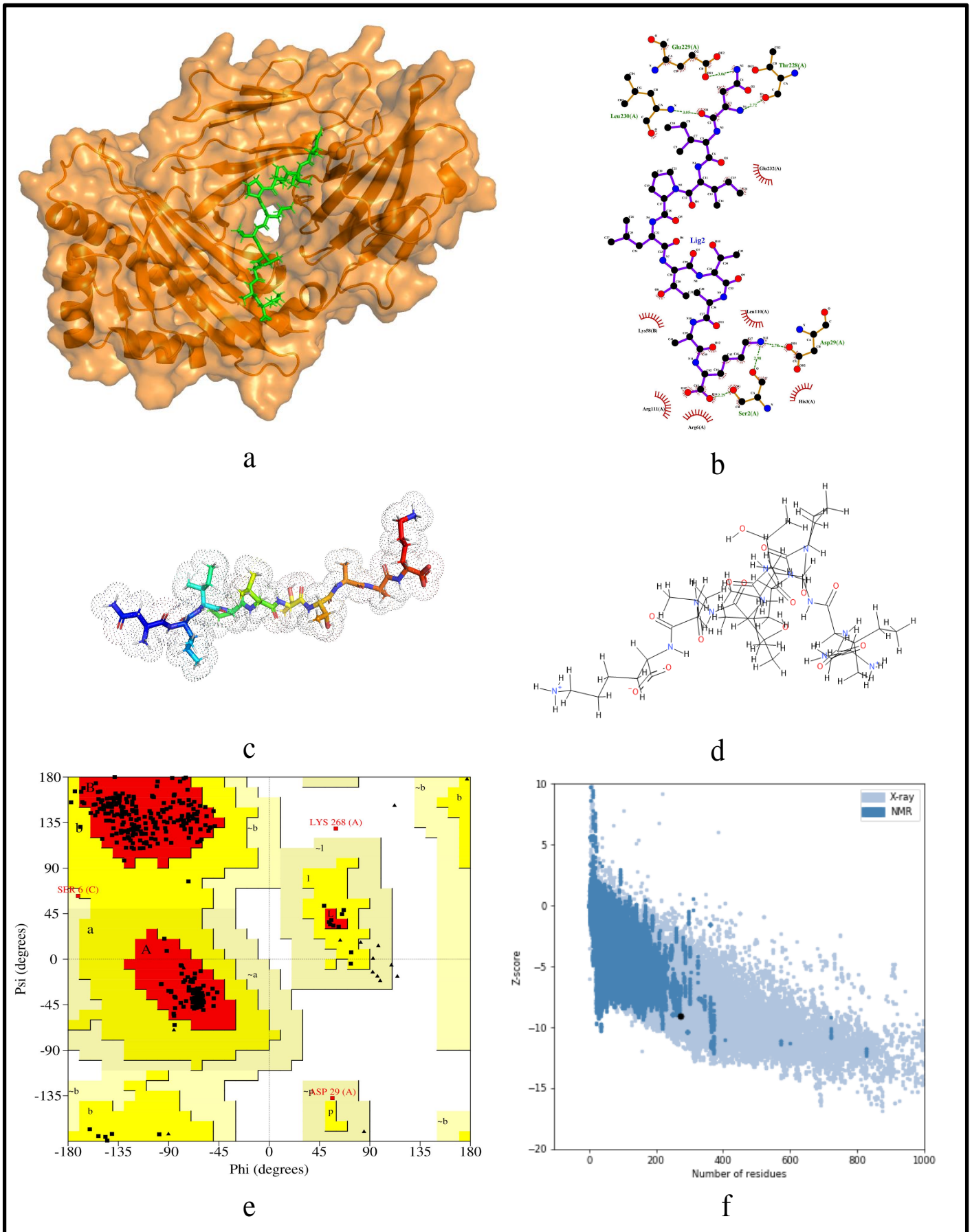


Figure S8: Structural analysis for MHC-I restricted T-cell epitope "NIIPLTAAK" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

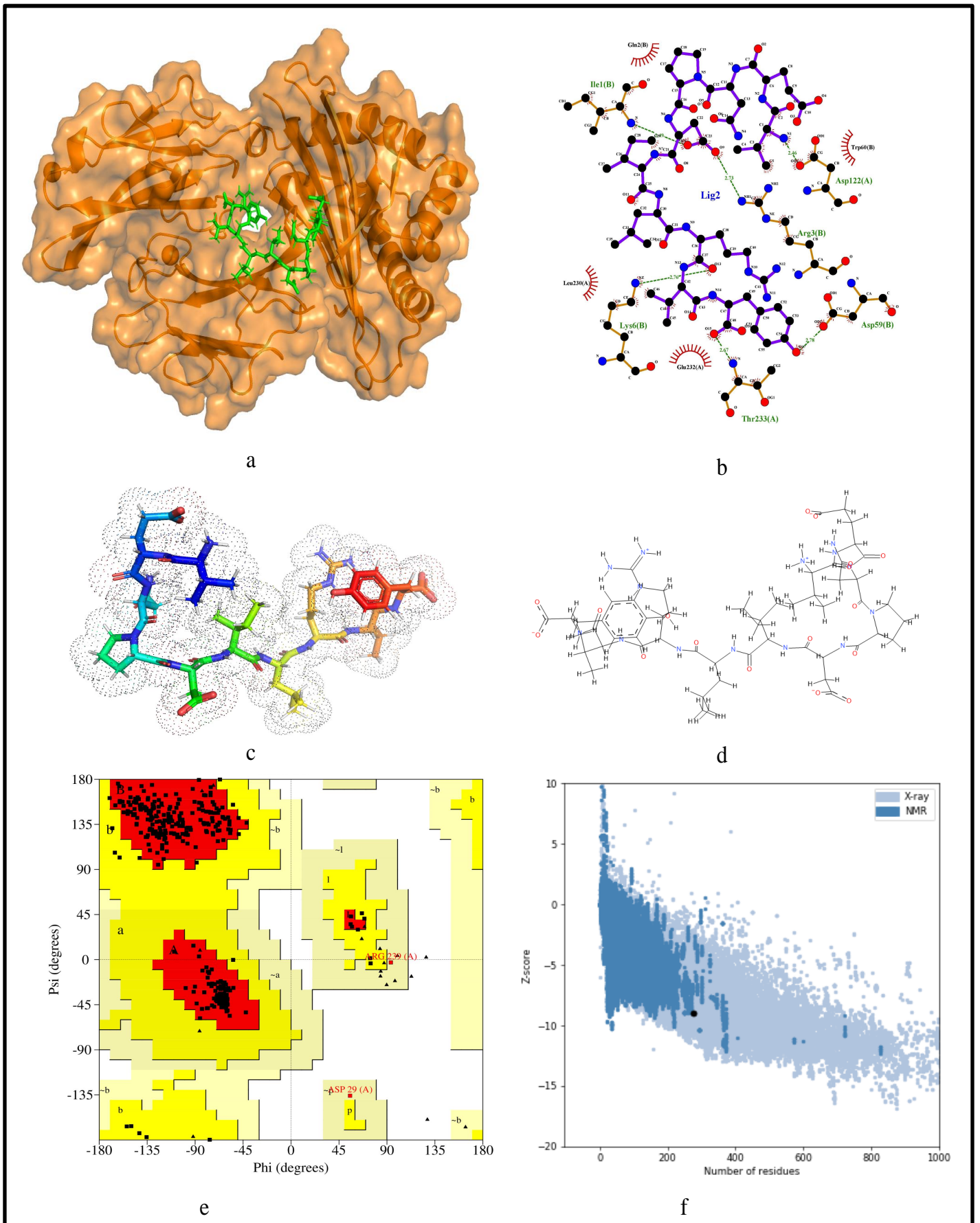


Figure S9: Structural analysis for MHC-I restricted T-cell epitope "VENPDILRVY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

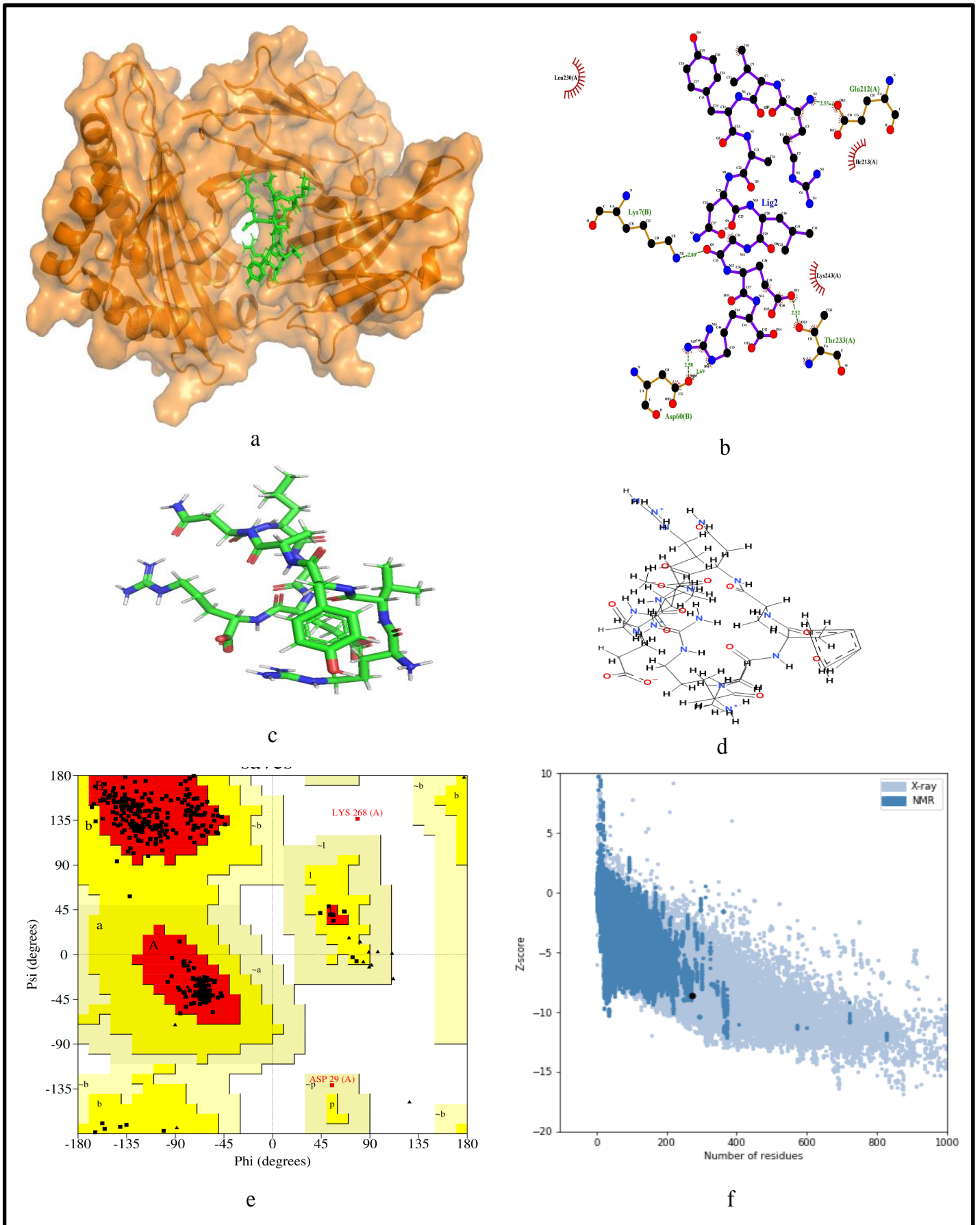


Figure S10: Structural analysis for MHC-I restricted T-cell epitope "RVYANLGER" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

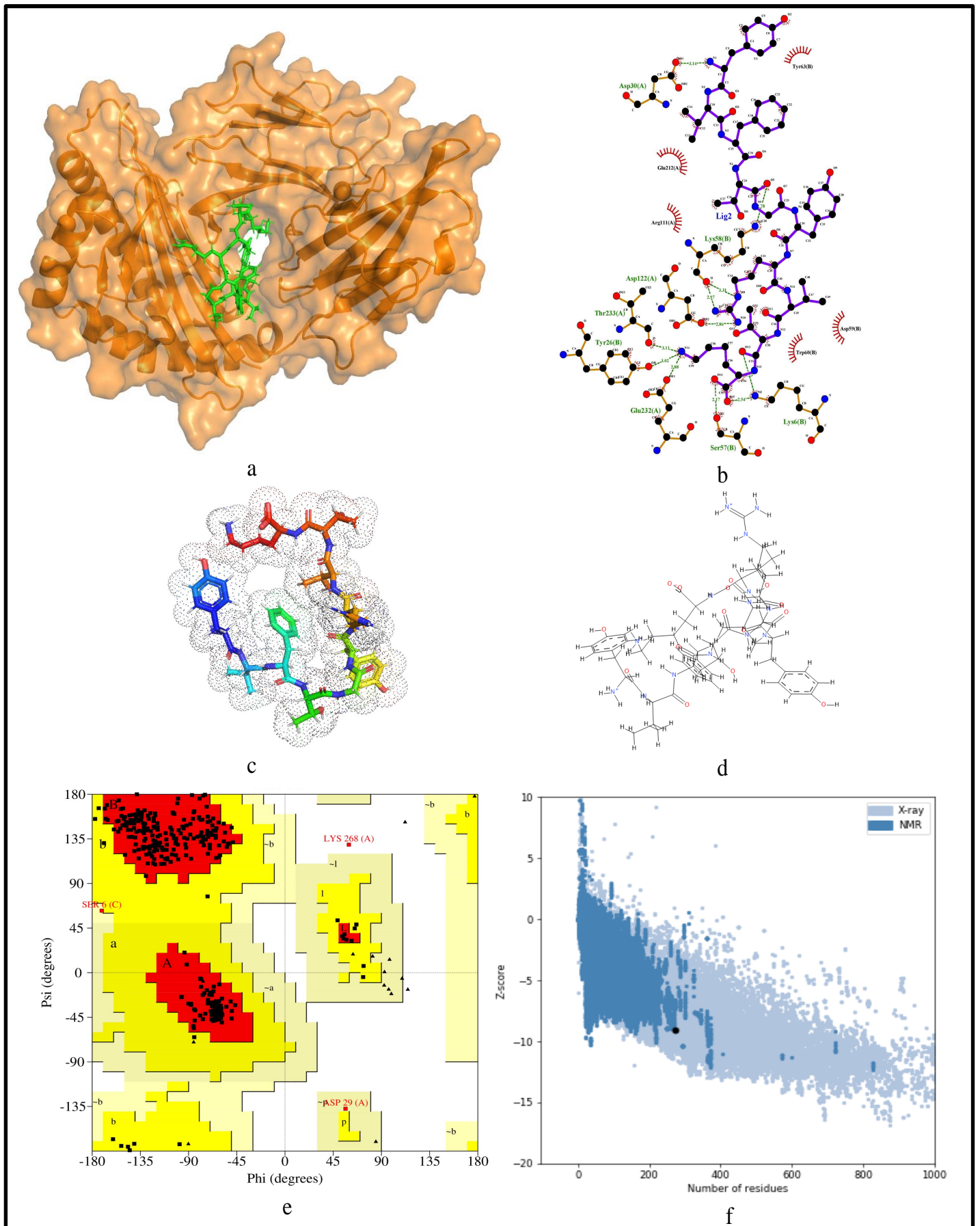


Figure S11: Structural analysis for MHC-I restricted T-cell epitope "YVFTGYRVTK" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

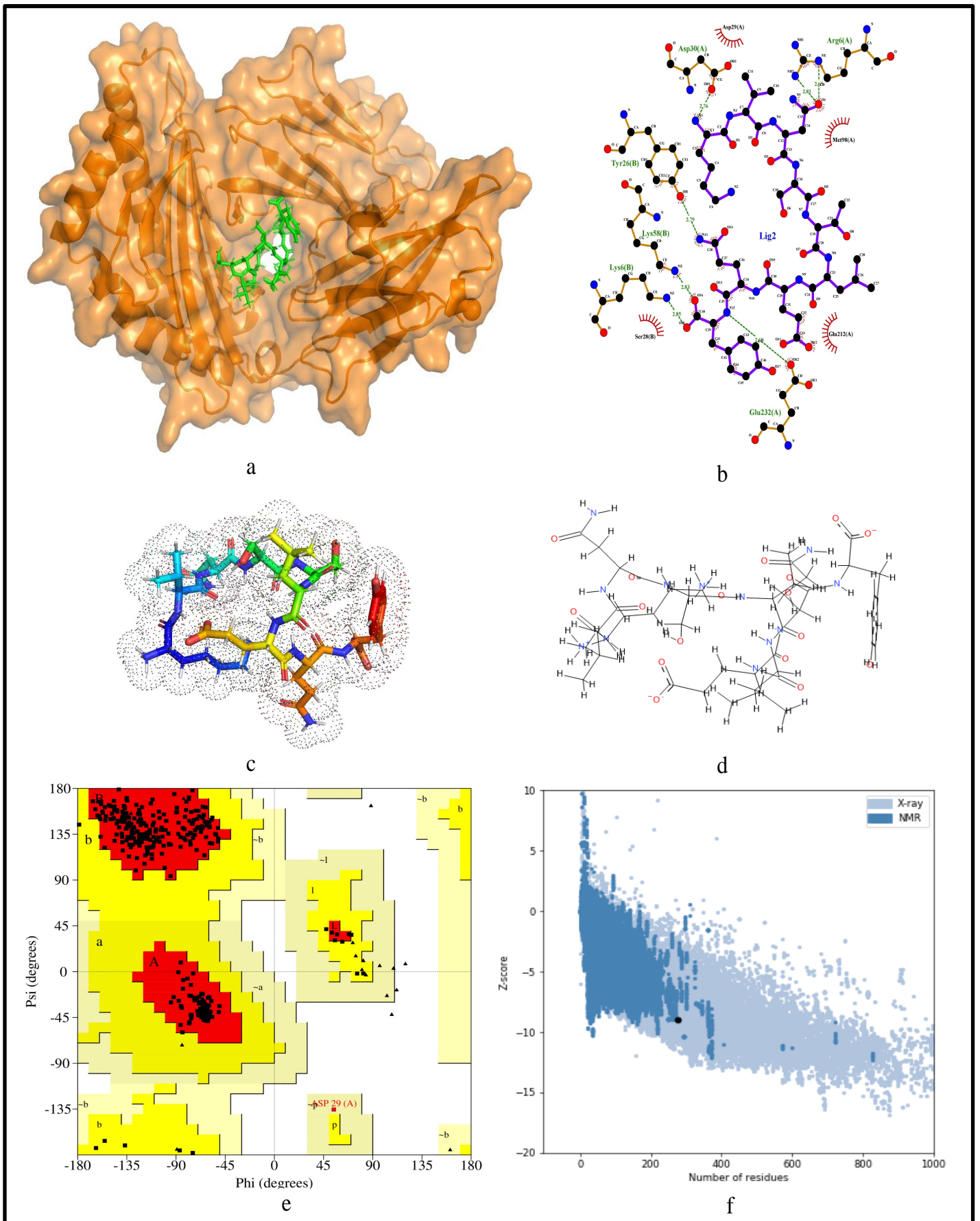


Figure S12: Structural analysis for MHC-I restricted T-cell epitope "KVNSTLEQY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

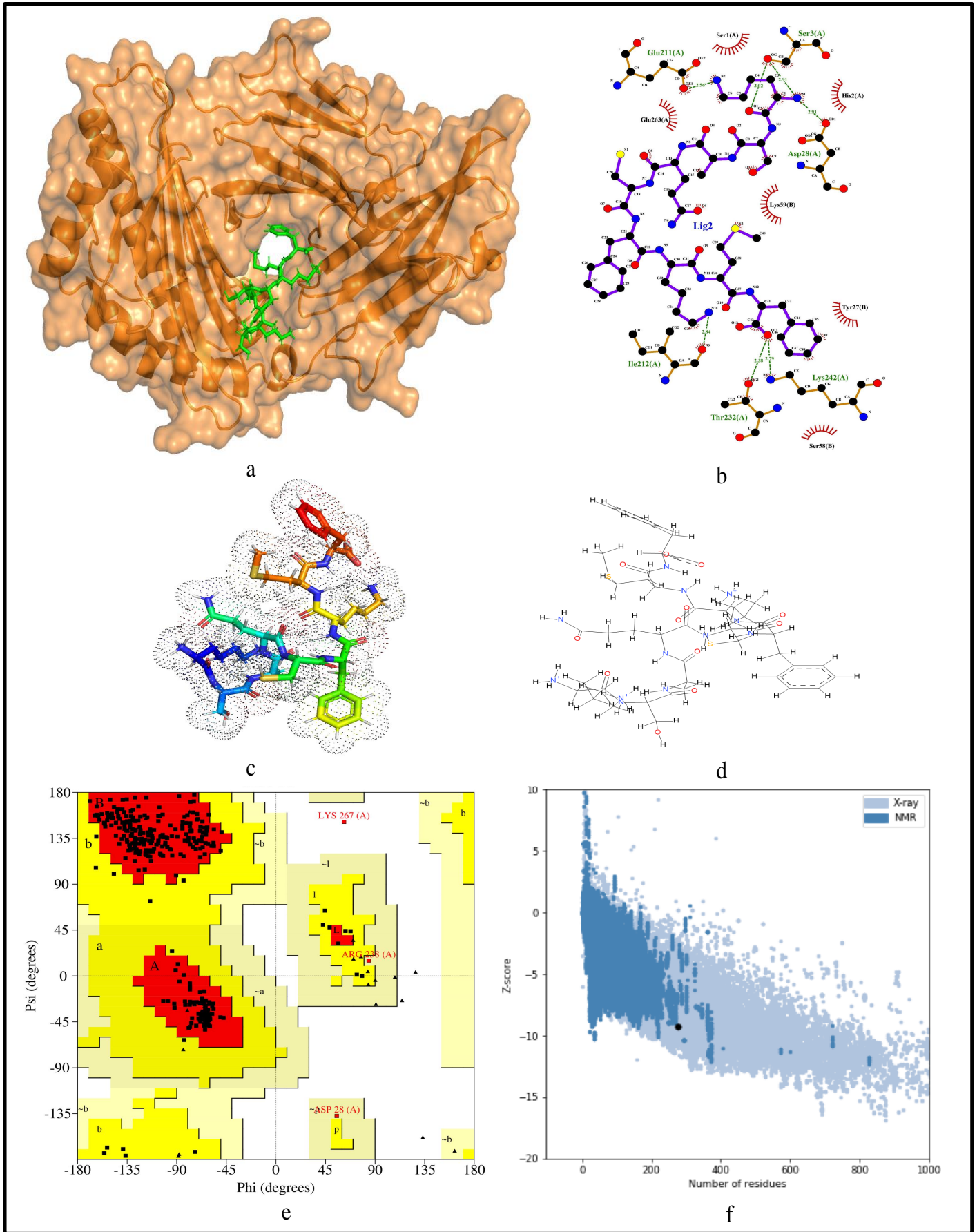


Figure S13: Structural analysis for MHC-I restricted T-cell epitope "KSAQCFKMF" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

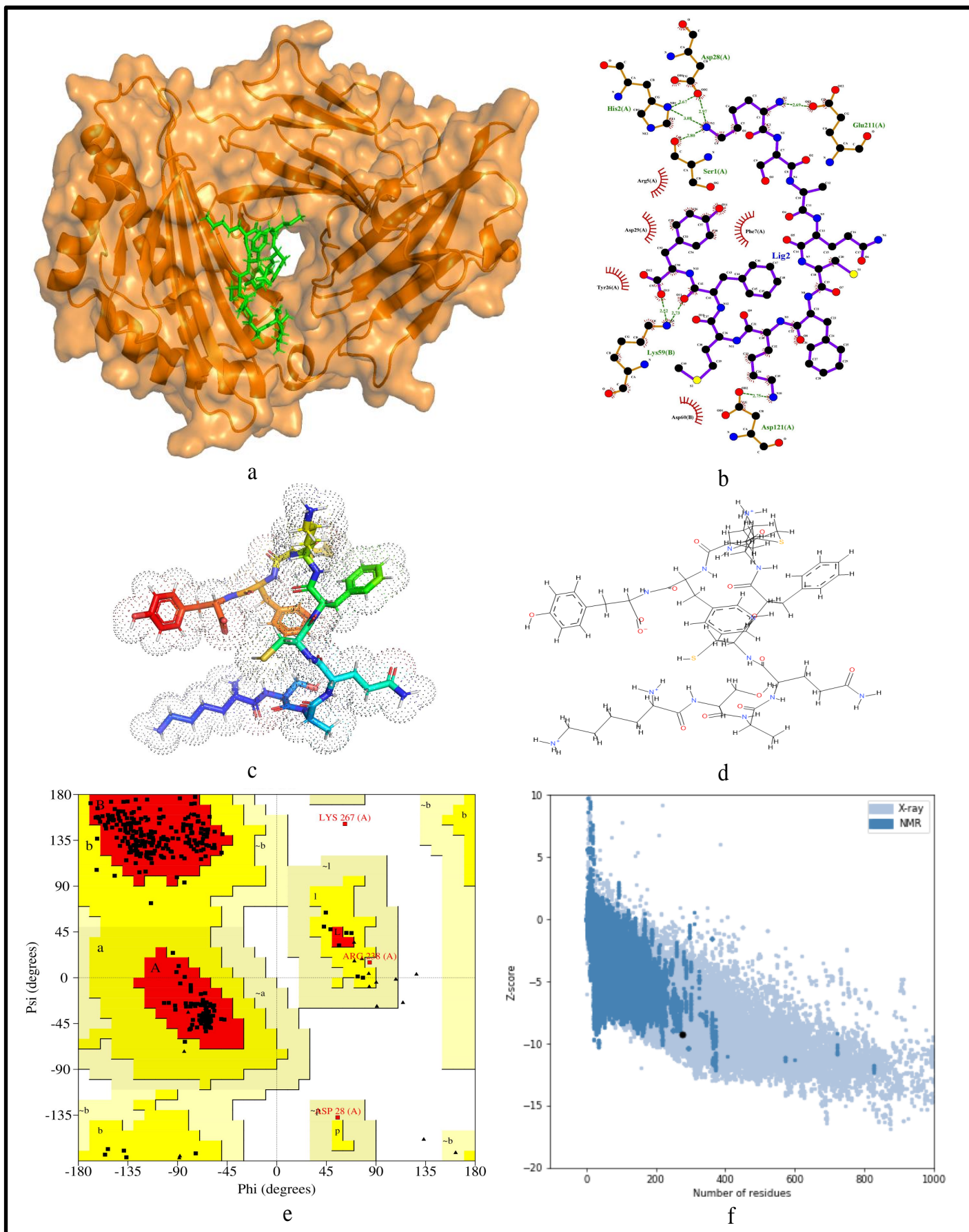


Figure S14: Structural analysis for MHC-I restricted T-cell epitope "KSAQCCKMFY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

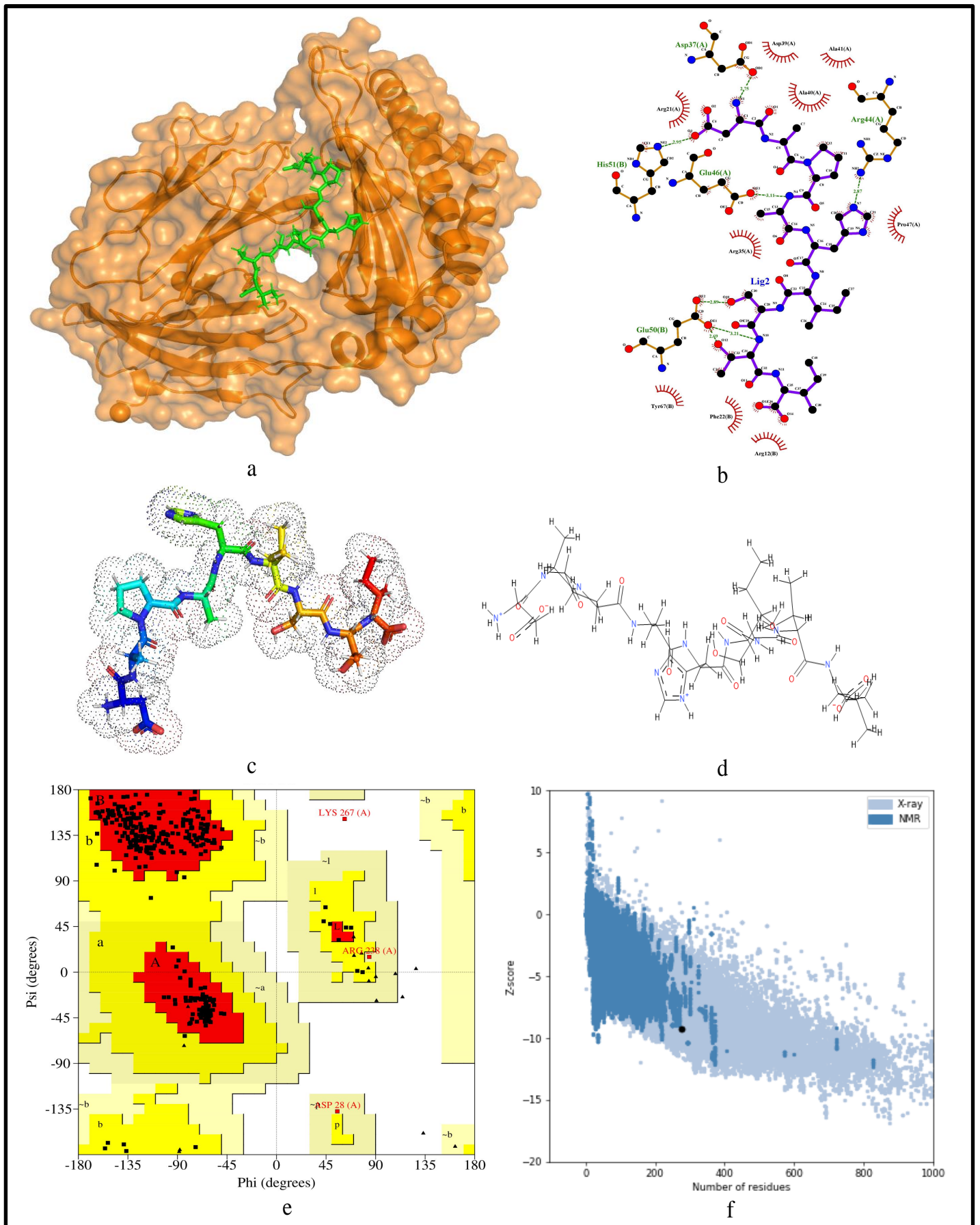


Figure S15: Structural analysis for MHC-I restricted T-cell epitope "DAPAHISTI" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

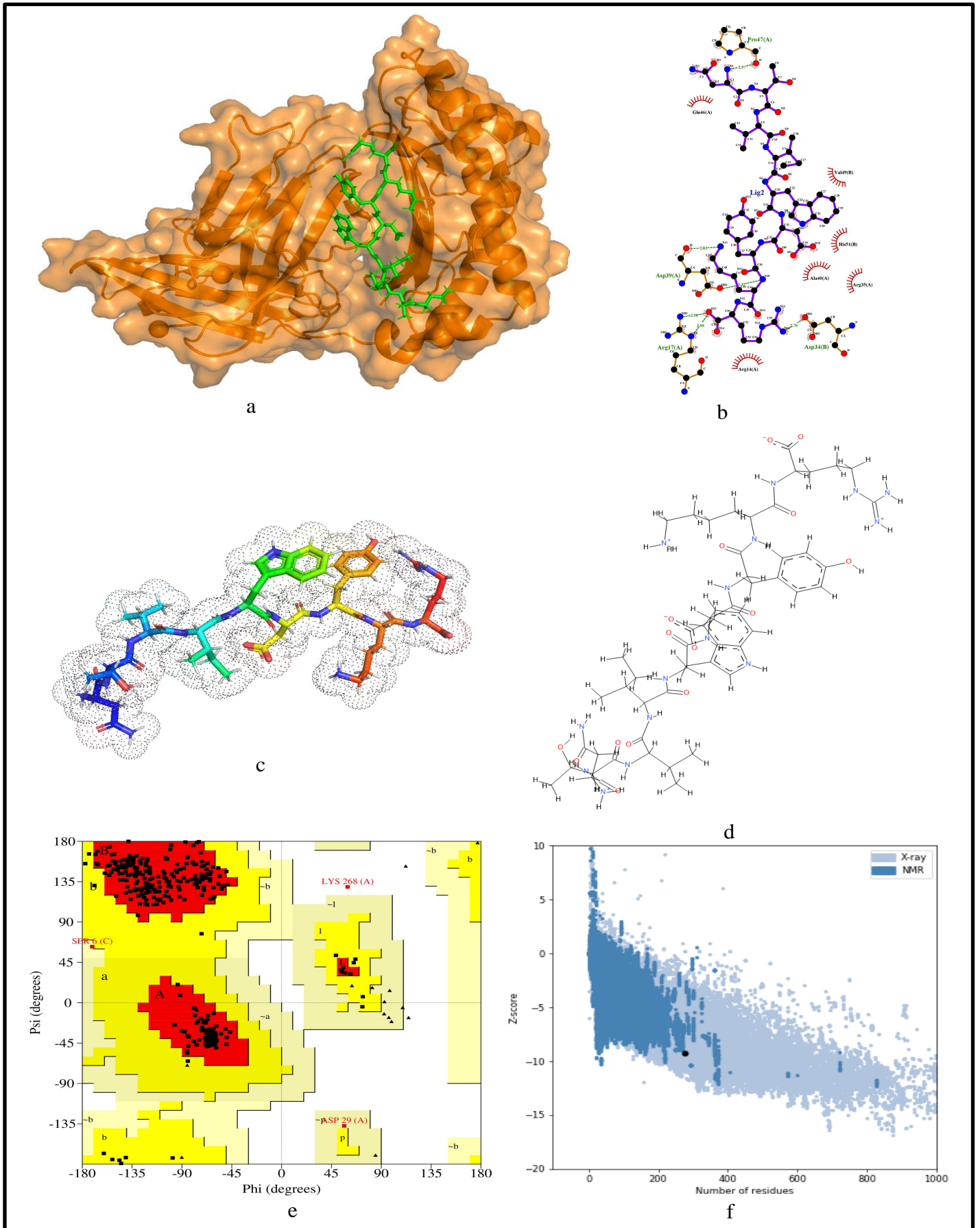


Figure S16: Structural analysis for MHC-I restricted T-cell epitope "NTVIWDYKR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

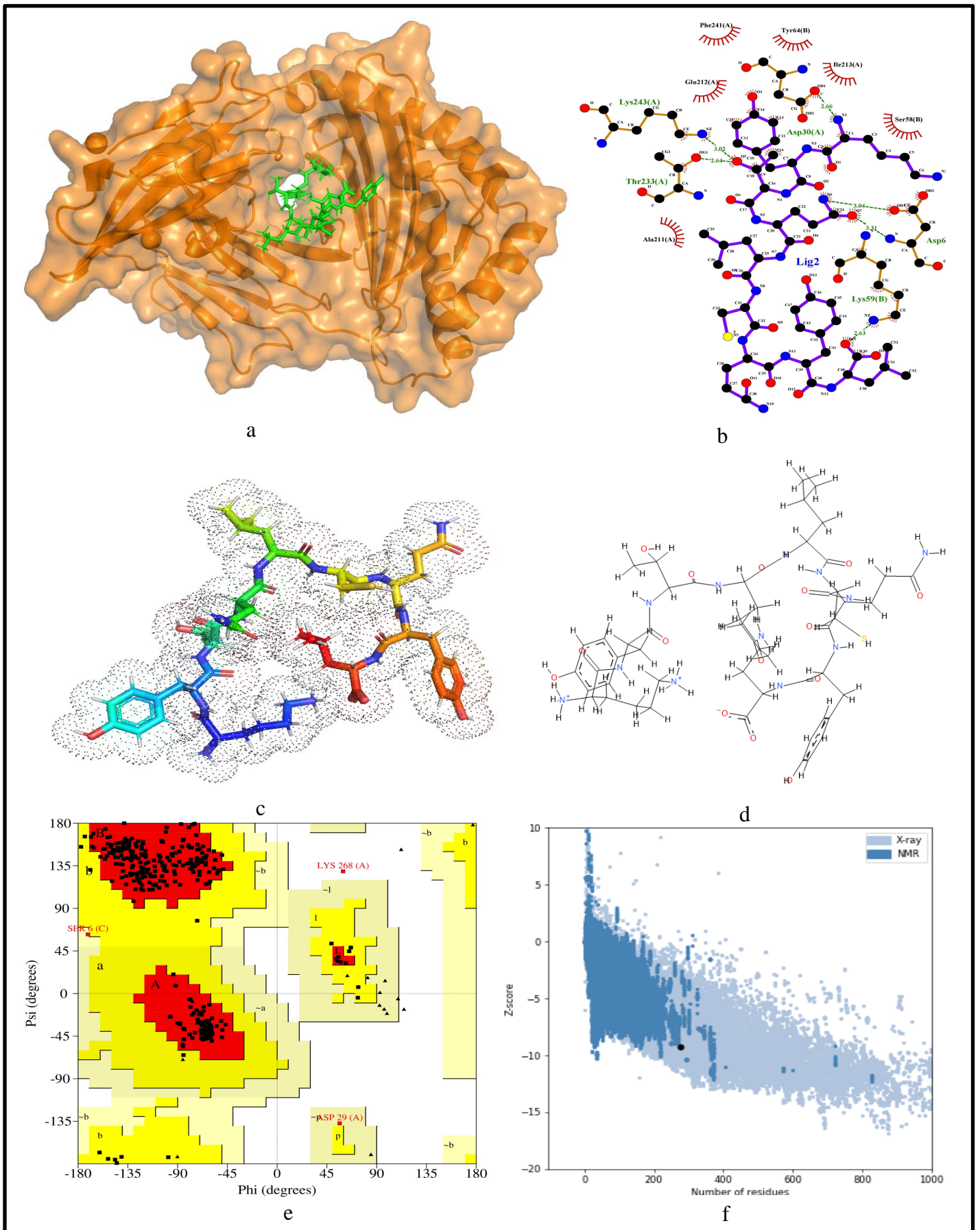


Figure S17: Structural analysis for MHC-I restricted T-cell epitope "KYTQLCQYL" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

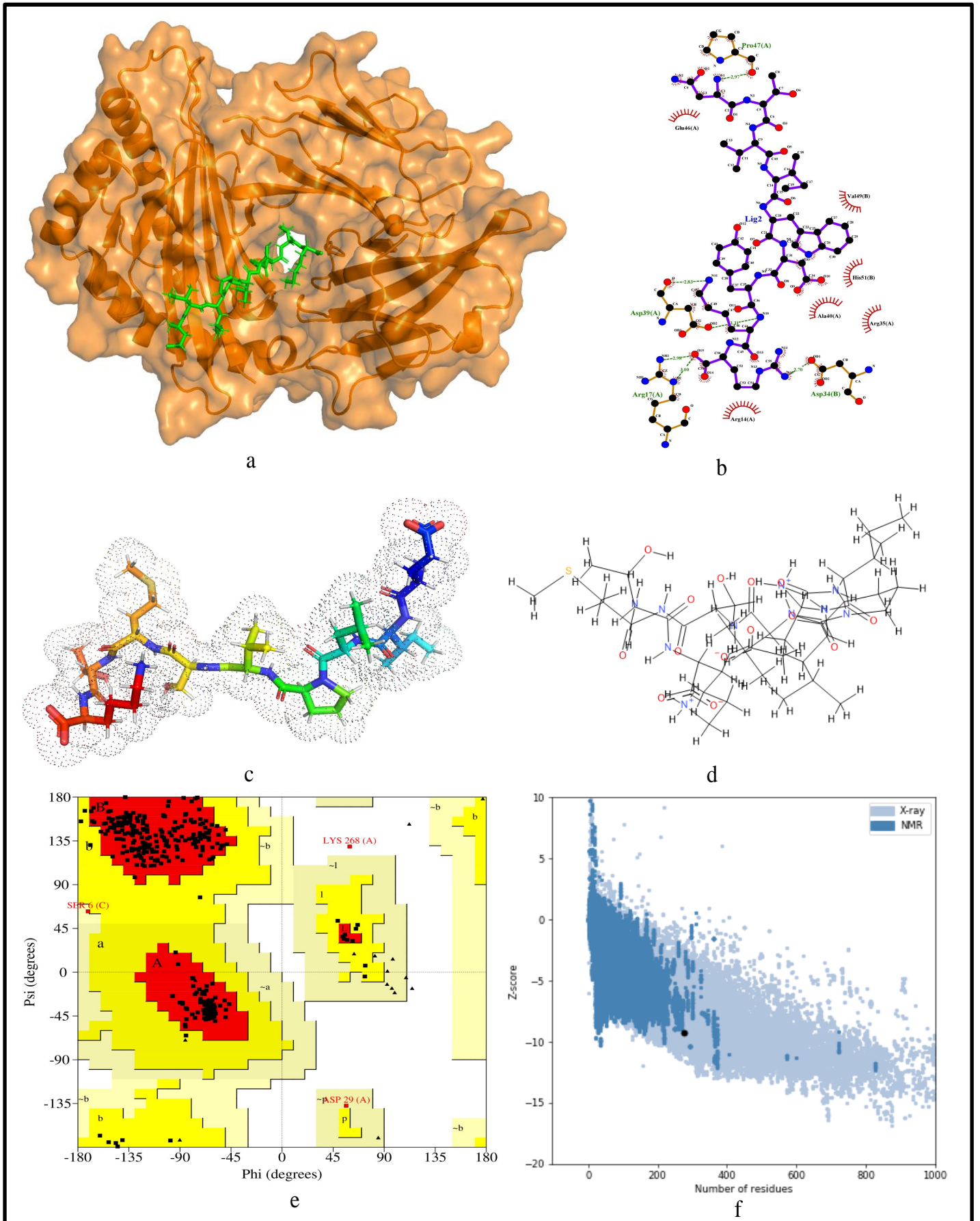


Figure S18: Structural analysis for MHC-I restricted T-cell epitope "EILPVSMTK" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

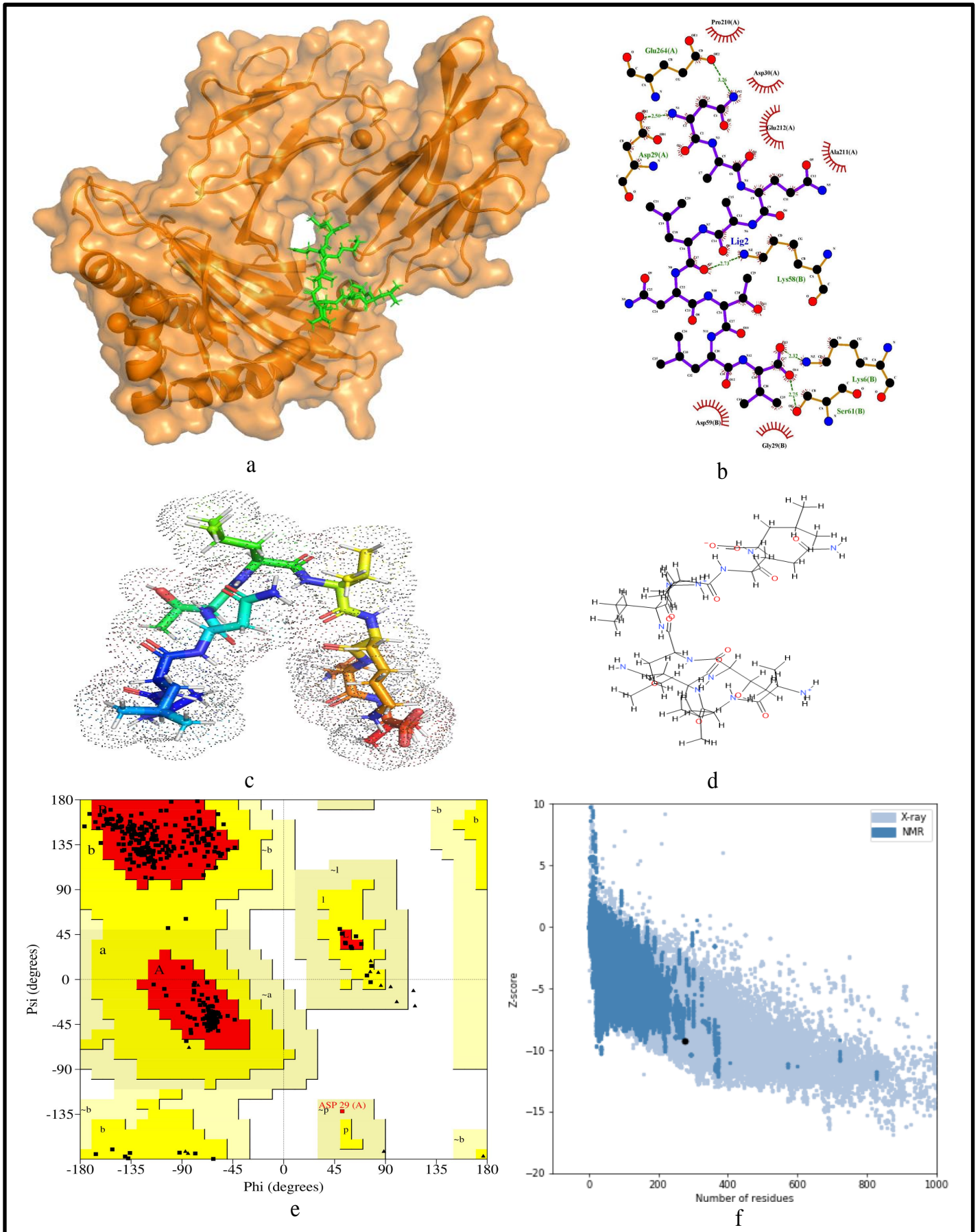


Figure S19: Structural analysis for MHC-I restricted T-cell epitope "ALNTLVKQL" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

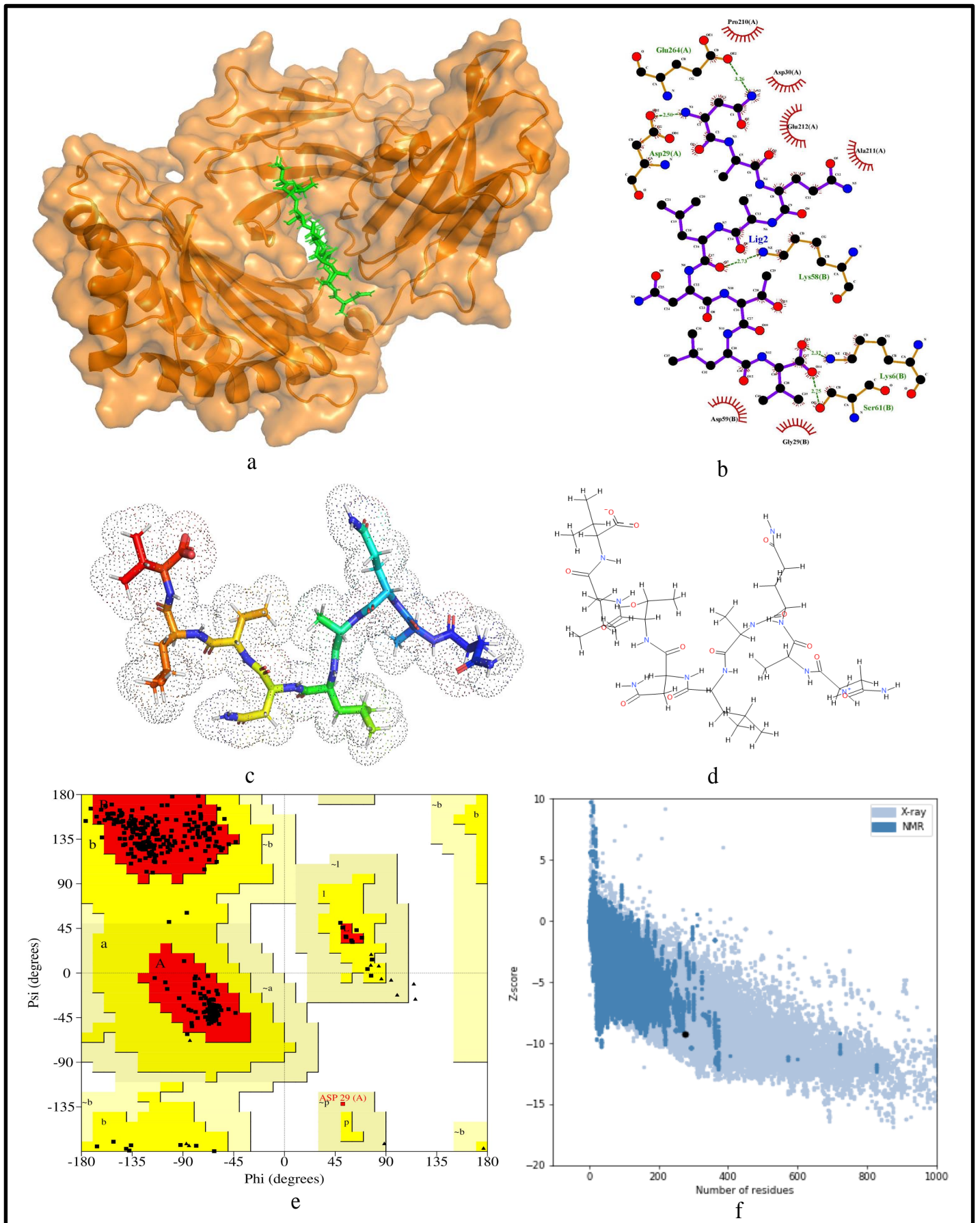


Figure S20: Structural analysis for MHC-I restricted T-cell epitope "NAQALNTLV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

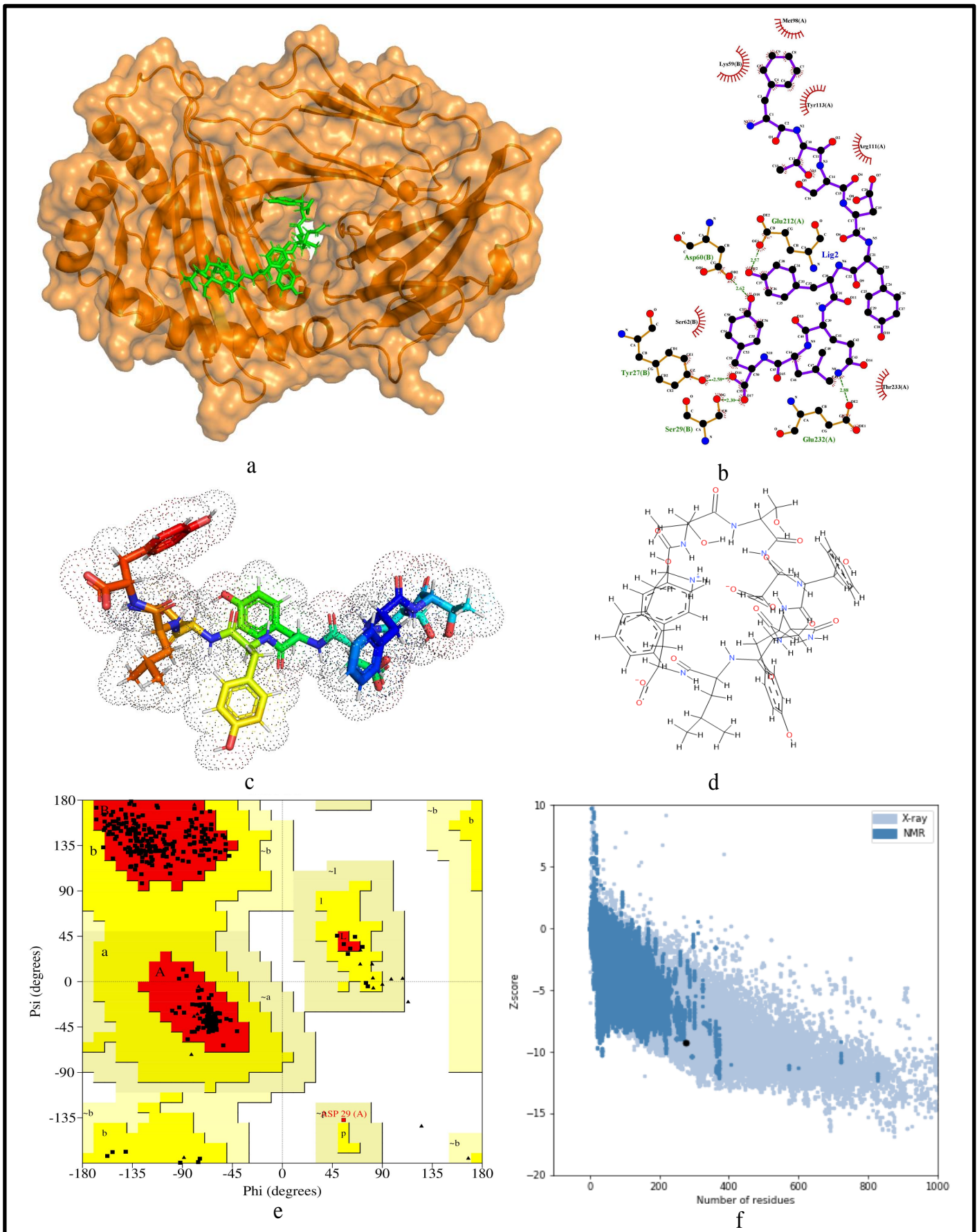


Figure S21: Structural analysis for MHC-I restricted T-cell epitope "FTSDYYQLY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

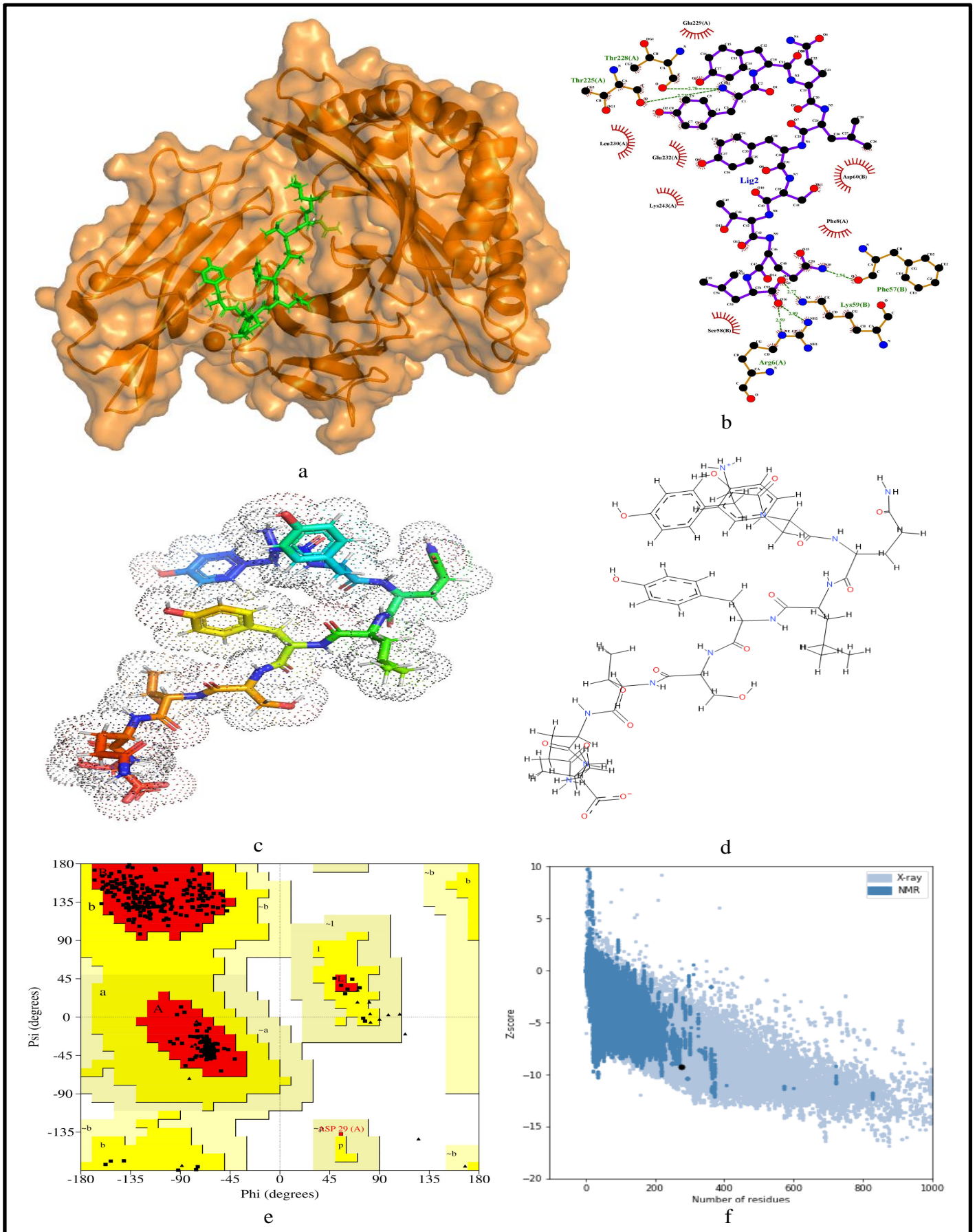


Figure S22: Structural analysis for MHC-I restricted T-cell epitope "YYQLYSTQL" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

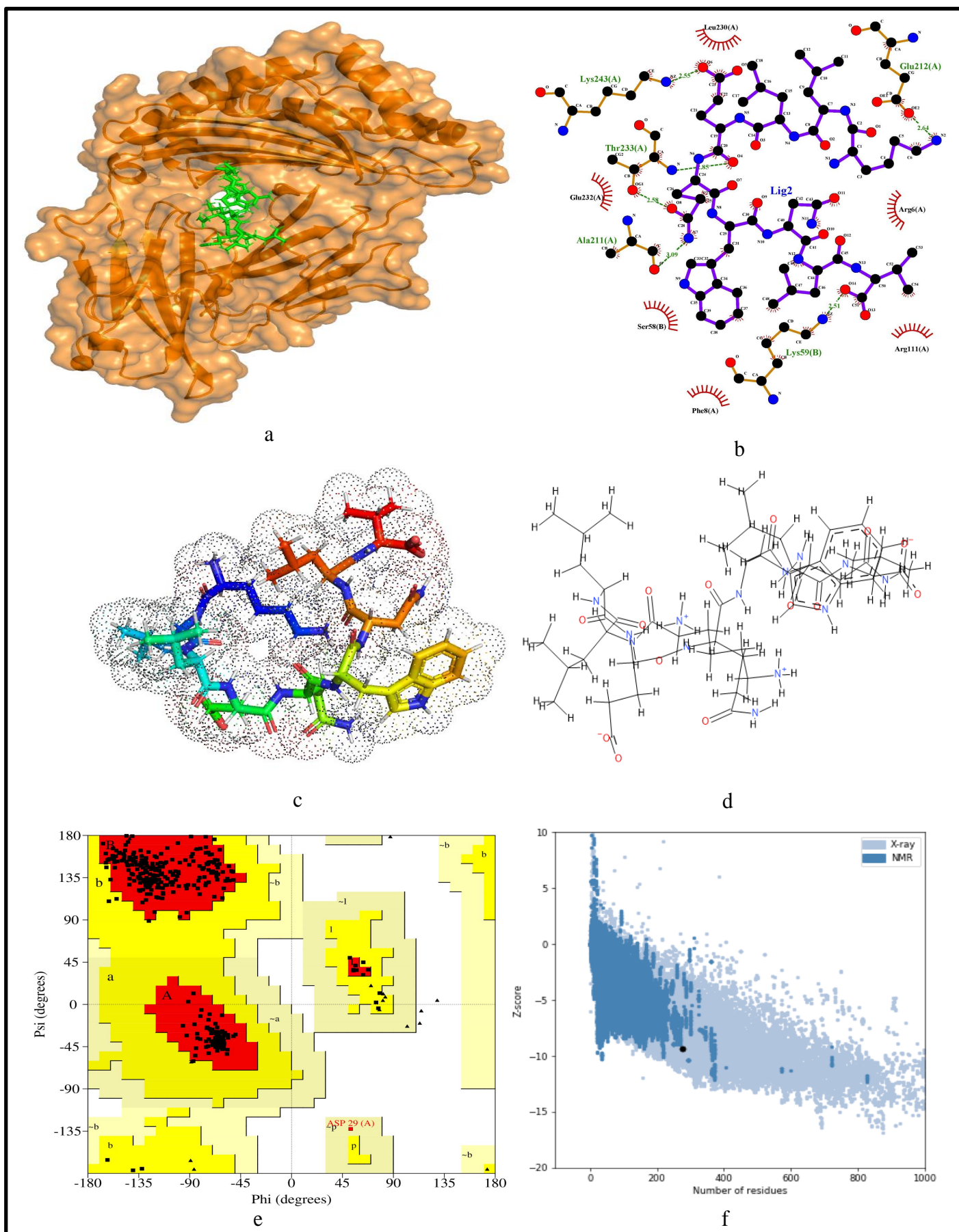


Figure S23: Structural analysis for MHC-I restricted T-cell epitope "KLLEQWNLV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

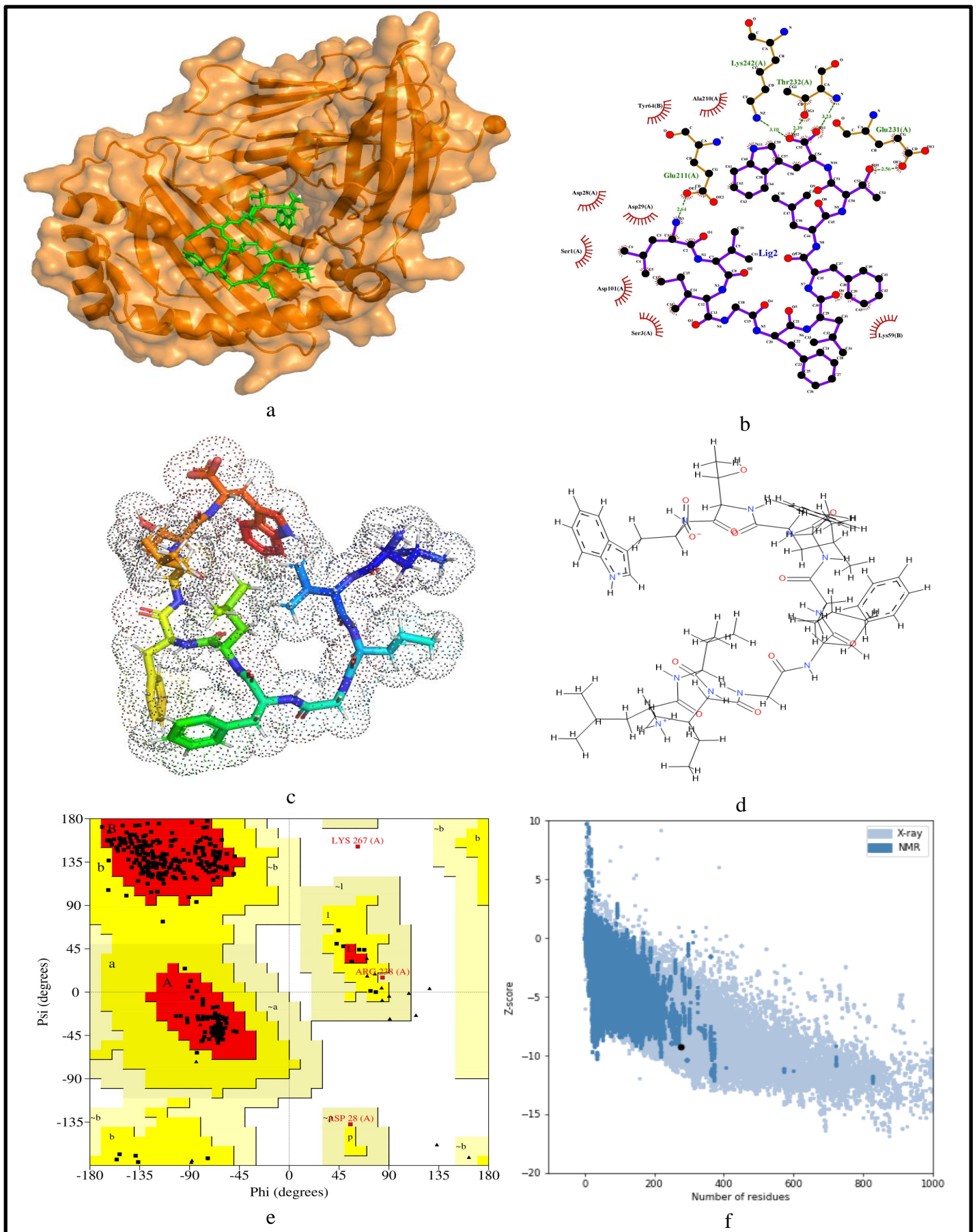


Figure S24: Structural analysis for MHC-I restricted T-cell epitope "LVIGFLFTW" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

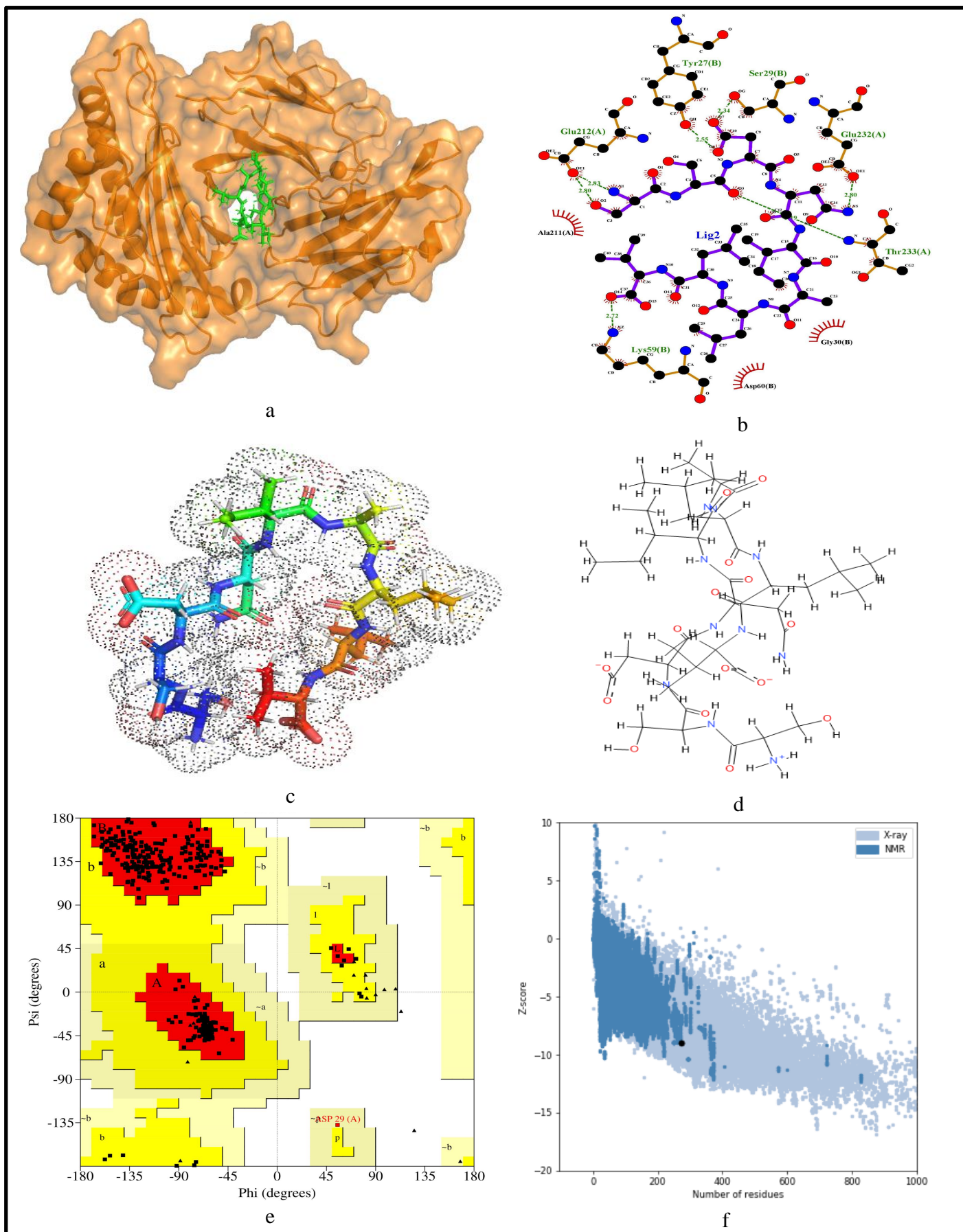


Figure S25: Structural analysis for MHC-I restricted T-cell epitope "SSDNIALLV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

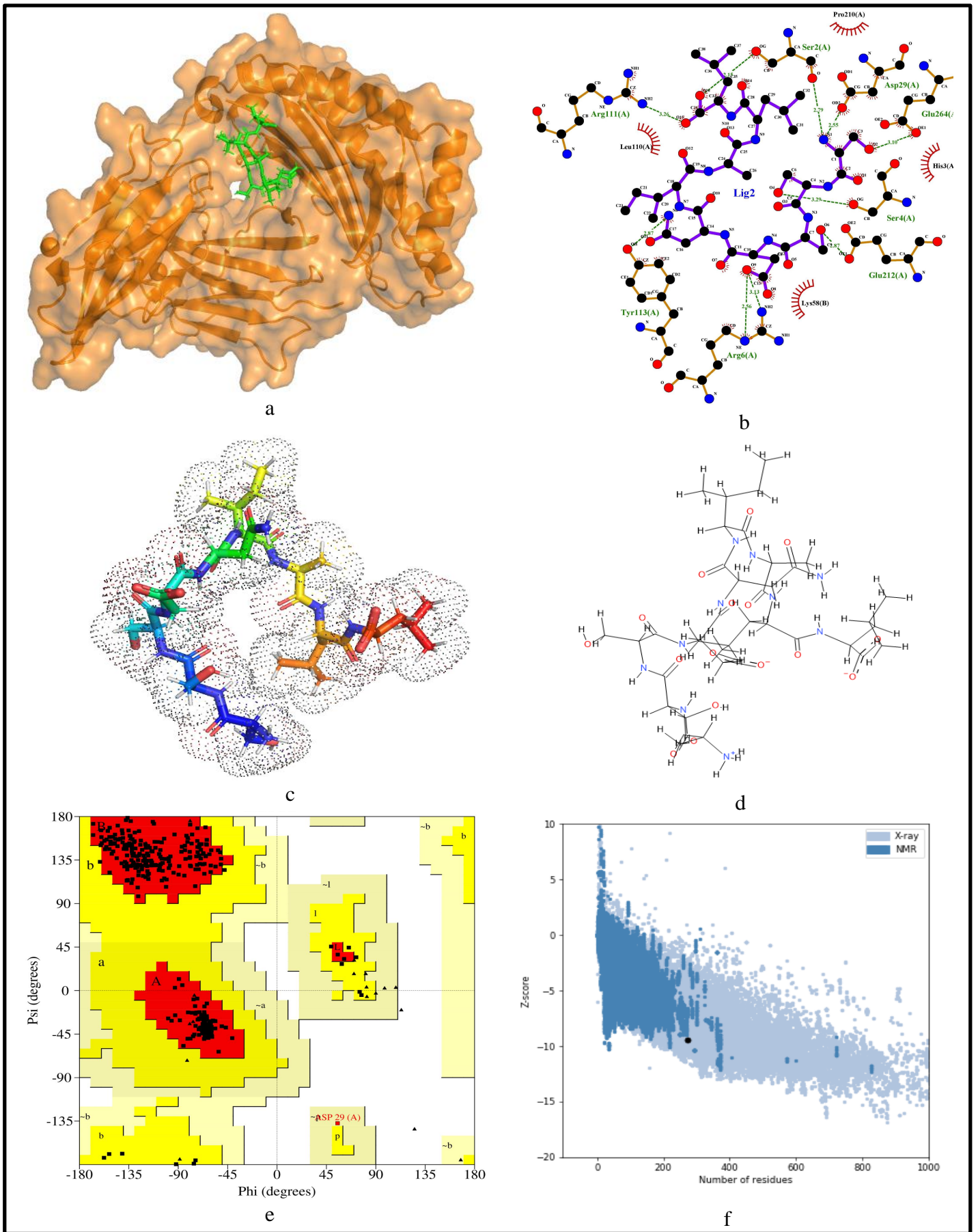


Figure S26: Structural analysis for MHC-I restricted T-cell epitope "SSSDNIALL" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

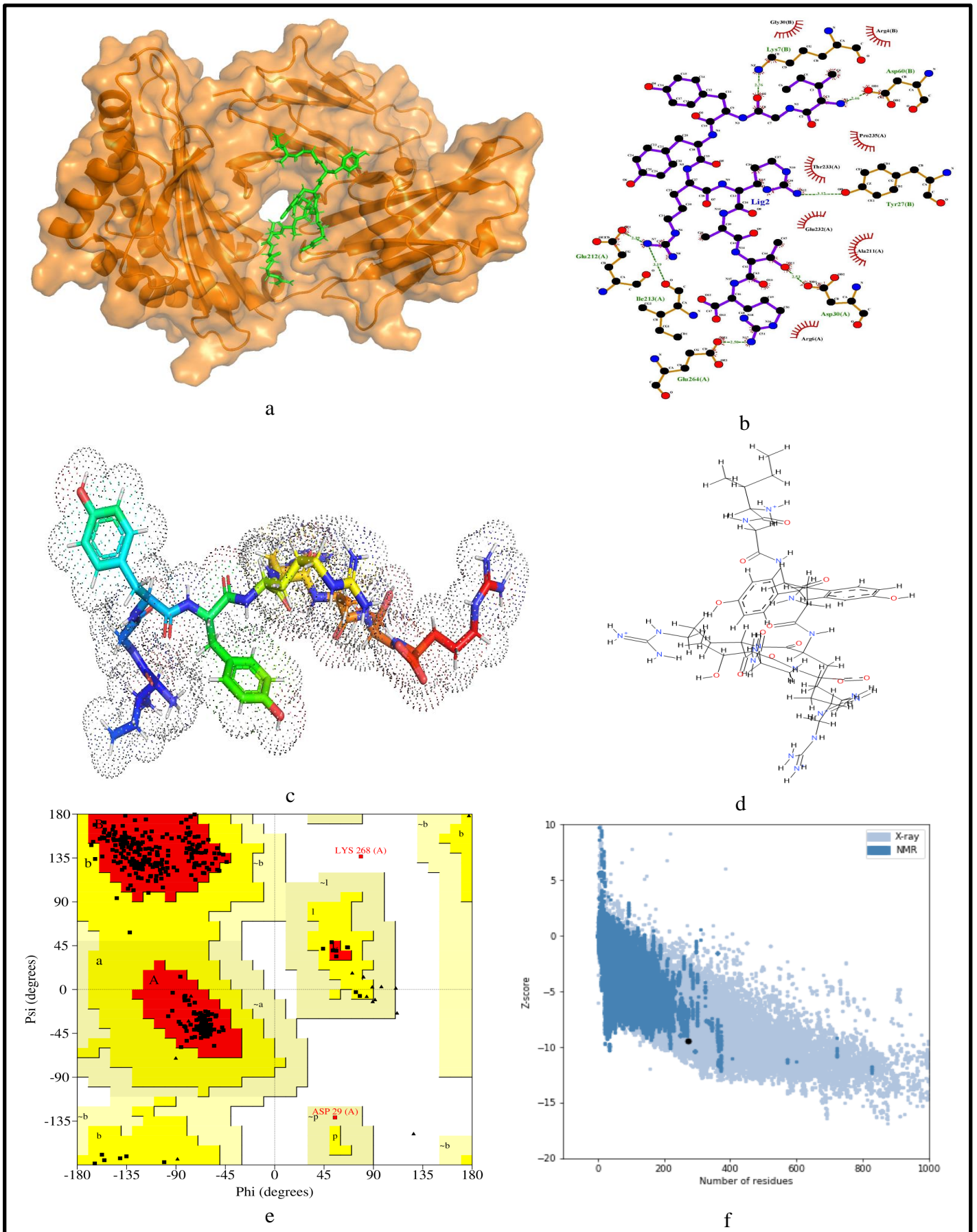


Figure S27: Structural analysis for MHC-I restricted T-cell epitope "GYRRATRR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

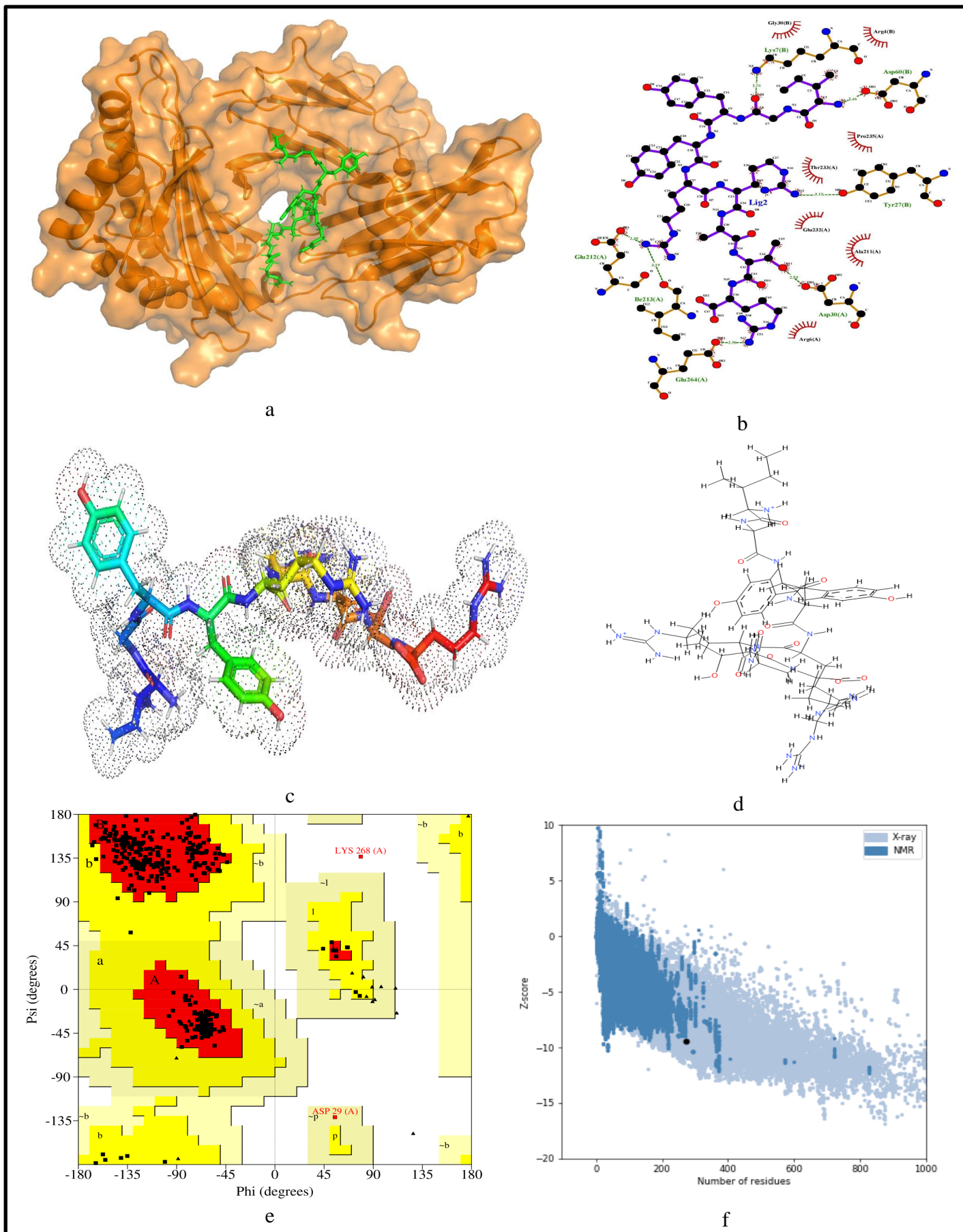


Figure S28: Structural analysis for MHC-I restricted T-cell epitope "IGYYRRATR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

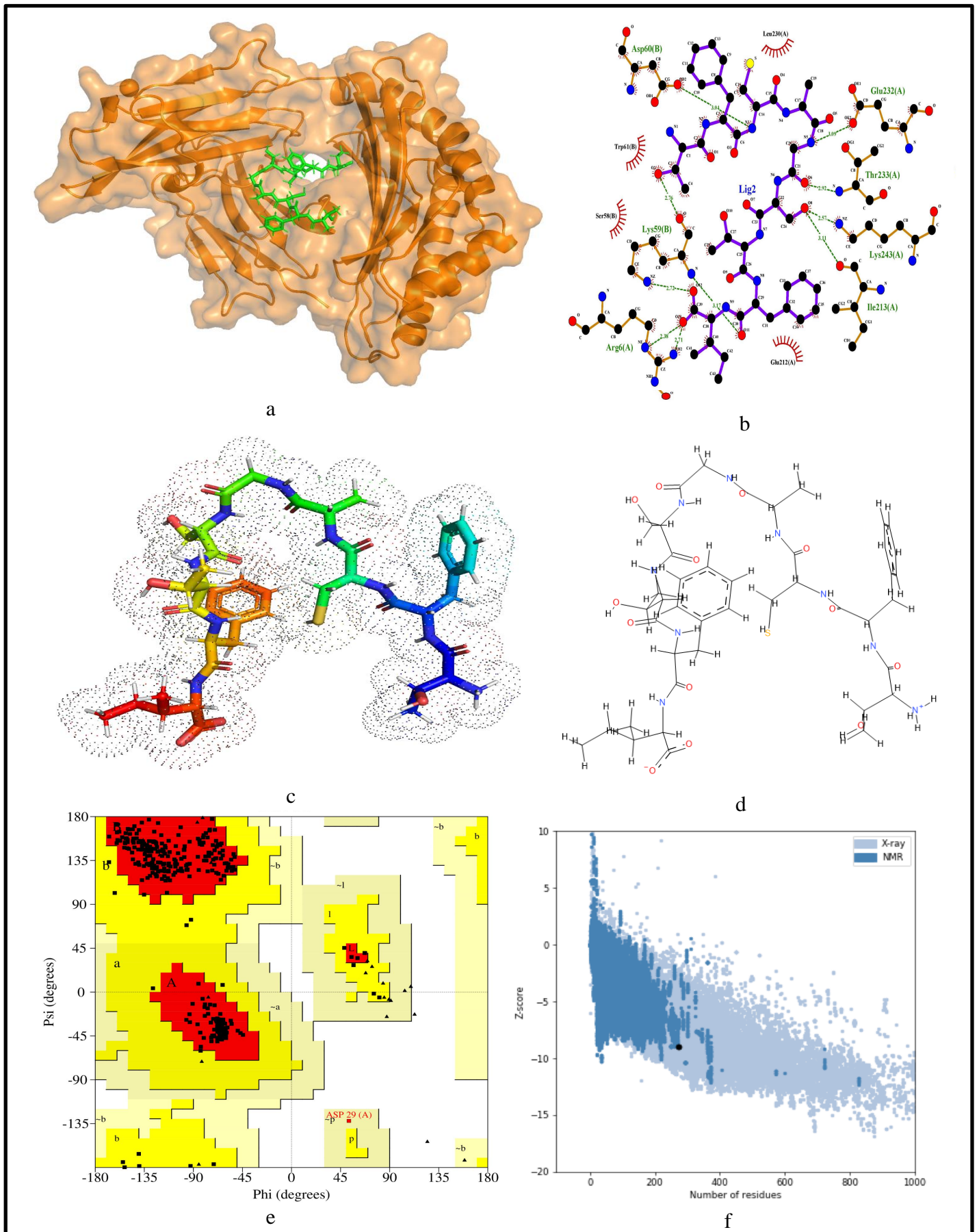


Figure S29: Structural analysis for MHC-II restricted T-cell epitope "FCAGSTFISDEVAR" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

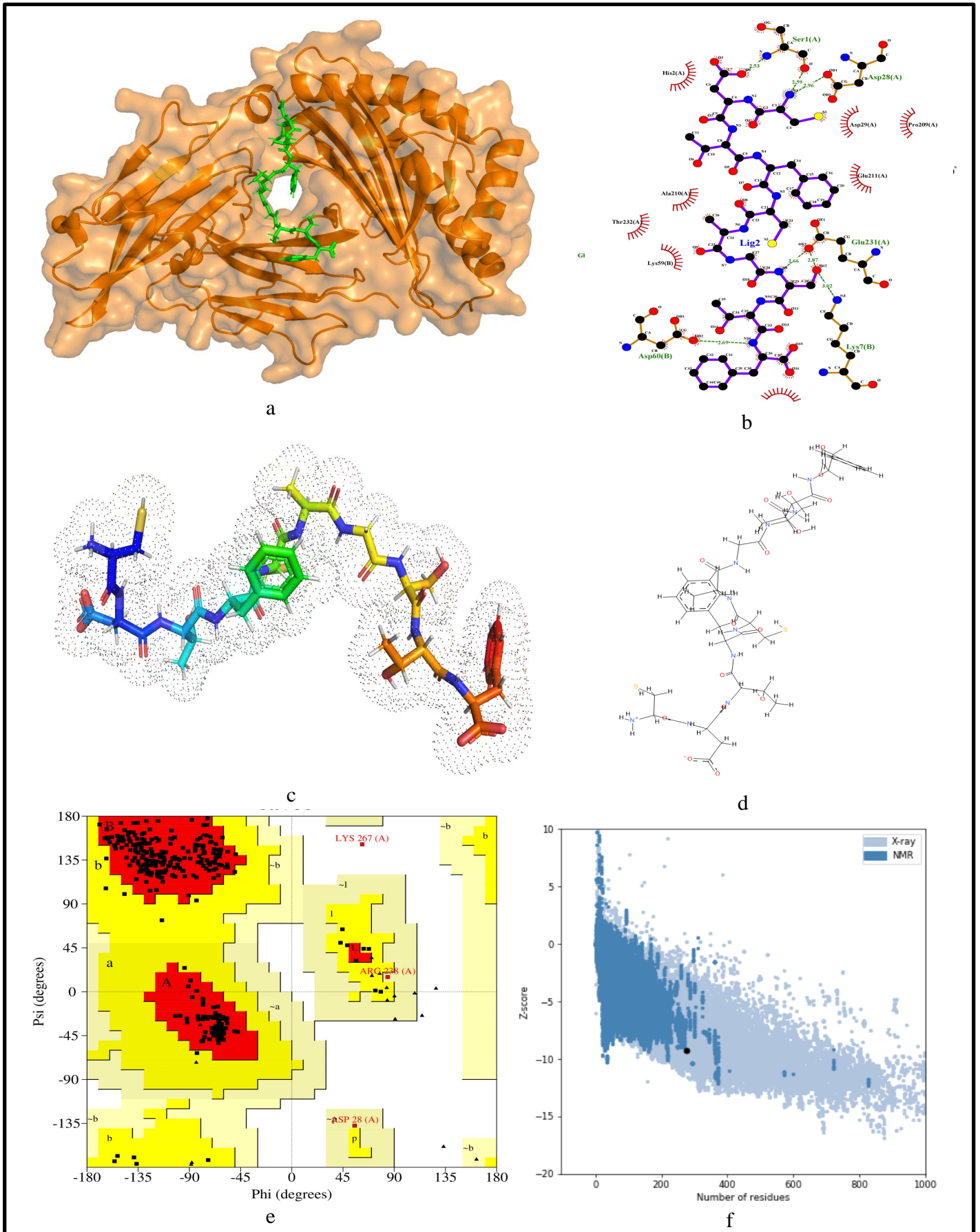


Figure S30: Structural analysis for MHC-II restricted T-cell epitope "DTFCAGSTFISDEA" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

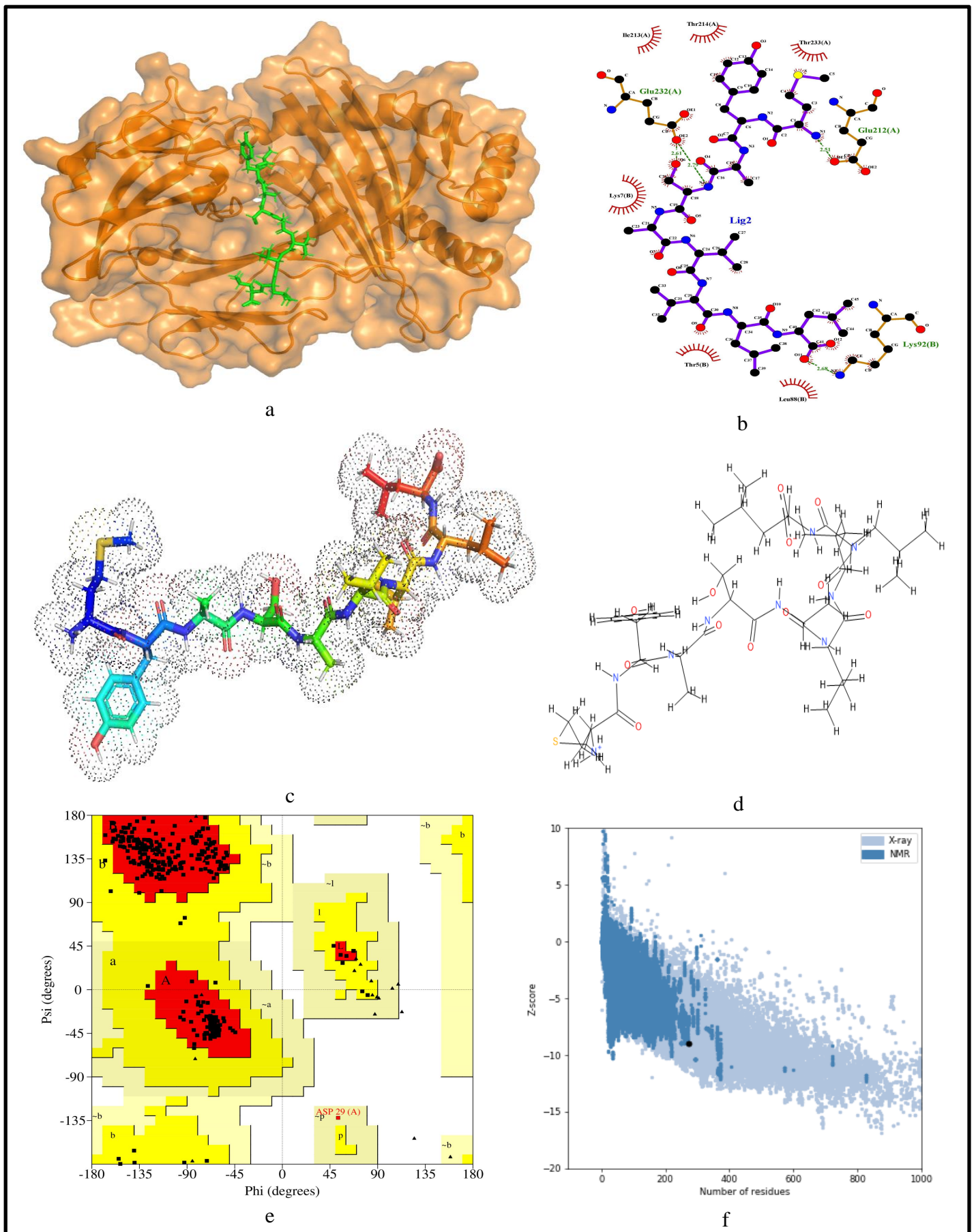


Figure S31: Structural analysis for MHC-II restricted T-cell epitope "ASAVVLLILMTARTV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

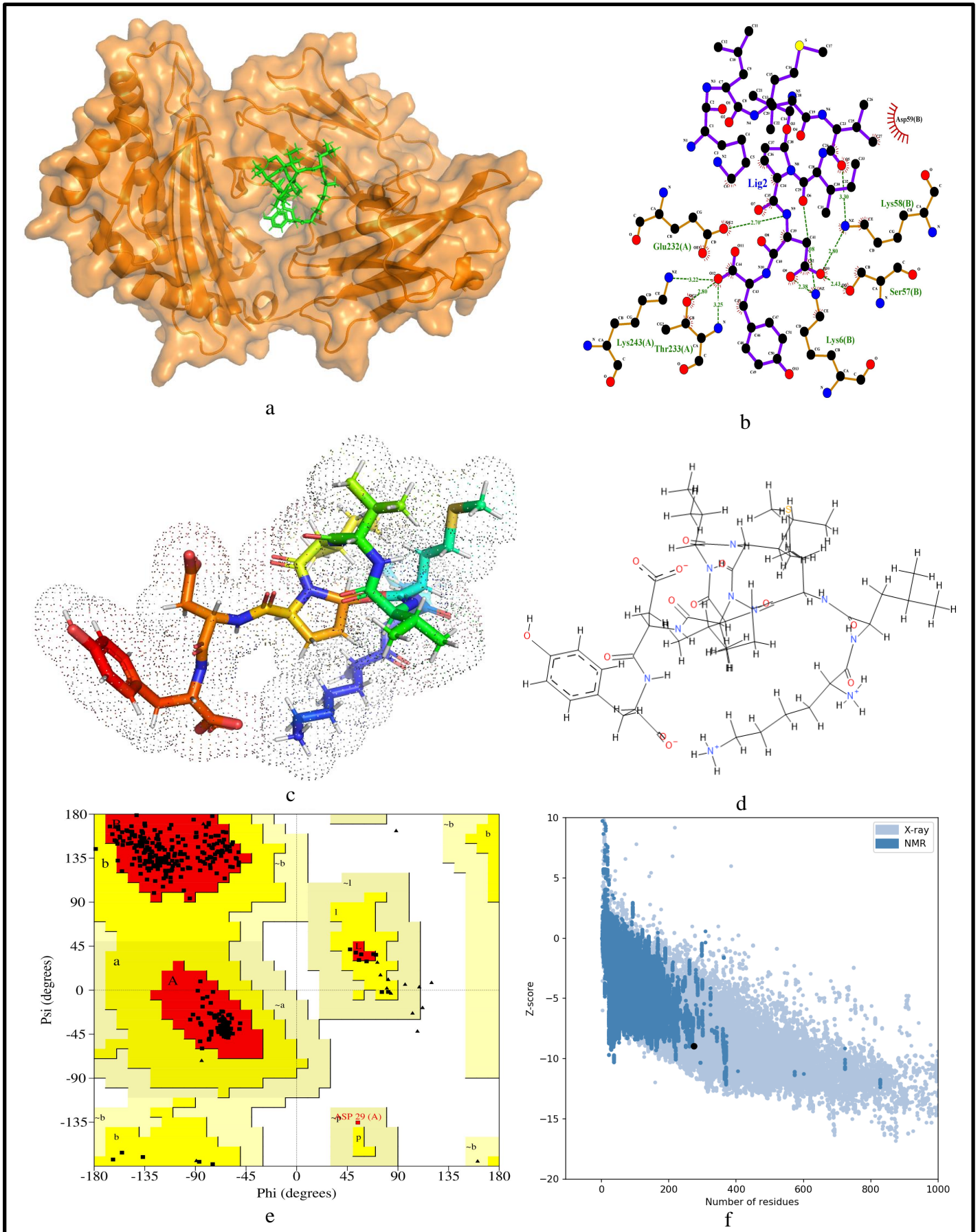


Figure S32: Structural analysis for MHC-II restricted T-cell epitope "LNIPLTTAAKLMVV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

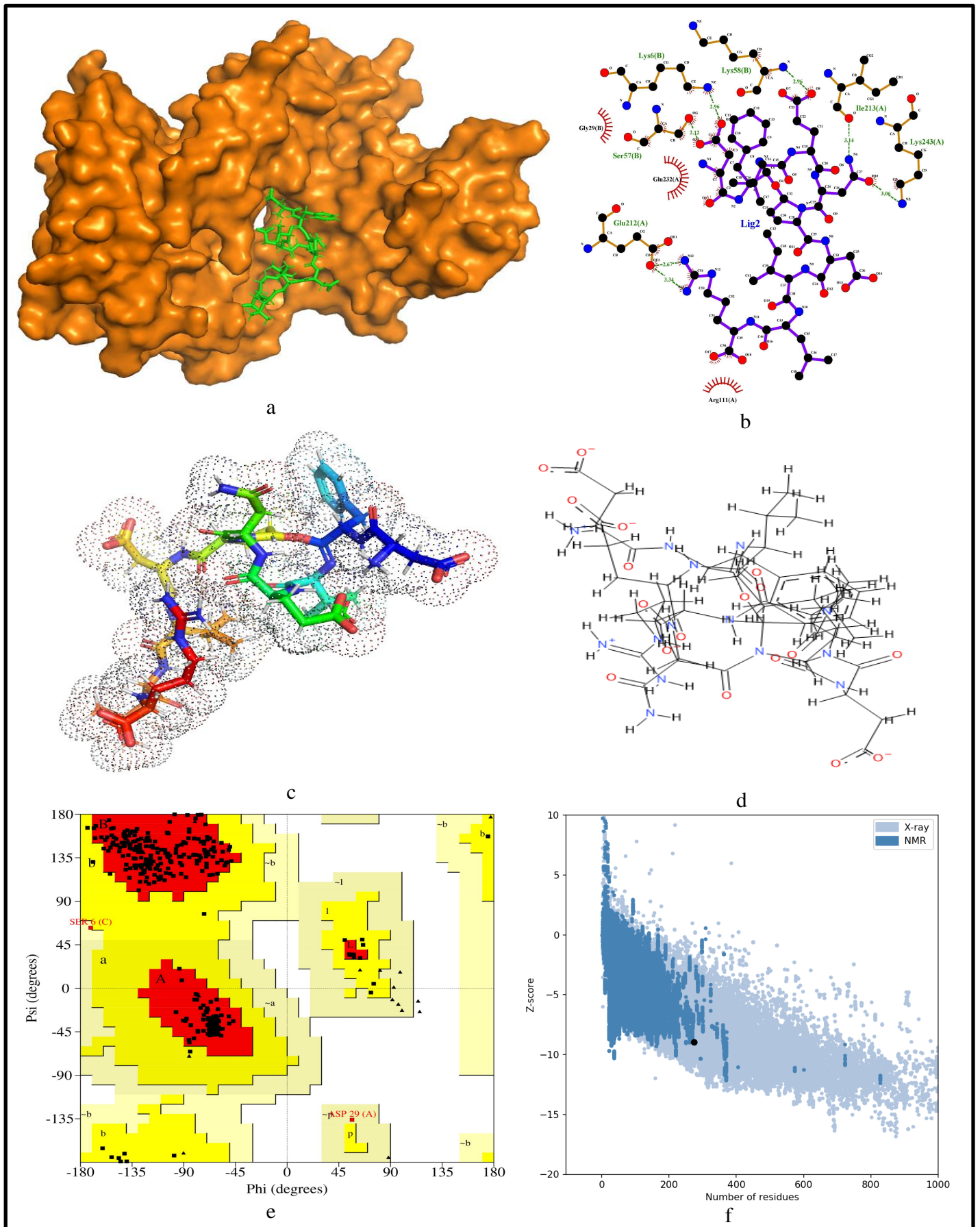


Figure S33: Structural analysis for MHC-II restricted T-cell epitope "ILRVYANLGERVRQA" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

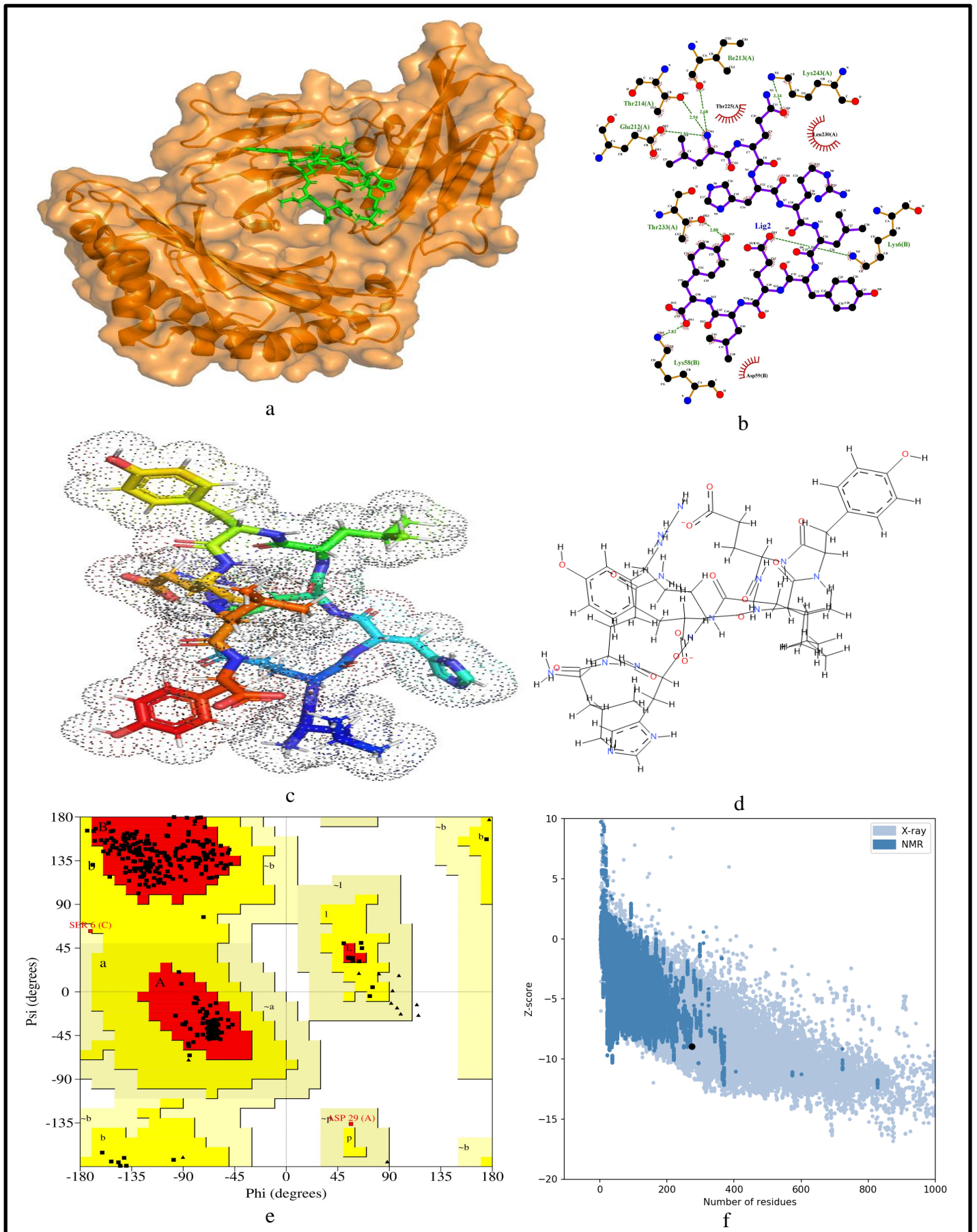


Figure S34: Structural analysis for MHC-II restricted T-cell epitope "RNRDVDTDFVNEFYA" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

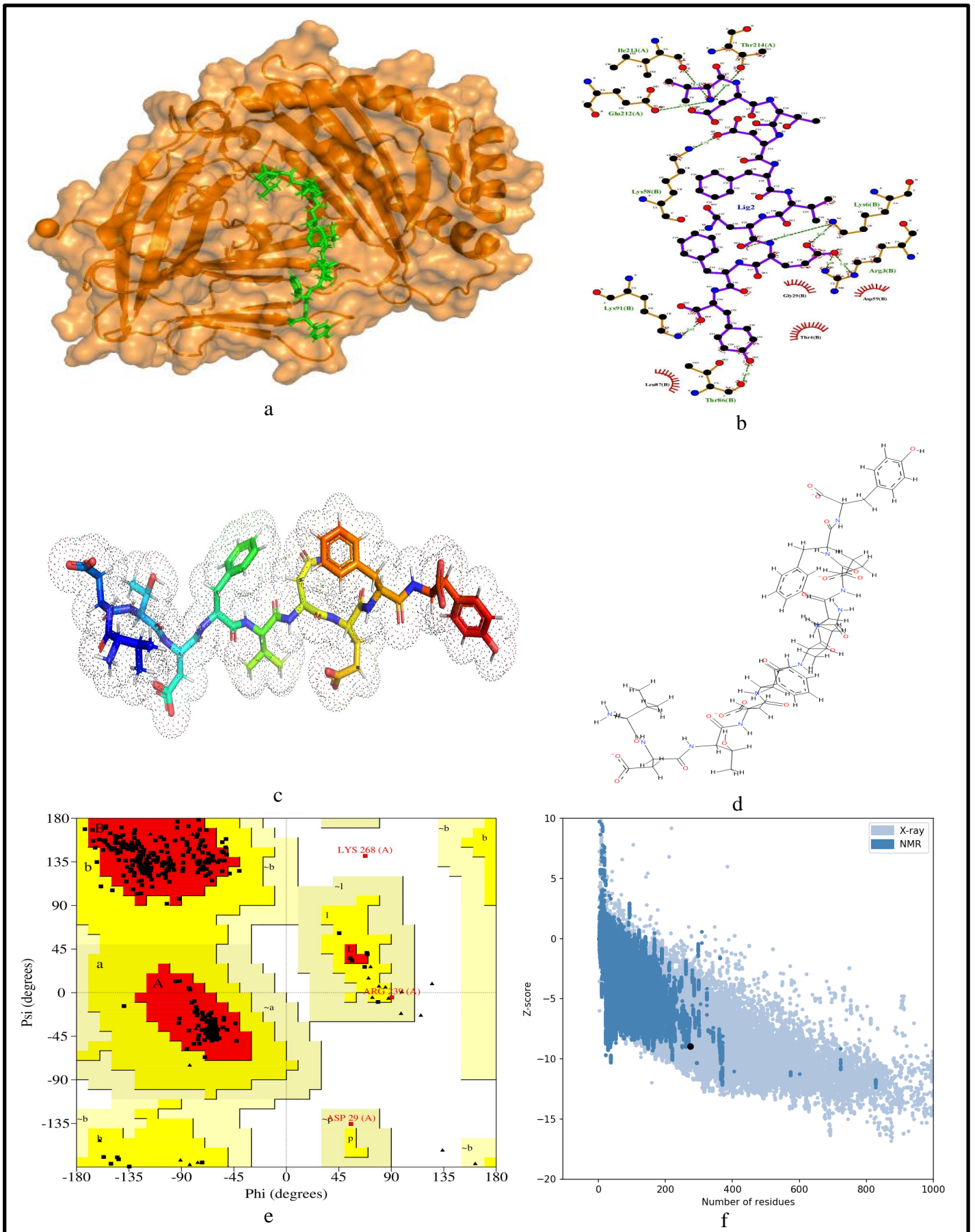


Figure S35: Structural analysis for MHC-II restricted T-cell epitope "YRNRDVDITDFVNEFY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

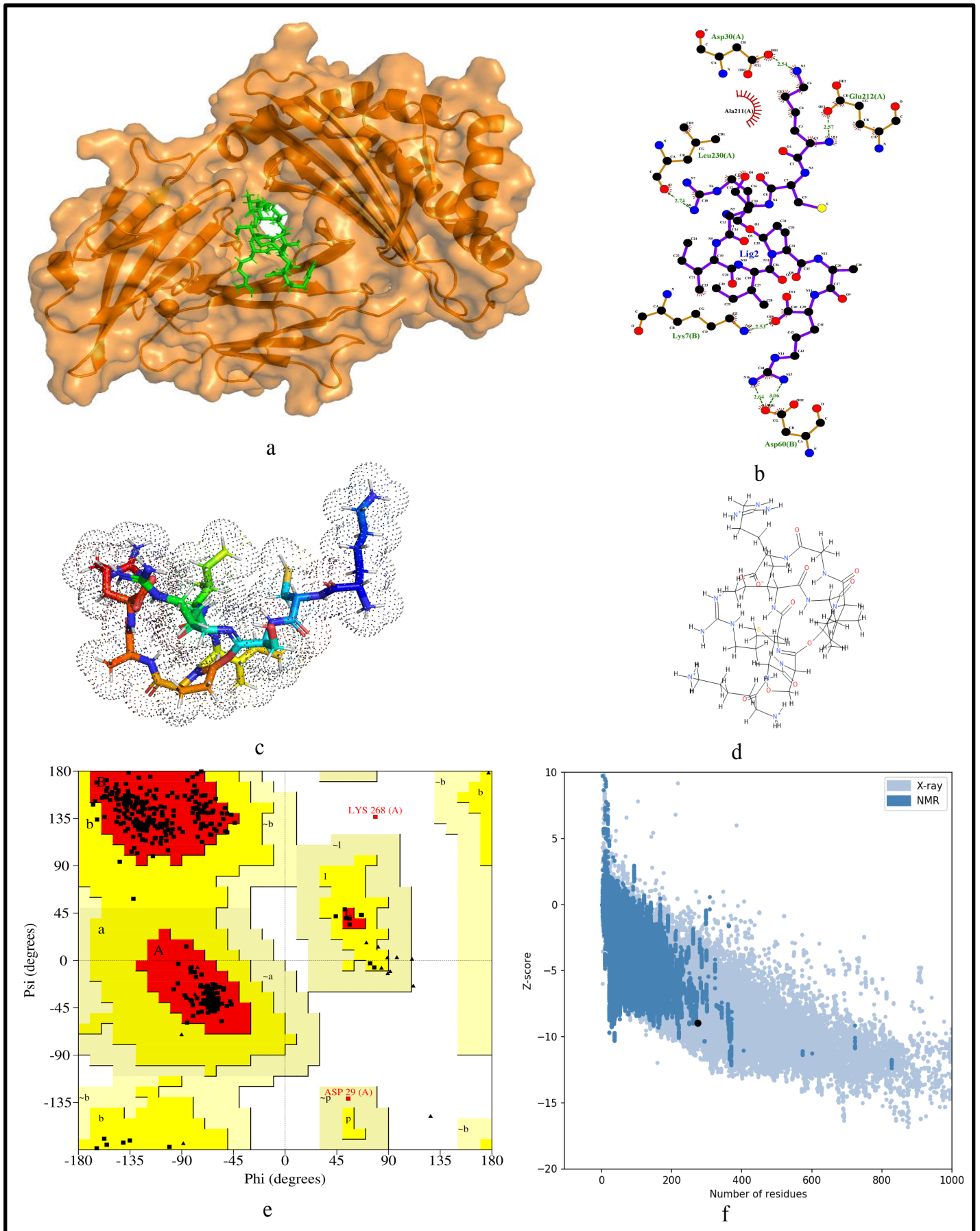


Figure S36: Structural analysis for MHC-II restricted T-cell epitope "ECFDKFKVNSTLEQY" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

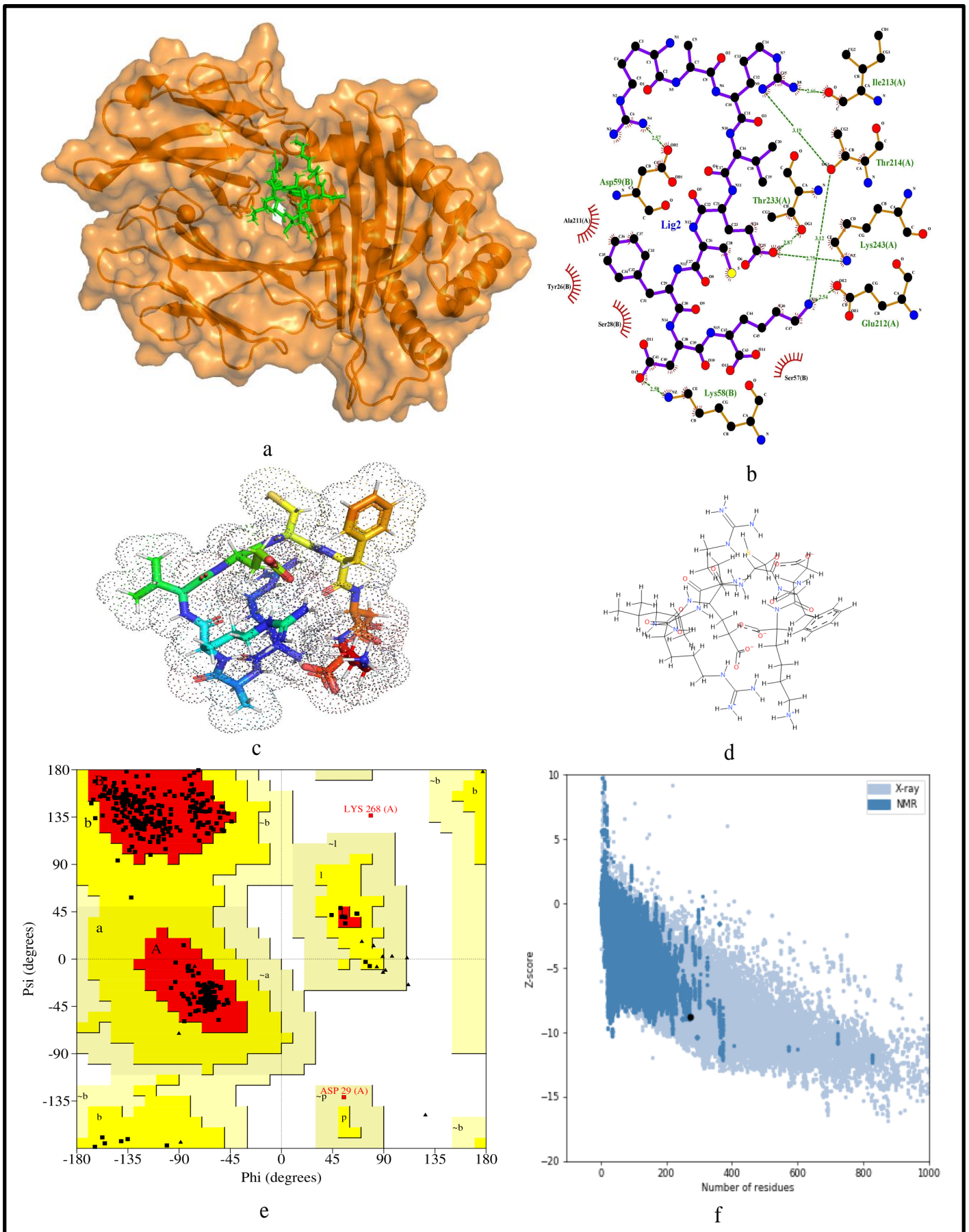


Figure S37: Structural analysis for MHC-II restricted T-cell epitope "KCSRIIPARARVECF" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

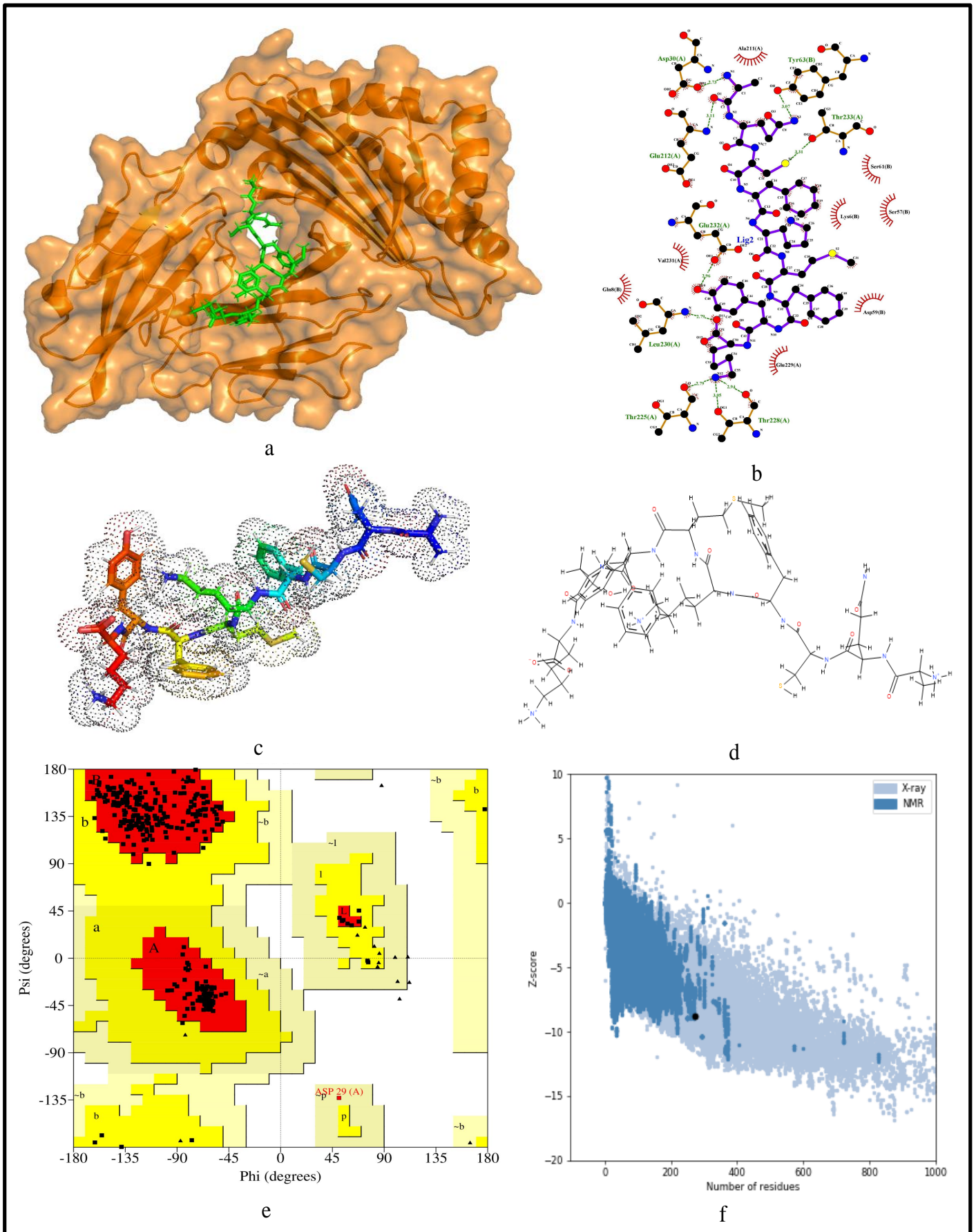


Figure S38: Structural analysis for MHC-II restricted T-cell epitope "AHKDKSAQCCKMFYK" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

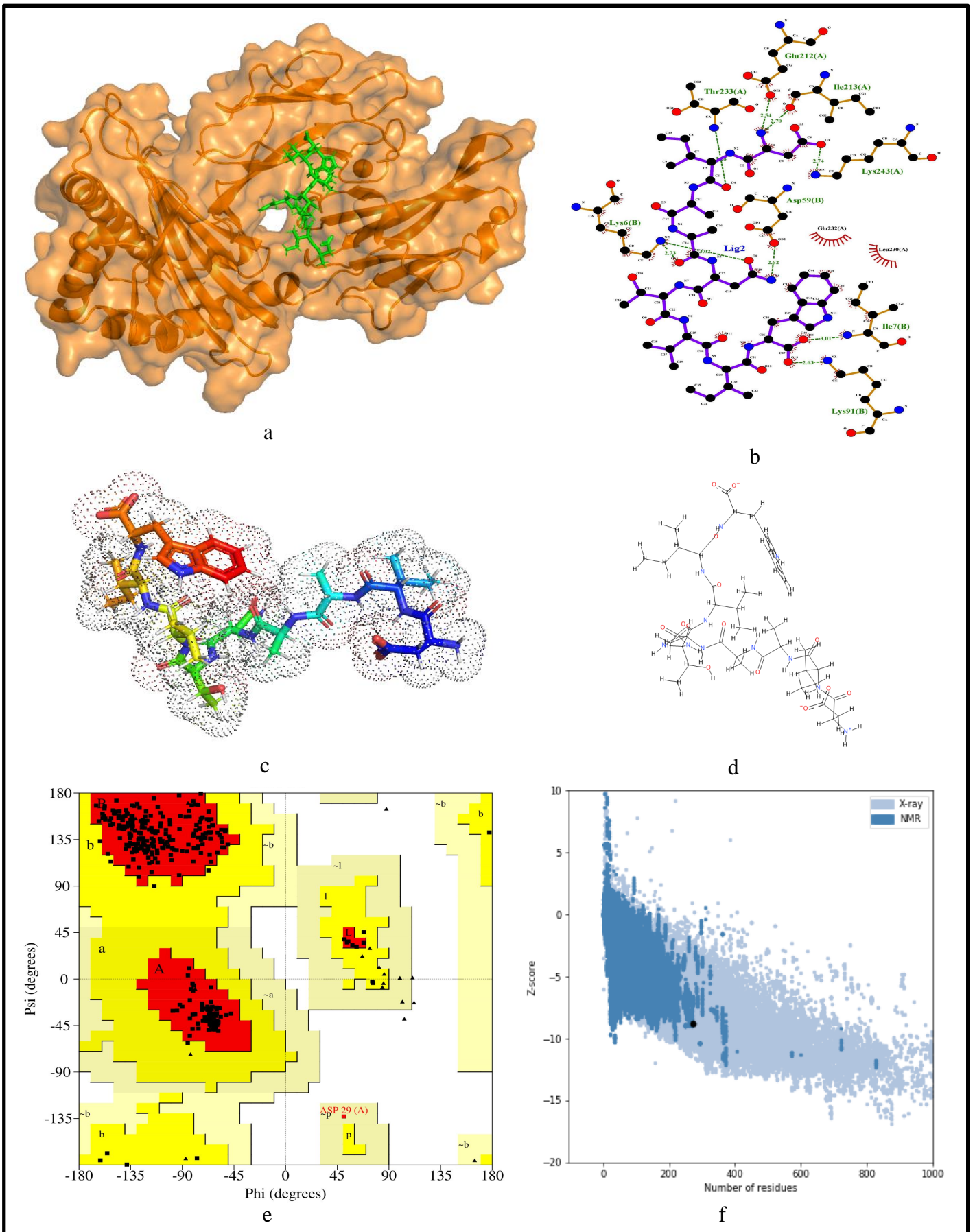


Figure S39: Structural analysis for MHC-II restricted T-cell epitope "WDYKRDAPAHISTIG" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

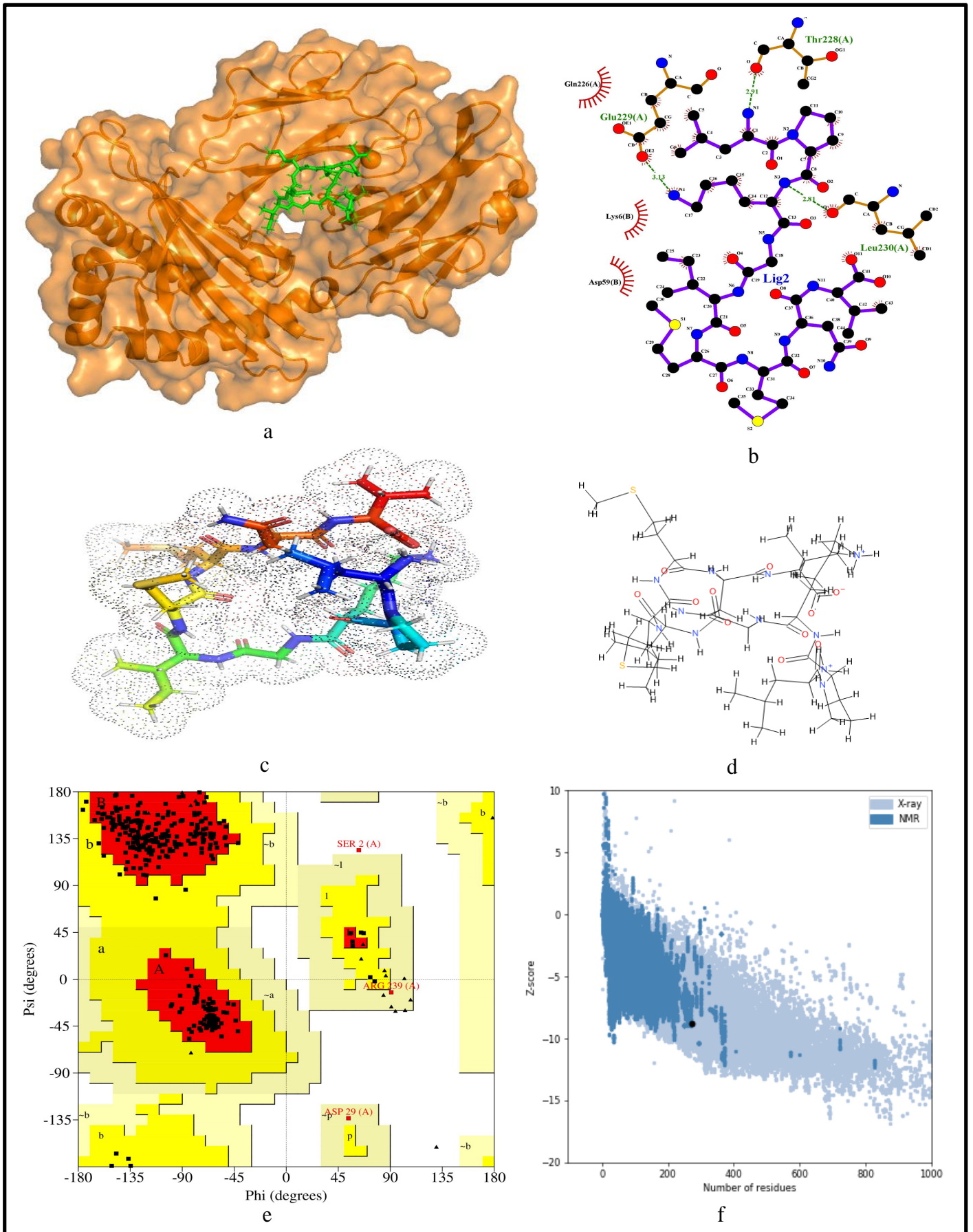


Figure S40: Structural analysis for MHC-II restricted T-cell epitope "PKGIMMNVAKYTQLC" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

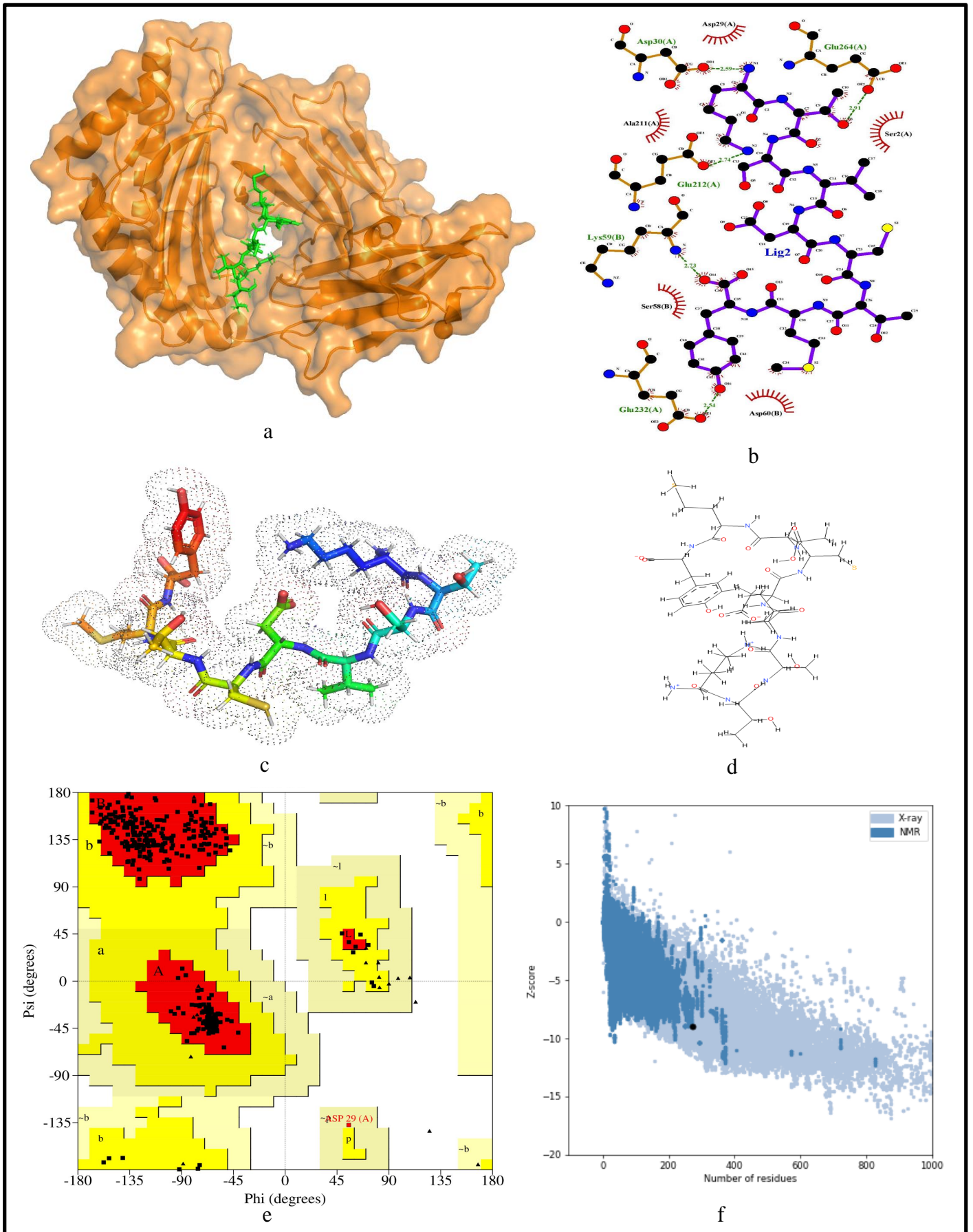


Figure S41: Structural analysis for MHC-II restricted T-cell epitope "PVSMTKTSVDCTMYI" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

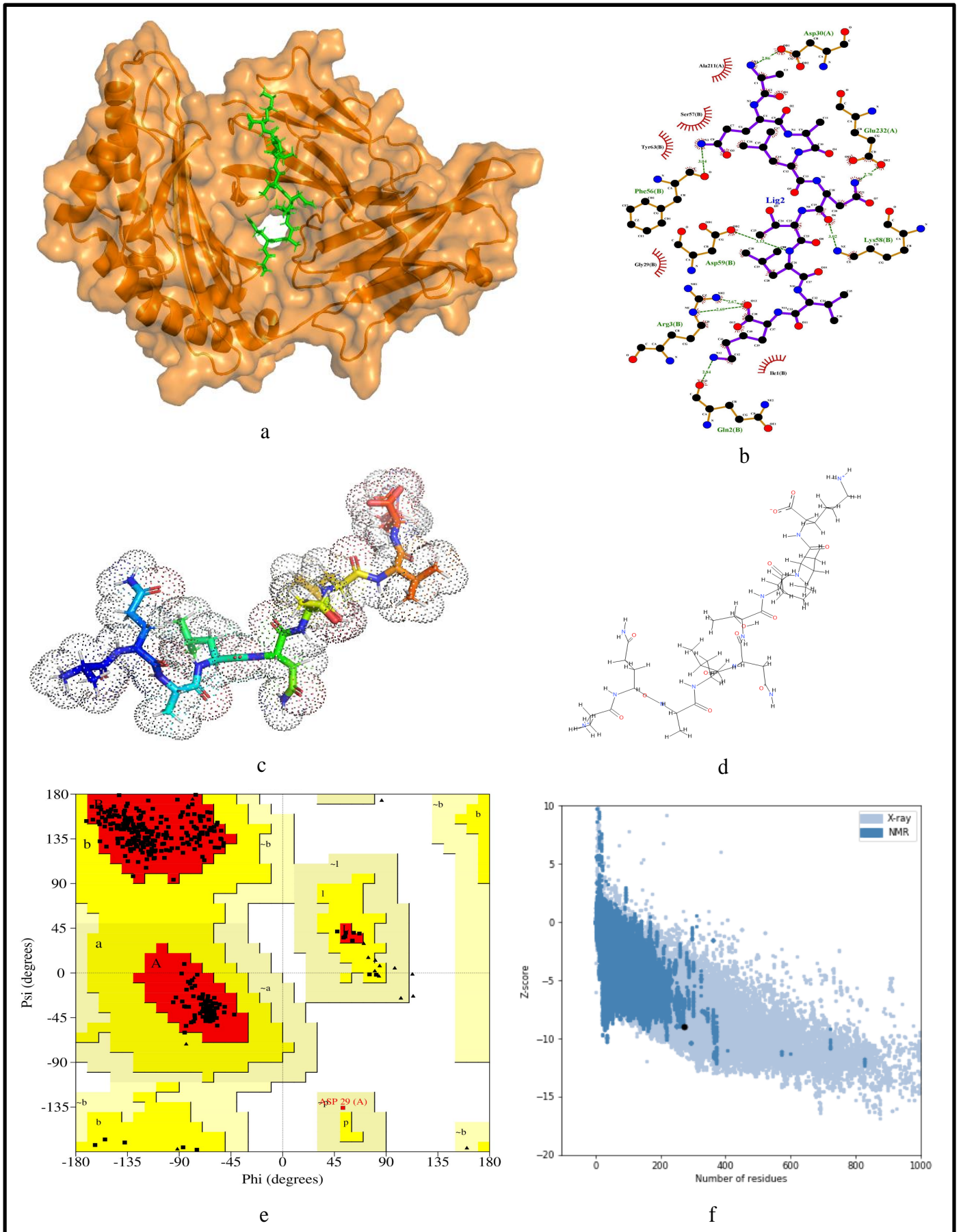


Figure S42: Structural analysis for MHC-II restricted T-cell epitope "QDVVNQNAQALNTLV" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

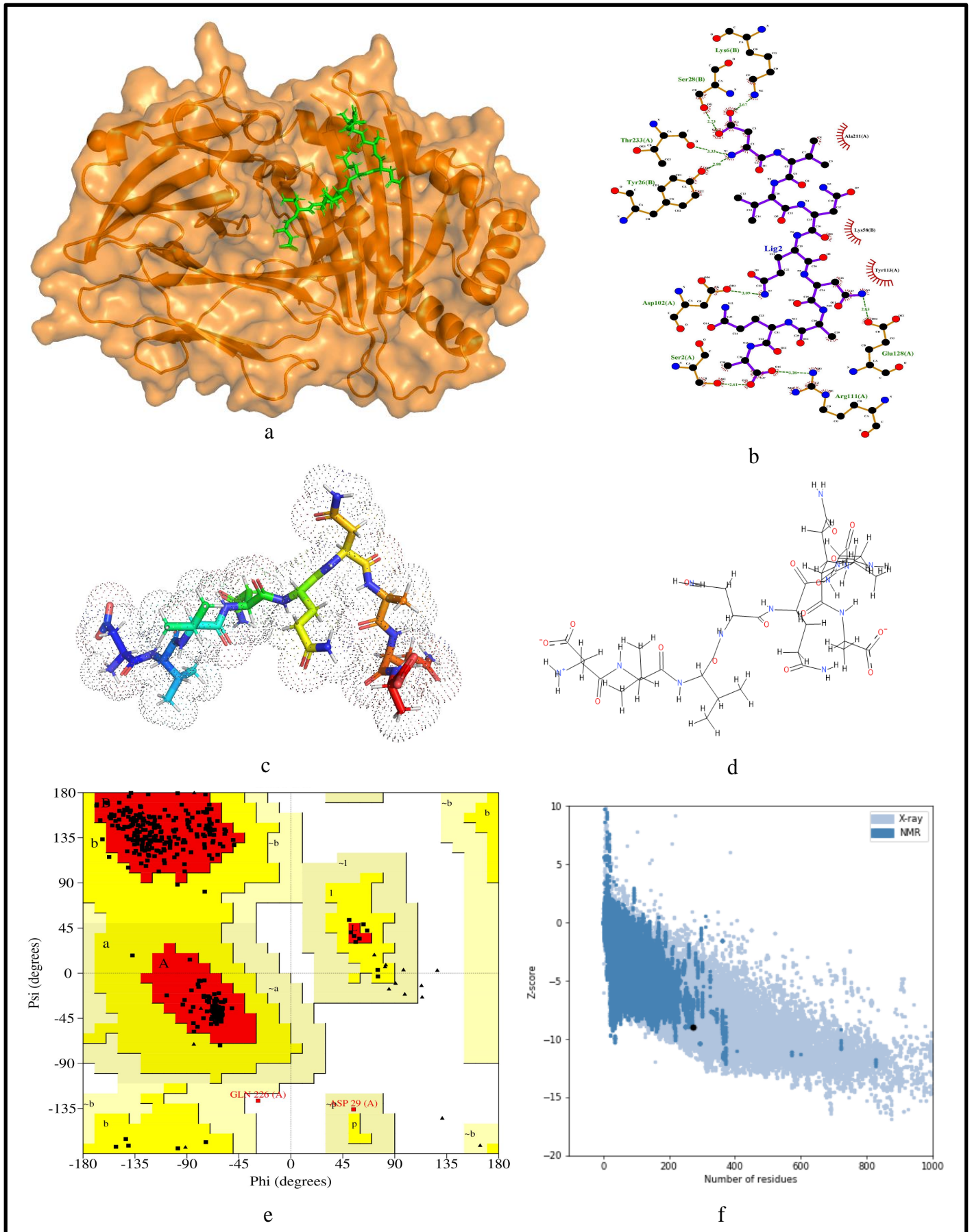


Figure S43: Structural analysis for MHC-II restricted T-cell epitope "DVVNQNAQALNTLVK" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

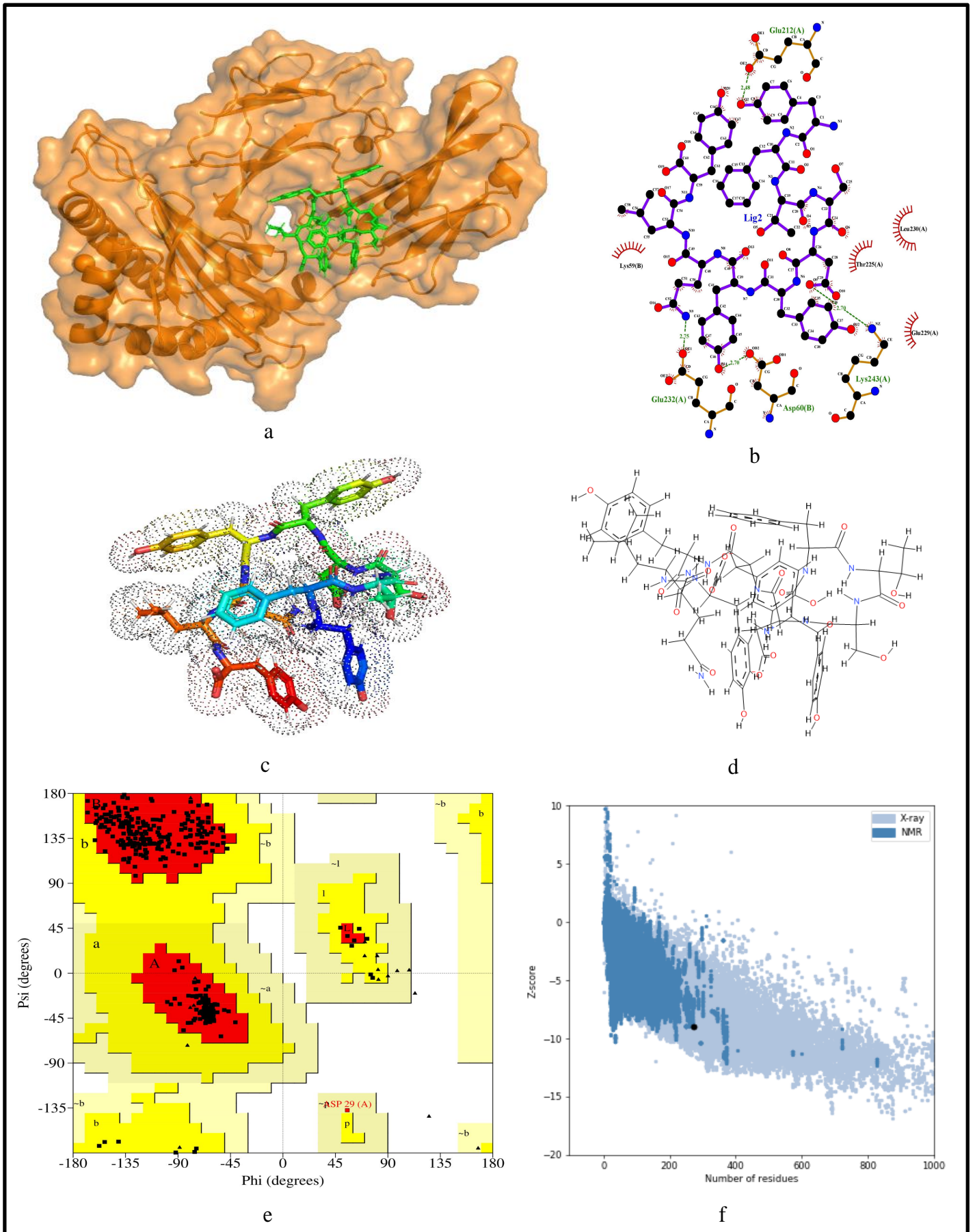


Figure S44: Structural analysis for MHC-II restricted T-cell epitope "HSYFTSDYYQLYSTQ" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

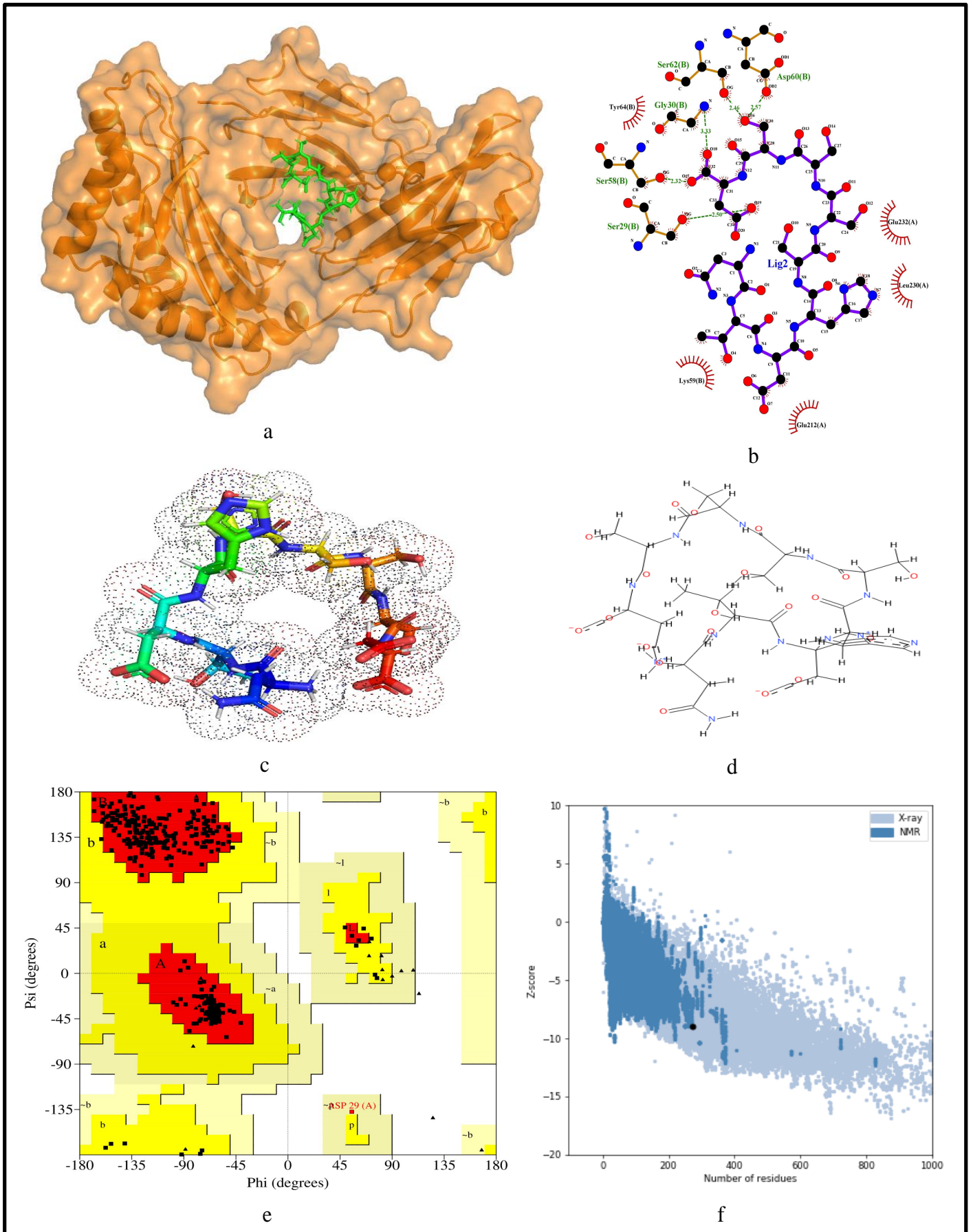


Figure S45: Structural analysis for MHC-II restricted T-cell epitope "NYKLNTDHSSSDNI" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

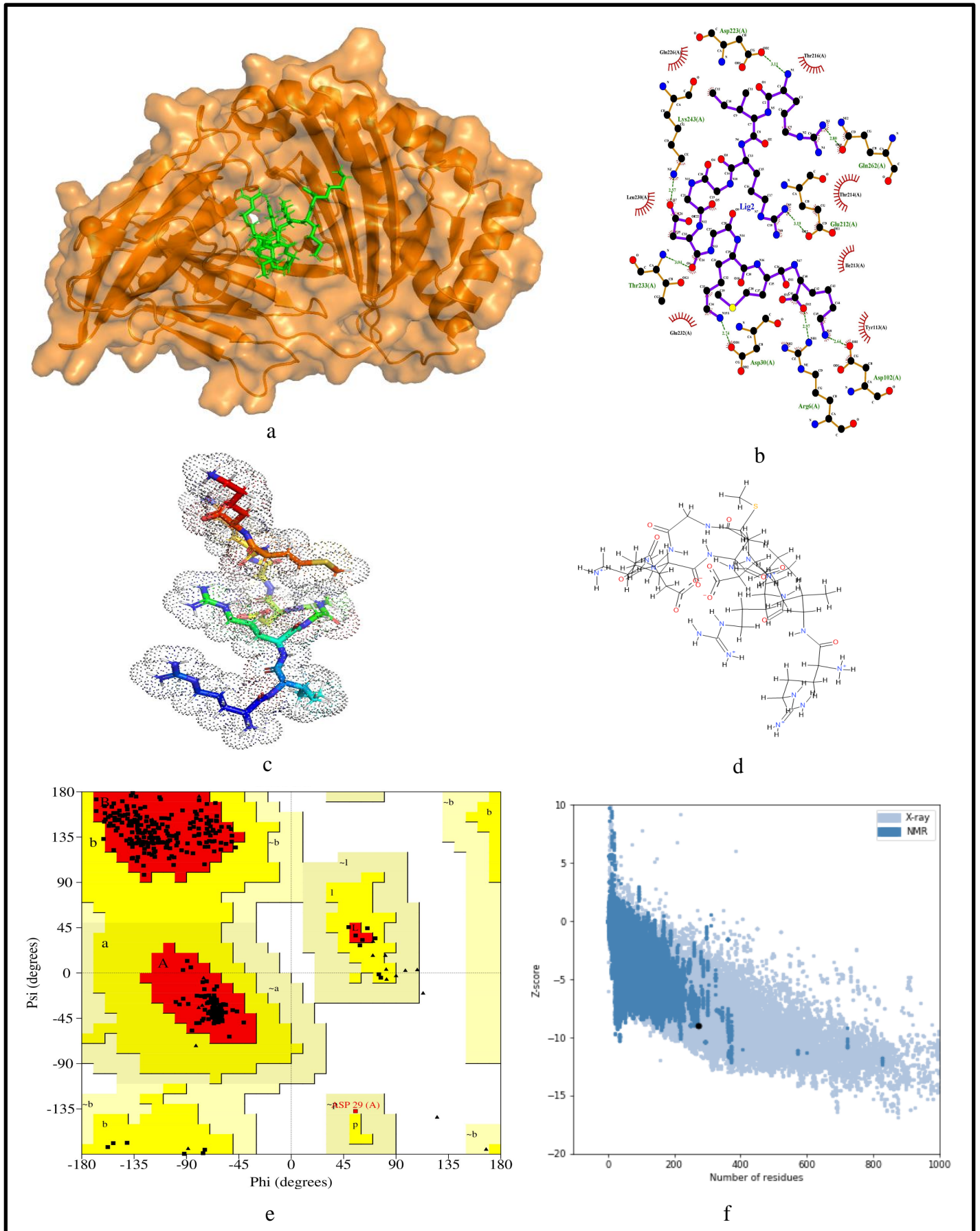


Figure S46: Structural analysis for MHC-II restricted T-cell epitope "IGYYRRATRRIRGGD" (a) Docking structure of MHC-I restricted T-cell epitope (b) 2D pose representation between the epitope and HLA allele showing the different non-covalent bonds (c) 3D structure of the epitope (d) Chemical structure of the epitope (e) Ramachandran plot of the epitope allele structure showing lower energy sites of the residues in different frames and (f) Z-Score plot

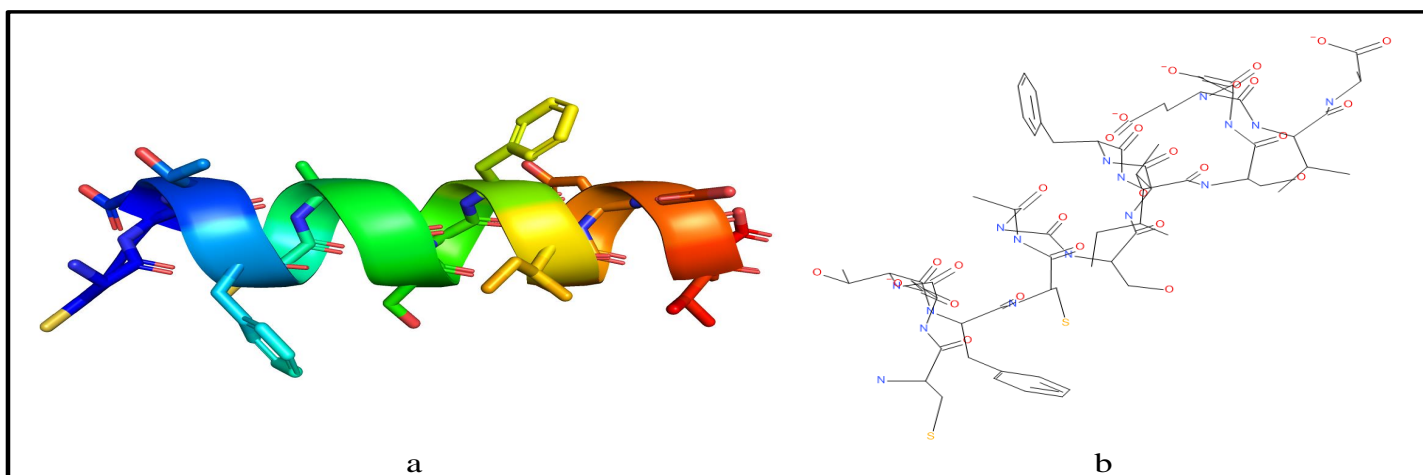


Figure S47: Structural representations for B-cell epitope "CDTFCAGSTFISDEVA" (a) 3D structure of the epitope (b) Chemical structure of the epitope

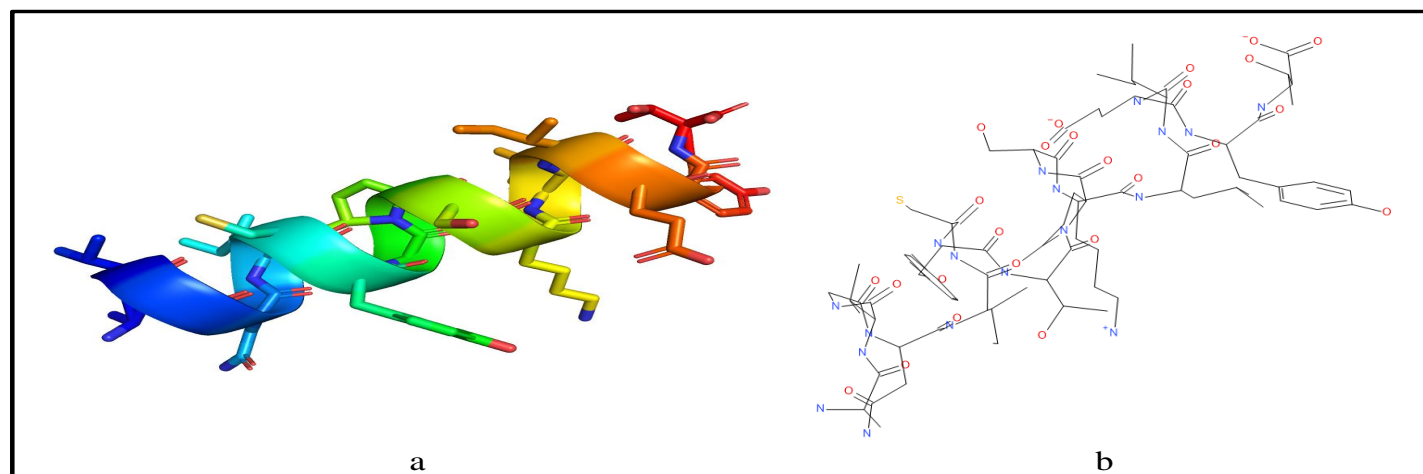


Figure S48: Structural representations for B-cell epitope "AVGNICYTPSKLIEYT" (a) 3D structure of the epitope (b) Chemical structure of the epitope

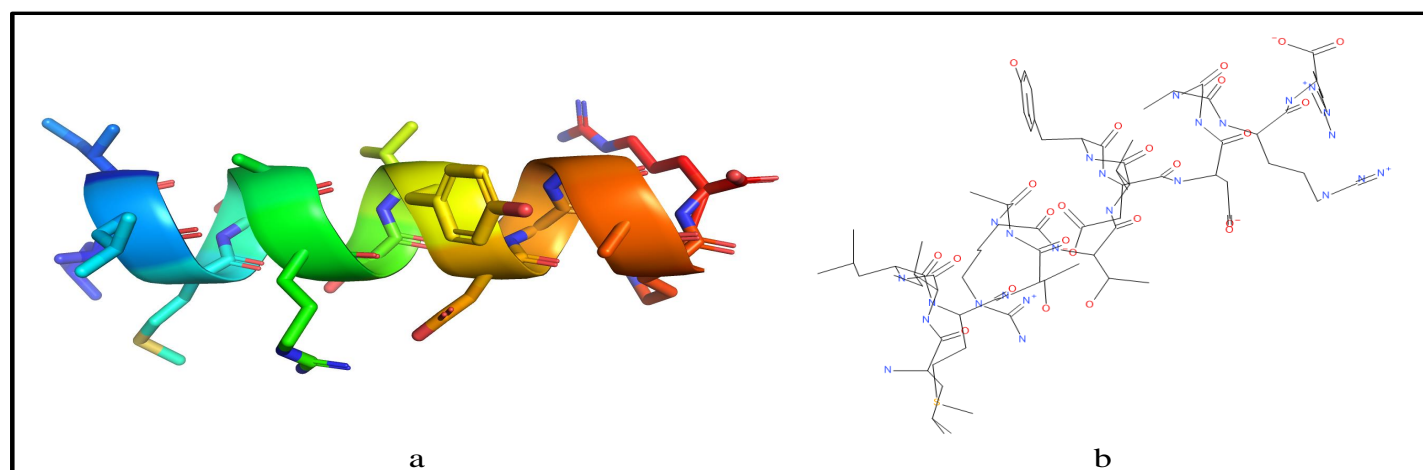


Figure S49: Structural representation for B-cell epitope "LILMTARTVYDDGARR" (a) 3D structure of the epitope (b) Chemical structure of the epitope

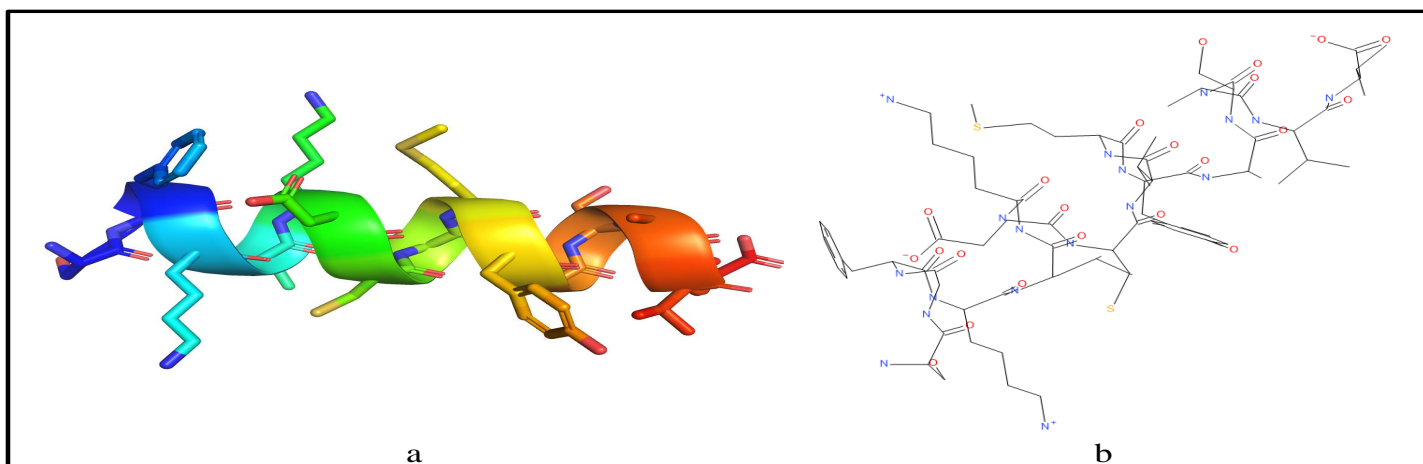


Figure S50: Structural representation for B-cell epitope "SGFKLKDCVMYASAVV" (a) 3D structure of the epitope (b) Chemical structure of the epitope

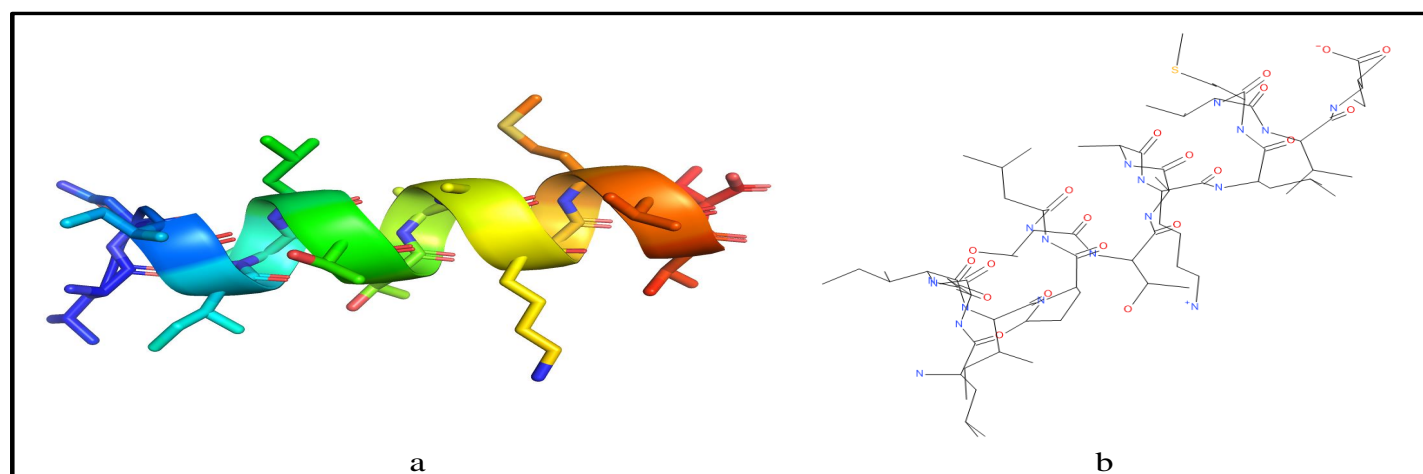


Figure S51: Structural representation for B-cell epitope "LNIPLTTAAKLMVVI" (a) 3D structure of the epitope (b) Chemical structure of the epitope

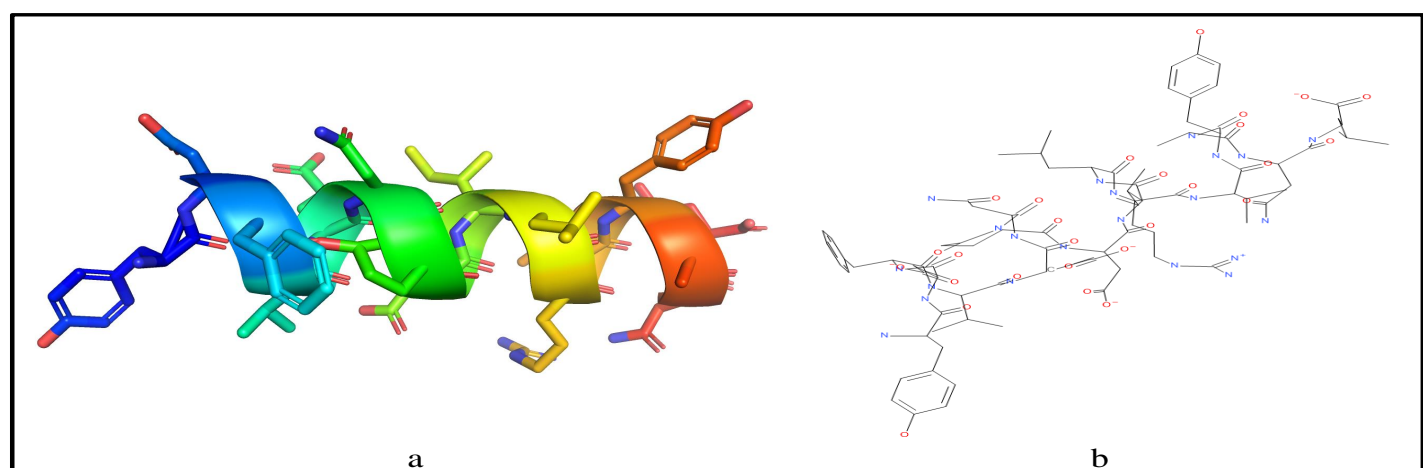


Figure S52: Structural representation for B-cell epitope "YDFVENPDILRVYANL" (a) 3D structure of the epitope (b) Chemical structure of the epitope

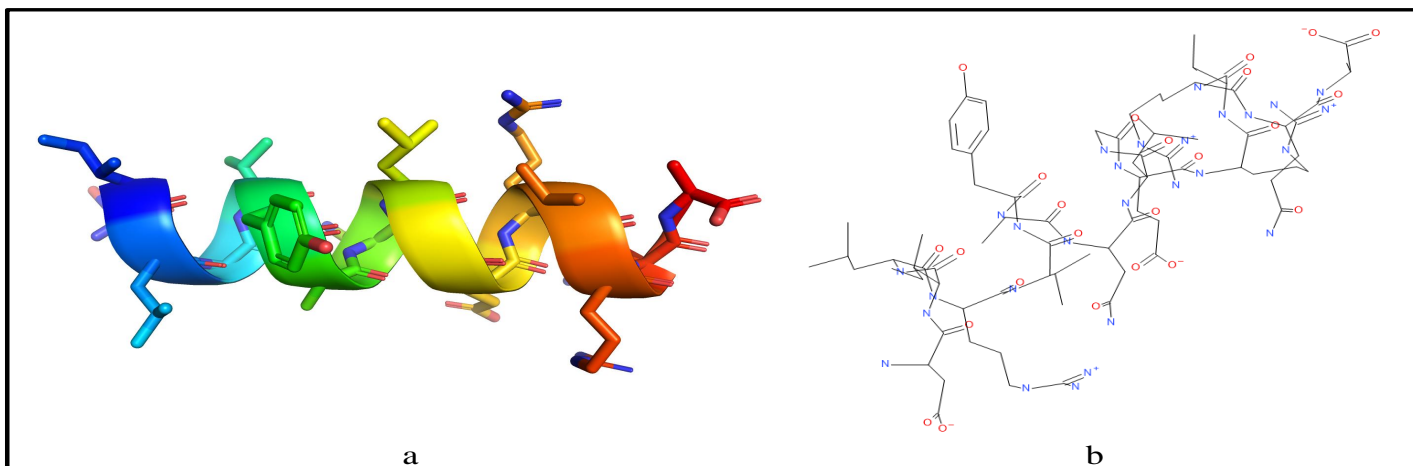


Figure S53: Structural representation for B-cell epitope "DILRVYANLGERVRQA" (a) 3D structure of the epitope (b) Chemical structure of the epitope

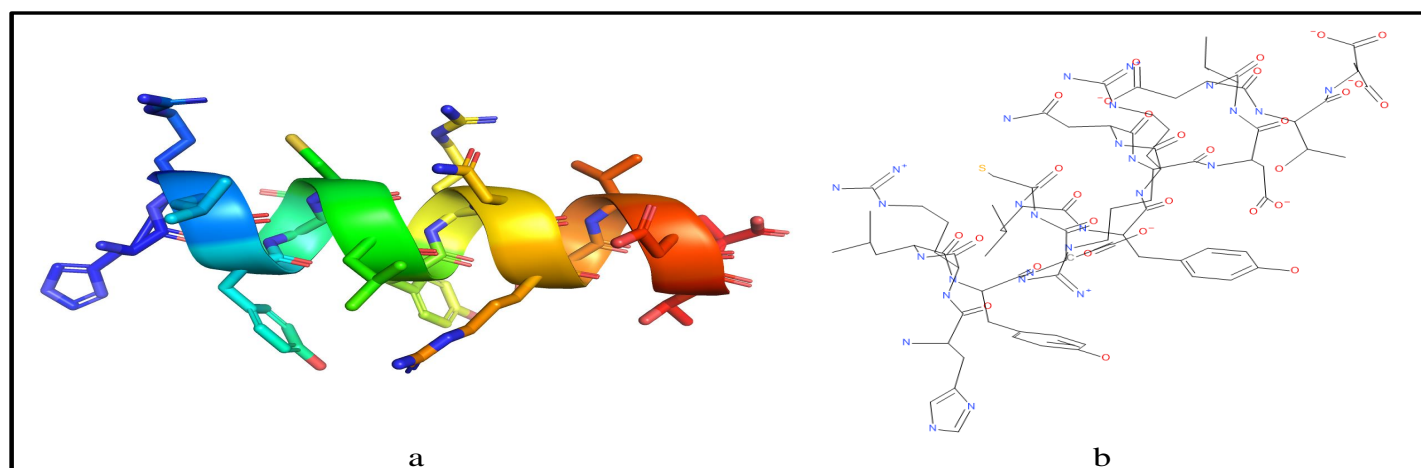


Figure S54: Structural representation for B-cell epitope "HRLYECLYRNRDVRTD" (a) 3D structure of the epitope (b) Chemical structure of the epitope

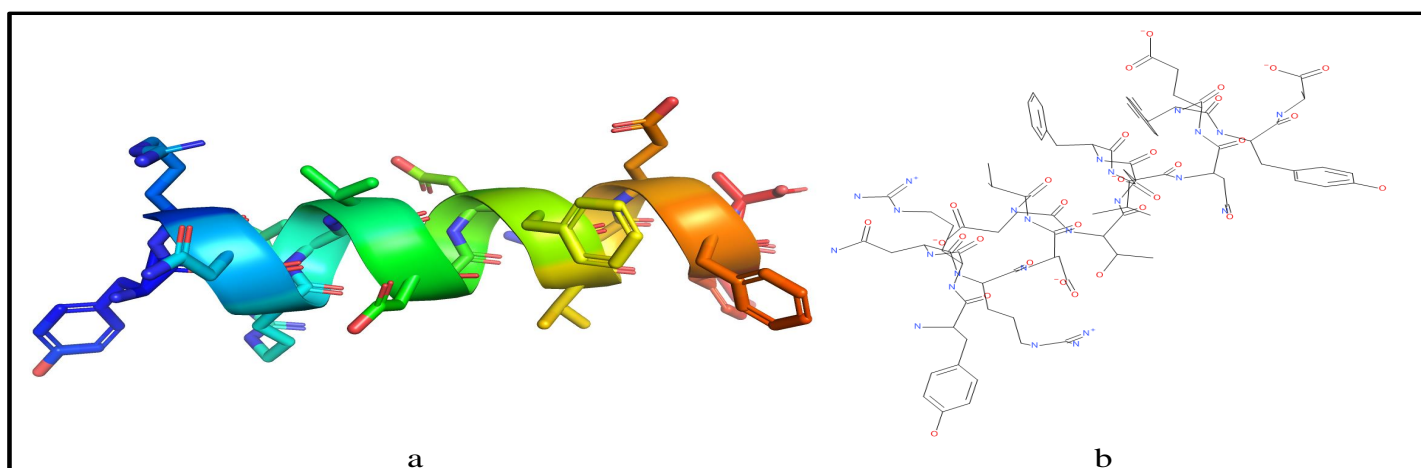


Figure S55: Structural representation for B-cell epitope "YRNRDVTDFVNEFYA" (a) 3D structure of the epitope (b) Chemical structure of the epitope

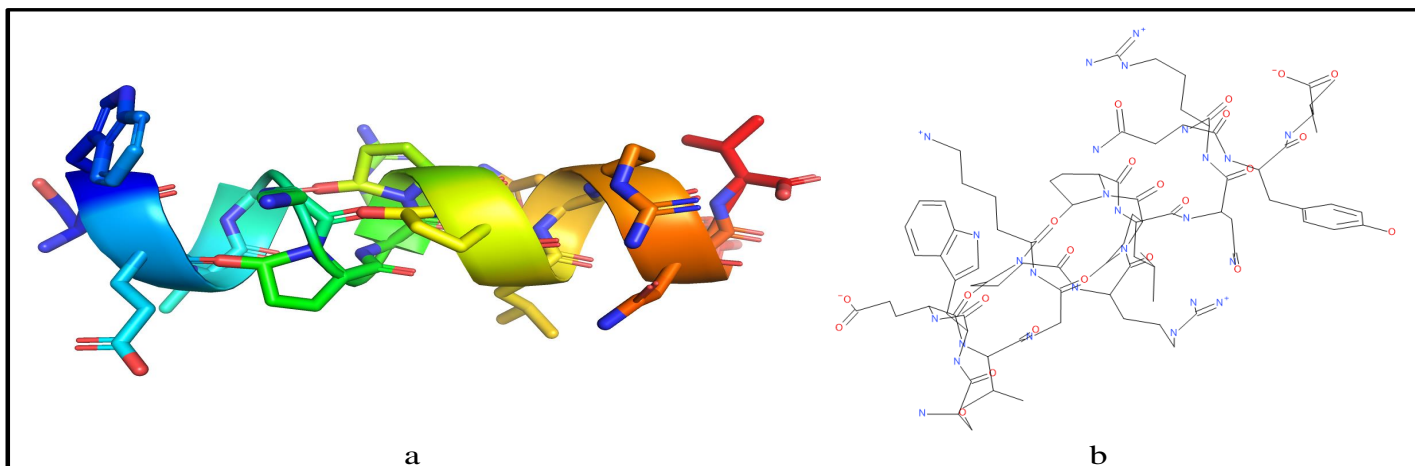


Figure S56: Structural representation for B-cell epitope "SWEVGKPRPPLNRNYV" (a) 3D structure of the epitope (b) Chemical structure of the epitope

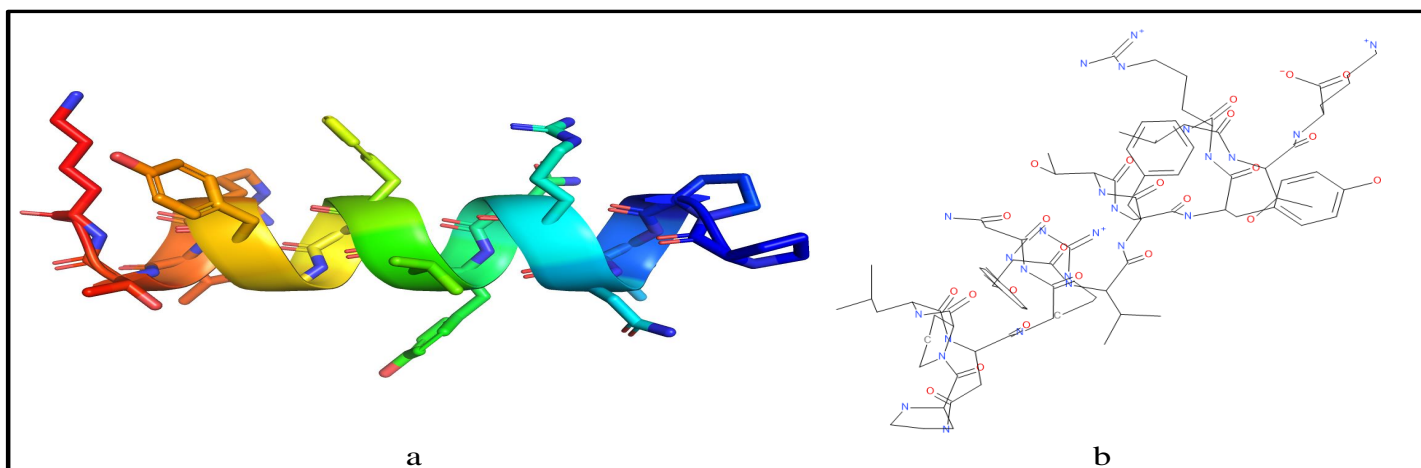


Figure S57: Structural representation for B-cell epitope "PPLNRNYVFTGYRVTK" (a) 3D structure of the epitope (b) Chemical structure of the epitope

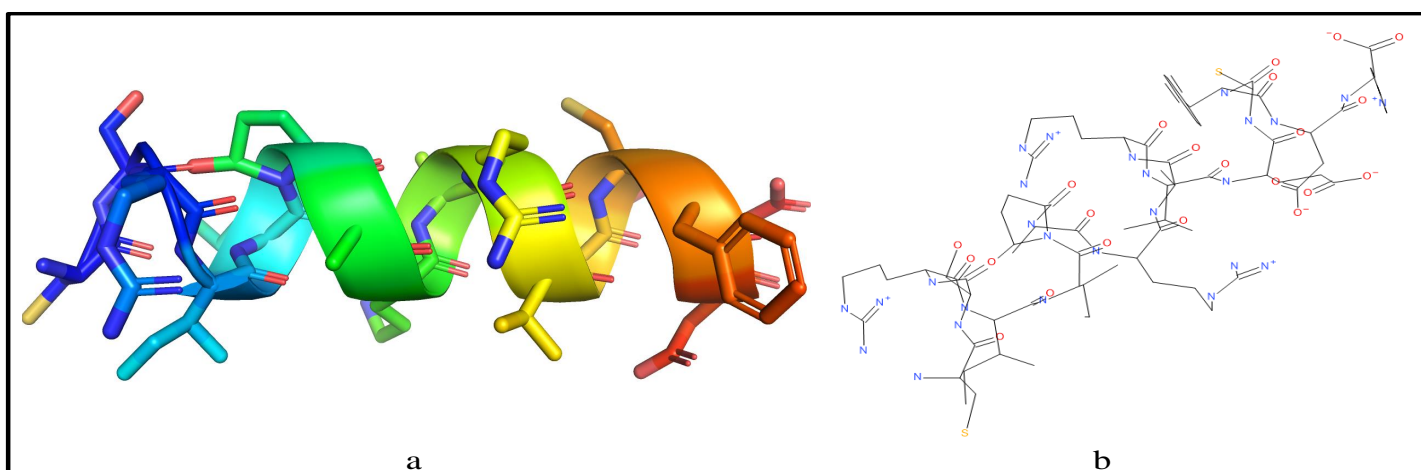


Figure S58: Structural representation for B-cell epitope "CSRIIPARARVECFDK" (a) 3D structure of the epitope (b) Chemical structure of the epitope

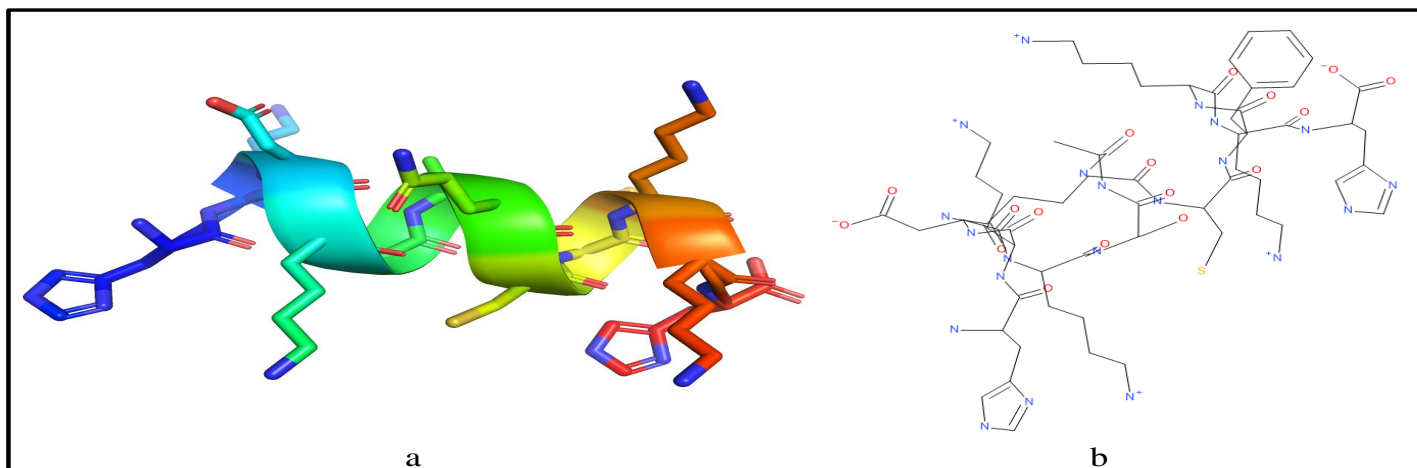


Figure S59: Structural representation for B-cell epitope "HKDKSAQCFK" (a) 3D structure of the epitope (b) Chemical structure of the epitope

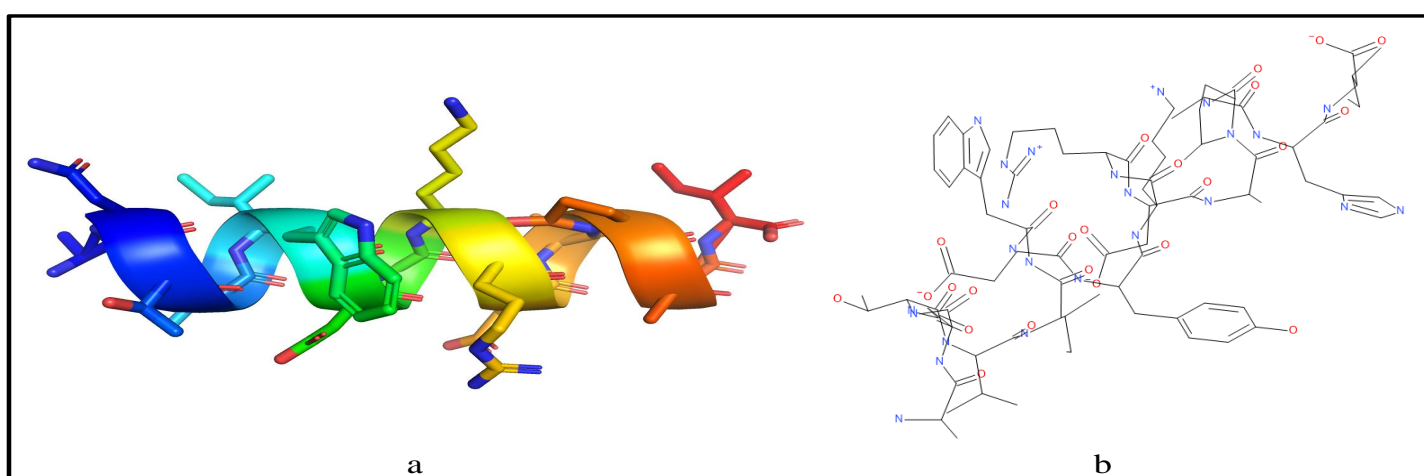


Figure S60: Structural representation for B-cell epitope "ANTVIWDYKRDAPAHI" (a) 3D structure of the epitope (b) Chemical structure of the epitope

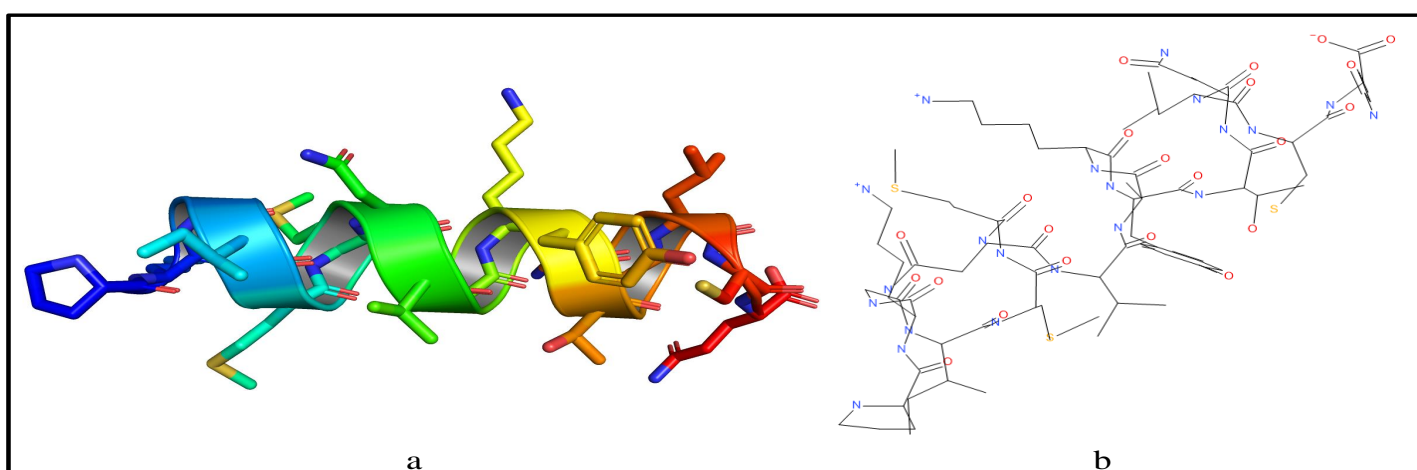


Figure S61: Structural representation for B-cell epitope "PKGIMMNVAKYTQLCQ" (a) 3D structure of the epitope (b) Chemical structure of the epitope

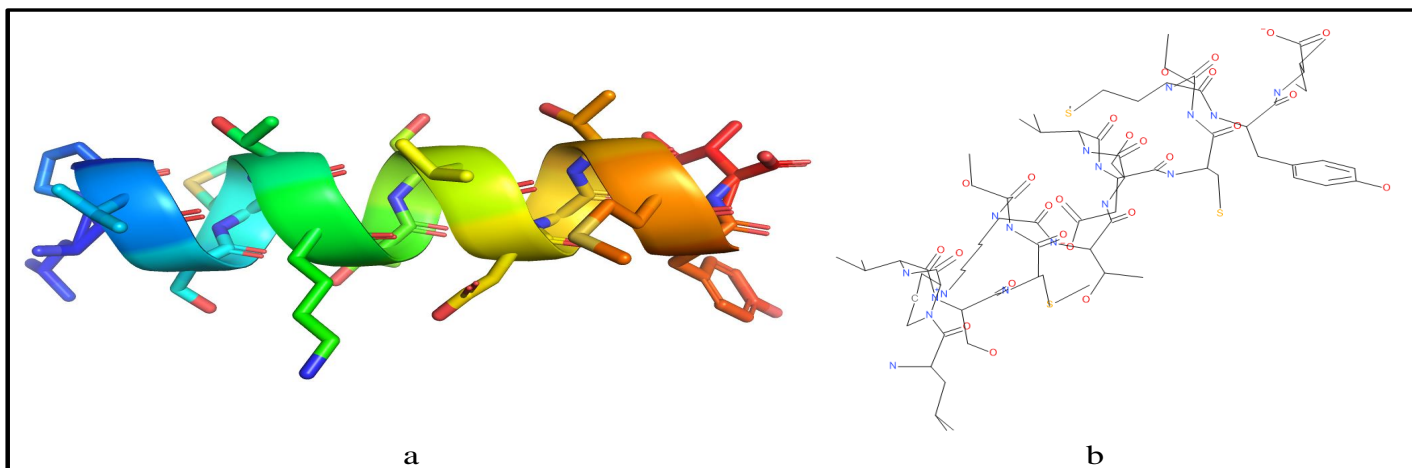


Figure S62: Structural representation for B-cell epitope "LPVSMTKTSVDCTMYI" (a) 3D structure of the epitope (b) Chemical structure of the epitope

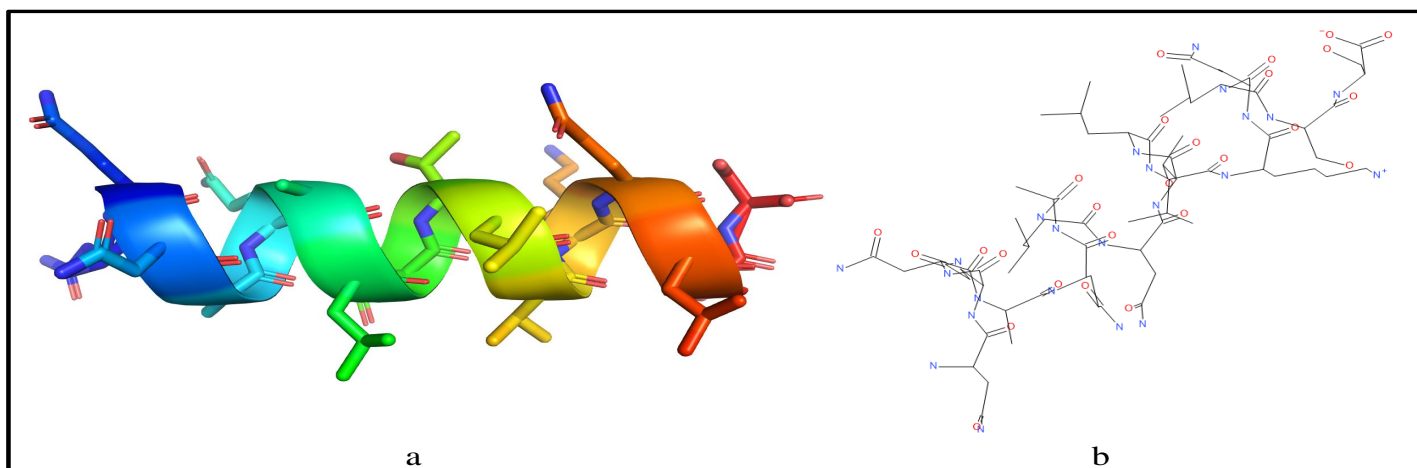


Figure S63: Structural representation for B-cell epitope "NQNAQALNTLVKQLSS" (a) 3D structure of the epitope (b) Chemical structure of the epitope

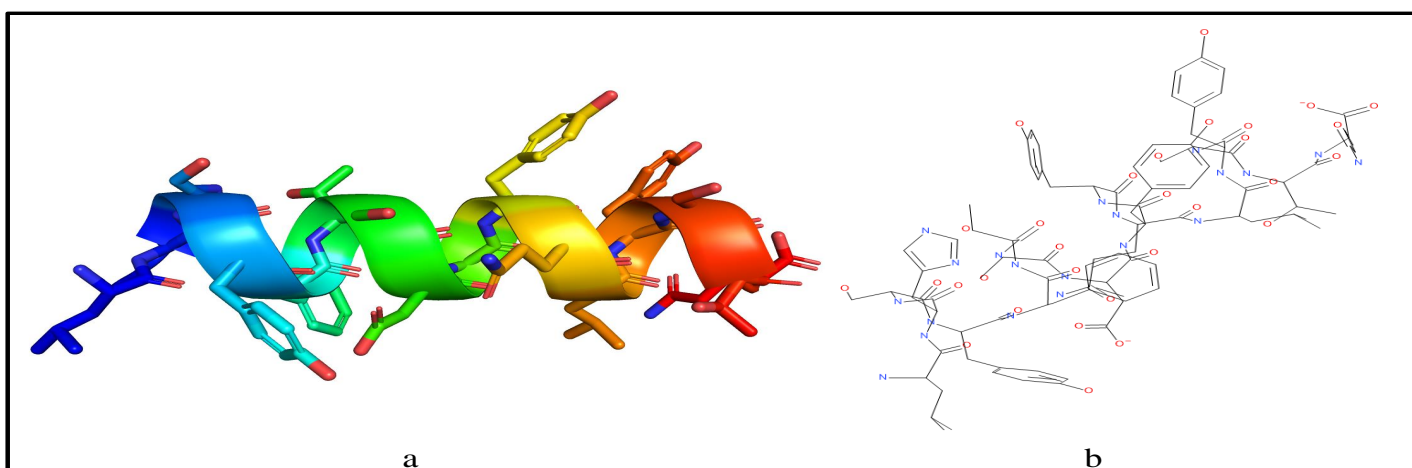


Figure S64: Structural representation for B-cell epitope "LHSYFTSDYYQLYSTQ" (a) 3D structure of the epitope (b) Chemical structure of the epitope

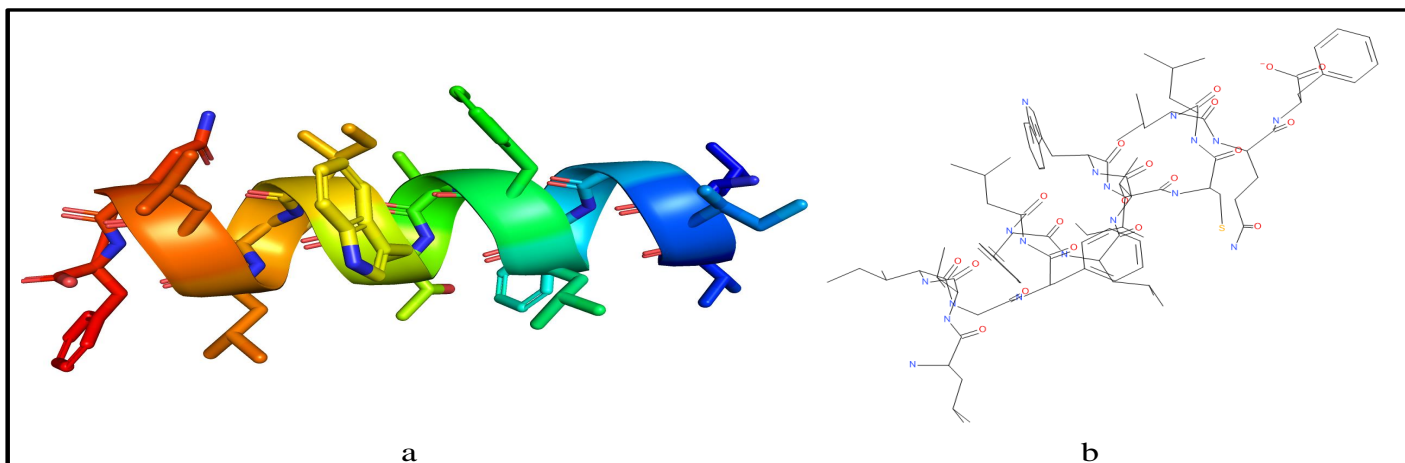


Figure S65: Structural representation for B-cell epitope "LVIGFLFTWICLLQF" (a) 3D structure of the epitope (b) Chemical structure of the epitope

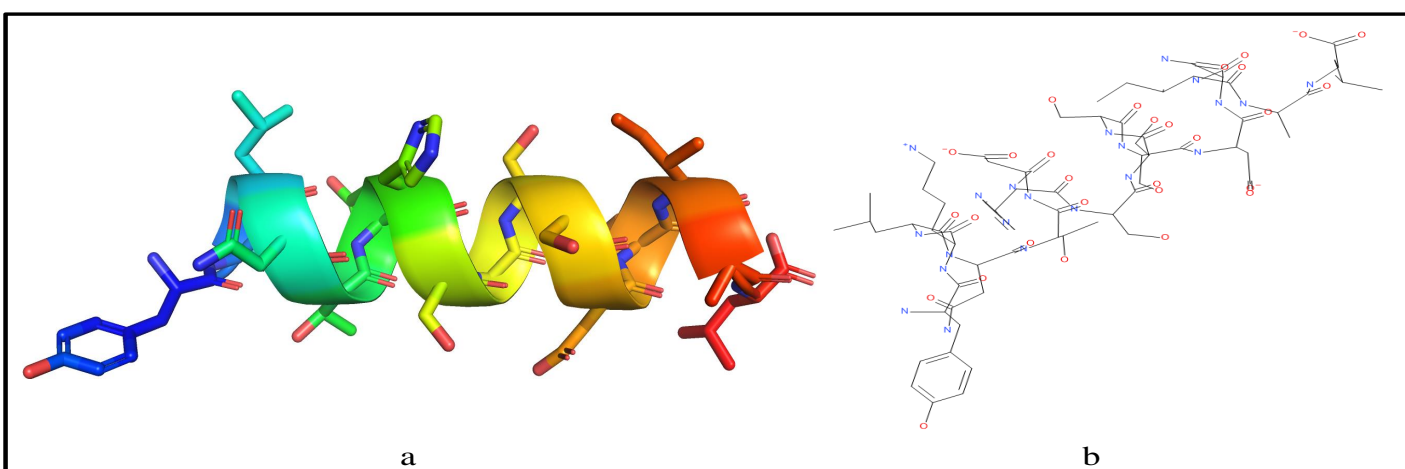


Figure S66: Structural representation for B-cell epitope "YKLNTHSSSDNIAL" (a) 3D structure of the epitope (b) Chemical structure of the epitope

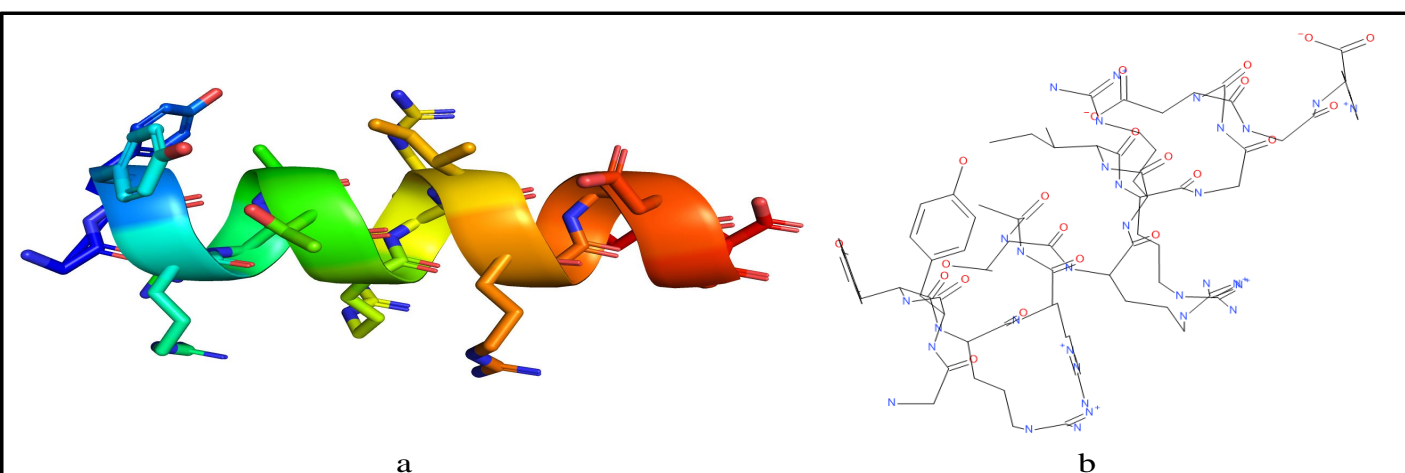


Figure S67: Structural representation for B-cell epitope "GYRRATRRIRGGDGK" (a) 3D structure of the epitope (b) Chemical structure of the epitope