Supplementary Table-1 : HLA types reported to present an epitope within the relevant peptides are listed according to <u>http://tools.iedb.org/population/</u>. HLA allele frequency within all Europe without any specific country or ethnicity is written in paranthesis.

European Coverage Class-I HLA

	Coverage						HLA genotypic f	allele Frequency (%)))					T
Epitope	Class I	HLA- A*02:0 (28.14	HLA- 1 A*24:02) (9.42)	HLA- A*68:01 (3.34)	HLA- B*07:02 (11.91)	HLA- B*35:01 (5.65)	HLA- B*35:08 (0.48)	HLA- B*49:01 (1.36)	HLA- B*51:01 (5.21)	HLA- B*52:01 (1.33)	HLA- C*03:03 (4.75)	HLA- C*03:04 (6.01)	HLA- C*12:02 (1.32)	hits
Peptide-1 SRLLEFYLAMPFATPMEAELARRSLAQ	64.49%	-	+	+	+	+	+	-	+	+	+	+	+	10
Peptide-2: PVPGVLLKEFTVSGNILTIRLTAADHR	8.77%	-	-	+	-	-	-	+	-	-	-	-	-	2
Peptide-3: SLLMWITQC	47.00%	+	-	-	-	-	-	-	-	-	-	-	-	1
Epitope set	83.68%	1	1	2	1	1	1	1	1	1	1	1	1	13
European Coverage Class-II HLA														
				HLA allele (genotypic frequency (%))										
	C	overage					(genoty	pic frequency	y (%))					Tabaluna
Epitope		overage Class II	HLA- DPB1*04:01 (38.47)	HLA- DPB1*04:02 (10.89)	HLA- DQB1*04 (1.05	4:01 DRB1) (8	(genoty ILA- L*01:01 [3.22)	pic frequenc HLA- DRB1*04:01 (6.20)	y (%)) HLA- DRB1*07:0 (13.08)	HL/ 1 DRB1*((1.2	A- 09:01 DR 7)	HLA- B1*11:01 (6.78)	HLA- DRB1*16:01 (4.12)	- Total HLA hits
Epitope Peptide -1: SRLLEFYLAMPFATPMEAELARRSLAQ	2 (8	Class II	HLA- DPB1*04:01 (38.47) +	HLA- DPB1*04:02 (10.89) +	HLA- DQB1*04 (1.05	H 4:01 DRB1) (8	(genoty ILA- L*01:01 [5.22) +	HLA- DRB1*04:01 (6.20)	y (%)) HLA- DRB1*07:0 (13.08) +	HL4 1 DRB1*((1.2	A- D9:01 DR 7)	HLA- B1*11:01 (6.78) -	HLA- DRB1*16:01 (4.12)	Total HLA hits 7
Epitope Peptide -1: SRLLEFYLAMPFATPMEAELARRSLAQ Peptide-2: PVPGVLLKEFTVSGNILTIRLTAADHR	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2lass II 24.45% 2.78%	HLA- DPB1*04:01 (38.47) +	HLA- DPB1*04:02 (10.89) +	HLA- DQB1*04 (1.05 +	4:01 DRB1) (8	(genoty ILA- L*01:01 [3.22) +	HLA allele pic frequenc HLA- DRB1*04:01 (6.20) +	y (%)) HLA- DRB1*07:0 (13.08) +	1 HL/ 1 DRB1*((1.2 +	A- D9:01 DR 7)	HLA- B1*11:01 (6.78) -	HLA- DRB1*16:01 (4.12) -	Total HLA hits 7 4
Epitope Peptide -1: SRLLEFYLAMPFATPMEAELARRSLAQ Peptide-2: PVPGVLLKEFTVSGNILTIRLTAADHR Peptide-3: SLLMWITQC		21ass II 44.45% 42.78% 59.64%	HLA- DPB1*04:01 (38.47) +	HLA- DPB1*04:02 (10.89) + -	HLA- DQB1*04 (1.05 +	4:01 DRB1) (8	(genoty ILA- 1*01:01 E 3.22) + +	HLA allele pic frequenc HLA- DRB1*04:01 (6.20) + +	y (%)) HLA- DRB1*07:0 (13.08) + -	1 HL/ 1 DRB1*((1.2 +	A- D9:01 DR 7)	HLA- B1*11:01 (6.78) - +	HLA- DRB1*16:01 (4.12) - +	Total HLA hits 7 4 2

- : not restricted

Supplementary Table-2: A)TCRs coded by mRNA's used in in vitro stimulation assays. Known recognizing minimal peptides, and binding HLA types. B) Physical characteristics of each peptide.

A)	TCR name	Specific peptide	position	HLA type
	CD8-pST1-hTCR-NYE#12	ATPMEAELARRSLAQ	97-111	B*0702
	CD4-pST1-hTCR-NYE#3	PVPGVLLKEFTVSGNILTIRLT	117–139	DRB1*0401
	CD8-pST1-NY-ESO 1-A2-TCR- VhuCmu	SLLMWITQC	157-165	A*0201

B)	Namo	Desition	Somucineo	Hudronothy	Iso-electric point
	Name	POSITION	Sequence	Top is hydrophilic Bottom is hydrophobic	solubility
	Peptide 1	85-111			рН 6.82
		(27mer)	SKLLEFTLAMIPFATPINEAELAKKSLAQ	Ser Fre Leu Fre Fre Fre Fre Fre Fre Fre Fre Fre Fre	≤5mg/ml in H ₂ O ≤10mg/ml in DMSO
	Peptide 2	ptide 2 117–143			рН 10.52
		(27mer)		Pro Val Val Eu Eu Leu Leu Leu Can Ran An Ran An Ran An An An An An An An An An An An An An	≤10mg/ml in H ₂ O ≤5mg/ml in DMSO
	Peptide 3	157-165			рН 3.00
		(9mer)	SLLIVIVVITQC	Ser Leu Met ILe ILe ILe GLn Cys	Undissolved in H₂O ≤10mg/ml in DMSO
			Color codes: Acidic	Aromatic Basic Aliphatic Polar	Cysteine

Supplementary Table-3: A) Nanoparticles containing single peptides. B) Nanoparticles containing three peptide mix. Peptides used in production, peptide content after production and washing, and size characteristics of each nanoparticle batch are mentioned in different rows.

Encapsulation of single peptides by PLGA										
Peptide	ug peptide used per mg PLGA	Peptide content of nanoparticle (ug pep/mg NP)	Particle Size ± SD	IMM60						
	5	4.2	177±50	+						
	5	1.3	211±70	+						
Dontido 1	10	3.1	178±47	+						
Peptide 1	15	4.6	215±66	+						
	22.5	12.8	213±51	+						
	22.5	12.4	208±49	-						
	5	1	184±54	+						
Peptide 2	10	9.7	203±53	+						
	20	22.4	224±71	+						
	5	5.8	198±52	+						
Peptide 3	10	7.1	201±55	+						
	20	11.3	218±59	+						

A)

B)

Encapsulation of multiple peptides by PLGA										
ug each peptide used per mg PLGA	Peptide	content of na (ug pep/mg l	Particle Size	IMM60						
	Peptide 1	Peptide 2	Peptide 3							
5	6.5	4.3	6.8	189±54	+					
5	7.1	4	4	203±58	+					
10	8.2	7.2	8.3	211±66	+					
10	7.7	6.4	9.5	212±73	+					
10	7.2	6.2	9.3	219±60	+					
10	11.4	13.4	11.5	227±61	+					
10	7.6	7.1	7.6							
10	6.2	5.5	7.5							
10	8.8	5.9	12	199±51	+					
10	6.1	4.3	11	201±53	-					

Supplementary Table-4:A) Known B35 binding epitope (underlined) within the peptide-1 and DRB1*0401 epitope (underlined) within peptide-2 shown with other overlapping peptides used in figure-3. **B)** HLA genotyping results of patients #6 and #7 in figure-3

A)

Peptide sequence	Position	Name
SRLLEFY <u>LAMPFATPM</u> EAELARRSLAQ	85-111	Peptide-1
SRLLEFY <u>LAMPFATPM</u> EA	85-102	
EFY <u>LAMPFATPM</u> EAE	89-103	
<u>AMPFATPM</u> EAELARR	93-107	
<u>ATPM</u> EAELARRSLAQ	97-111	
PVPG <u>VLLKEFTVSG</u> NILTIRLTAADHR	117–143	Peptide-2
<u>VLLKEFTVSG</u> NILTIRLT	121-138	

B)

)	HLA Type - Class I	A3	A1	B35	B8	Cw4	Cw7	
Patient 06	HLA Type – Class II	DRB1*01	DRB1*03	DRB3*01	DQB1*02	DQB	1*05	
	HLA Type - Class I	A1	A2	B8	B27	Cw2	2	Cw7
Patient 07	HLA Type – Class II	DRB1*0301/11	DRB1*0401, 1 13/16/21/26 33/35/38	/ / DRB3*01	DRB4*0	DQB1*()201 DQ	B1*0302

Supplementary Table-5: PLGA NY-ESO-	1 nanoparticle related	microscopic findings in liver	r and lung – scheduled	euthanasia animals (Day 1).
-------------------------------------	------------------------	-------------------------------	------------------------	-----------------------------

	Males					Females				
Group	1	2	3	4	5	1	2	3	4	5
Dose (mg/kg/day)	0	50	0.5	5	50	0	50	0.5	50	50
No. animals examined	5	5	5	5	5	5	5	5	5	5
Liver(No. Examined)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Apoptosis/necrosis; hepato- celular, focal/multifocal	0	5	5	4	5	0	5	1	3	5
Minimal	0	0	3	2	3	0	2	1	0	3
Mild	0	5	2	2	2	0	3	0	1	1
Moderate	0	0	0	0	0	0	0	0	2	1
Infiltration, mononuclear cell; vascular/perivascular	0	0	4	5	4	0	0	5	5	5
Minimal	0	0	4	3	4	0	0	3	1	0
Mild	0	0	0	2	0	0	0	2	4	5
Thrombus	0	0	3	3	2	0	0	2	5	3
Minimal	0	0	1	0	2	0	0	1	2	1
Mild	0	0	2	3	0	0	0	1	3	1
Moderate	0	0	0	0	0	0	0	0	0	1
Lung (No. Examined)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Infiltration, mononuclear cell; vascular	0	0	5	5	3	0	0	4	5	5
Minimal	0	0	5	5	3	0	0	4	3	4
Mild	0	0	0	0	0	0	0	0	2	1

	Males	Males			Females		
Group	1	2	5	1	2	5	
Dose (mg/kg)	0	50	50	0	50	50	
No. animals examined	5	5	5	5	5	5	
Liver (No. Examined)	(5)	(5)	(5)	(5)	(5)	(5)	
Apoptosis/necrosis; hepatocellular	0	2	3	0	1	0	
Minimal	0	2	2	0	1	0	
Mild	0	0	1	0	0	0	
Infiltration, mononuclear cell; vascular/perivascular	0	0	5	0	0	5	
Minimal	0	0	5	0	0	2	
Mild	0	0	0	0	0	3	
Granulomatous inflammation	0	0	1	0	0	0	
Minimal	0	0	0	0	0	0	
Mild	0	0	1	0	0	0	
Thrombus, minimal	0	0	1	0	0	0	
Lung (No. Examined)	(5)	(5)	(5)	(5)	(5)	(5)	
Infiltration, mononuclear cell; vascular/perivascular	0	0	1	0	0	2	
Minimal	0	0	1	0	0	2	
Mild	0	0	0	0	0	0	

Supplementary Table-6: PLGA NY-ESO-1 nanoparticle related microscopic findings in liver and lung –Scheduled Euthanasia Animals (Day 7).