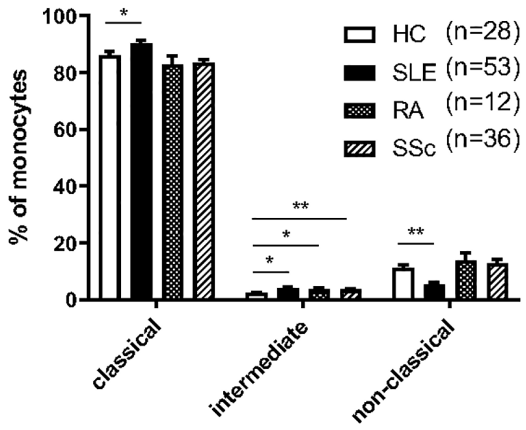
Supplementary Table S1. Anti-human antibodies used in flow cytometry.

Label	Target	Clone	Manufacturer
V450	CD14	MϕP9	BD Biosciences
V500	HLA-DR	G46-6	BD Biosciences
APC	CD86	2331/FUN-1	BD Biosciences
APC-H7	CD40	5C3	BD Biosciences
PE	CX3CR1	2A9-1	BD Biosciences
PerCP/Cyanine5.5	CD16	3G8	BioLegend
FITC	CD3	UCHT1	BioLegend
FITC	CD19	HIB19	BioLegend
FITC	CD66b	G10F5	BioLegend
APC	CCR2	K036C2	BioLegend
APC	Siglec-10	5G6	BioLegend
APC/Cyanine7	CD62L	DREG-56	BioLegend
PE/Cyanine7	CD68	Y1/82A	BioLegend

Supplementary Table S2. Primer sequences used in qPCR analysis.

Target name	Forward (F) or Reverse (R)	Sequence (5'-> 3')
GAPDH	F	GTC TCC TCT GAC TTC AAC AGC G
	R	ACC CTG TTG CTG TAG CCA A
NR4A1	F	GTT CTC TGG AGG TCA TCC GCA AG
	R	GCA GGG ACC TTG AGA AGG CCA
NR4A2	F	TAT TCC AGG TTC CAG GCG AA
	R	GCT AAT CGA AGG ACA AAC AG
NR4A3	F	CCA AGC CTT AGC CTG CCT GTC
	R	AGC CTG TCC CTT ACT CTG GTG G

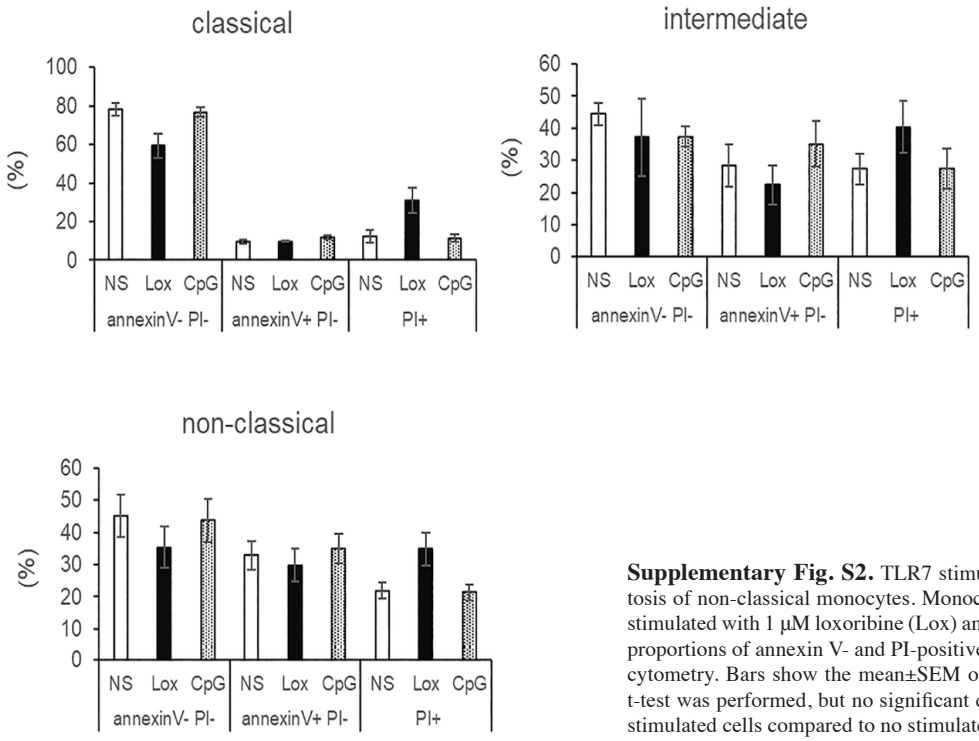


Supplementary Fig. S1.
The proportion of non-classical monocytes was reduced in patients with SLE. Whole blood from patients with several autoimmune diseases (SLE; n=53, RA; n=12, SSc; n=36) and healthy donors (n=28) was analysed using flow cytometry. Bars show the mean+SEM of proportion of each monocyte subset in pan-monocyte. Student's t-test was performed (*vs*. HC).
**p*<0.05, ***p*<0.01.

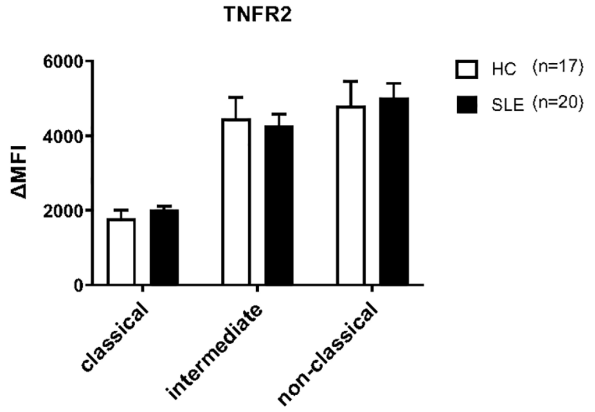
Supplementary Table S3. Treatment of patients in Fig. 1E.

Treatment	SLE n=11
HCQ	8 (73%)
Corticosteroids	11 (100%)
TAC	1 (9%)
MMF	6 (55%)
IVCY	6 (55%)
Baricitinib	1 (9%)
Belimumab	4 (36%)
Pulse corticosteroid therapy	1 (9%)
RTX	2 (18%)

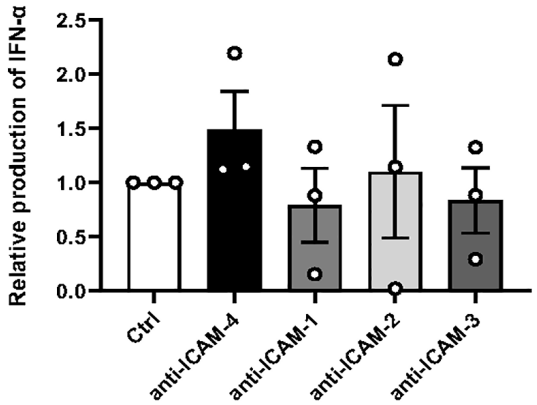
HCQ: hydroxychloroquine; TAC: tacrolimus; MMF: mycophenolate mofetil; IVC: intravenous cyclophosphamide; RTX: rituximab.



Supplementary Fig. S2. TLR7 stimulation did not specifically enhance apoptosis of non-classical monocytes. Monocyte subsets were sorted by cell sorter and stimulated with 1 μM loxoribine (Lox) and 0.5 μM CpG ODN 2216 for 3 hours. The proportions of annexin V- and PI-positive and negative cells were analysed by flow cytometry. Bars show the mean±SEM of proportions of indicated cells. Student's t-test was performed, but no significant difference was found both Lox- and CpG-stimulated cells compared to no stimulated (NS) cells.



Supplementary Fig. S3. Expression levels of TNFR2 on monocytes from SLE patients were similar to those from healthy donors. Expression levels of TNFR2 on monocytes in whole blood from healthy donors (n=17) and patients with SLE (n=20) were measured by flow cytometry. ΔMFI was calculated by subtracting isotype control value from the MFI of each molecule. Bars represent the mean+SEM. Student's t-test was performed, but no significant difference was found between healthy donors and SLE groups.



Supplementary Fig. S4. Effects of anti-ICAM antibodies against IFN-α production by PBMCs. CpG-induced production of IFN-α by PBMCs of healthy donors (n=3) in the presence of indicated antibodies (1 μg/mL). Bars represent the mean+SEM of relative IFN-α levels compared to isotype control antibody stimulated cells (Ctrl). Student's t-test was performed, but no significant difference was found between ICAM-treated groups and Ctrl group.