

**Supplementary Table 1.** Percentage of data availability in the cohort for variables with missing data.

Age	95.7%
Anti-dsDNA (not including those assessed by PMAT)	92.8%
ACLA IgG	80.1%
ACLA IgM	79.5%
Anti-β2-gpI IgG	75.3%
Anti-β2-gpI IgM	75.3%
LAC	67.5%
Ongoing GC	99.5%
Ongoing HCQ	99.3%
Ongoing MTX	99.2%
Ongoing AZA	99.3%
ANA positivity	95.6% *
* 100% for SLE and UCTD	

**Supplementary Table 2.** Autoantibody titres among the four clusters identified. Data are shown as median (interquartile range)

	<b>Cluster 1 n=47</b>	<b>Cluster 2 n=174</b>	<b>Cluster 3 N=582</b>	<b>Cluster 4 N=21</b>	<b>p</b>
Age	43 (30-59)	54 (43-66)	51 (32-64)	55 (48-70)	0.003
ANA titre	1:640 (1:160-1:1280)	1:640 (1:320-1:640)	1:640(1:160-1:640)	1:160 (1:160-1:320)	< 0.001
Anti-BICD2	0.1 (0.1-0.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001
Anti-fibrillarlin	0.4 (0.2-0.7)	0.3 (0.2-0.4)	0.3 (0.2-0.4)	0.3 (0.2-0.5)	< 0.001
Anti-Ku	0.2 (0.1-1.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001
Anti-PM1-A	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	< 0.001
Anti-RNA pol III	0.2 (0.1-0.2)	0.1 (0.1-0.2)	0.1 (0.1-0.2)	0.1 (0.1-0.1)	< 0.001
Anti-Th/To RPP25	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001
Anti-Th/To RPP38	0.1 (0.1-0.2)	0.0 (0.0-0.1)	0.0 (0.0-0.1)	0.0 (0.0-0.1)	< 0.001
Anti-dsDNA	11.9 (0.8-116.3)	0.5 (0.2-2.4)	0.5 (0.2-1.7)	0.3 (0.2-0.7)	< 0.001
Anti-RNP	1.6 (0.2-15.5)	0.3 (0.2-0.8)	0.2 (0.1-0.7)	0.1 (0.1-0.3)	< 0.001
Anti-Sm	0.4 (0.1-3.0)	0.3 (0.2-0.4)	0.2 (0.1-0.2)	0.2 (0.2-0.2)	< 0.001
Anti-Ro52	1.0 (0.4-167.5)	196.3 (192.4-196.3)	0.2 (0.1-0.6)	8.6 (0.3-161.9)	< 0.001
Anti-Ro60	7.8 (0.9-583.7)	583.7 (389.2-583.7)	0.4 (0.2-2.3)	0.5 (0.1-4.7)	< 0.001
Anti-La	1.5 (0.3-12.3)	34.1 (8.0-195.8)	0.3 (0.2-0.7)	0.2 (0.2-0.6)	< 0.001
Anti-Scl70	0.6 (0.3-2.1)	0.3 (0.2-0.4)	0.3 (0.2-0.6)	0.2 (0.2-0.4)	0.005
Anti-Jo1 (test 1)	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.0-0.1)	153.6 (153.6-153.6)	< 0.001
Anti-CENP	0.7 (0.3-1.1)	0.6 (0.4-0.9)	0.5 (0.3-1.1)	0.4 (0.2-1.1)	0.208
Anti-DFS70	0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.1 (0.0-0.2)	0.08
Anti-Rib P	0.4 (0.1-7.2)	0.1 (0.1-0.2)	0.1 (0.1-0.3)	0.1 (0.1-0.2)	< 0.001
Anti-EJ	0.1 (0.1-0.2)	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	< 0.001
Anti-HMGCR	0.1 (0.1-0.1)	0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.1 (0.1-0.1)	0.102
Anti-Jo1 (test 2)	0.0 (0.0-0.1)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	10.7 (8.8-11.5)	< 0.001
Anti-MDA5	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001
Anti-Mi2	0.2 (0.1-0.4)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.2 (0.2-0.2)	< 0.001
Anti-NXP2	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.001
Anti-OJ	0.2 (0.2-0.3)	0.2 (0.2-0.2)	0.2 (0.2-0.3)	1.0 (0.8-1.5)	< 0.001
Anti-PL12	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.1)	< 0.001
Anti-PL7	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.006
Anti-SAE	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.1 (0.0-0.1)	< 0.001
Anti-SRP	0.1 (0.1-0.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	< 0.001
Anti-TIF1y	0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.001

**Supplementary Table 3.** Comparison of clinical, laboratory and serological features of SLE patients among clusters. Data are shown as median (interquartile range) or number (percentage).

	Cluster 1 N=28	Cluster 2 N=23	Cluster 3 N=89	P	Pairwise (Corrected)
Age	36 (26-43)	42 (33-50)	40 (35-51)	0.044	C1 vs C2 0.128 C1 vs C3 0.042 C2 vs C3 0.983
Sex (female)	22/28 (78.6)	22/23 (95.7)	81/89 (89.3)	0.1	
Malar Rash	19/28 (67.9)	11/23 (47.8)	36/89 (40.4)	0.04	C1 vs C2 0.296 C1 vs C3 0.033 C2 vs C3 0.523
Photosensitivity	14/28 (50.0)	8/23 (34.8)	33/89 (37.1)	0.422	
DLE	1/28 (3.6)	0/23 (0.0)	2/89 (2.2)	0.677	
Oral ulcers	4/28 (14.3)	3/23 (13.0)	6/89 (6.7)	0.402	
Arthritis	22/28 (78.6)	17/23 (73.9)	57/89 (68.6)	0.294	
Raynaud's phen.	4/28 (14.3)	2/23 (8.7)	17/89 (19.1)	0.459	
Serositis	6/28 (21.4)	4/23 (17.4)	12/89 (13.5)	0.585	
Pulmonary	1/28 (3.6)	0/23 (0.0)	3/89 (3.4)	0.666	
PAH	0/28 (0.0)	0/23 (0.0)	1/89 (0.7)	0.749	
Nephritis	15/28 (53.6)	9/23 (39.1)	31/89 (39.3)	0.208	
Myositis	0/28 (0.0)	1/23 (4.3)	1/89 (1.1)	0.395	
PNS	0/28 (0.0)	1/23 (4.3)	4/89 (4.5)	0.523	
Psychosis	0/28 (0.0)	0/23 (0.0)	2/89 (1.4)	0.559	
Seizure	0/28 (0.0)	1/23 (4.3)	5/89 (5.6)	0.441	
Leukopenia	16/28 (57.1)	9/23 (39.1)	27/89 (37.1)	0.037	C1 vs C2 0.4 C1 vs C3 0.03 C2 vs C3 0.421
Haemolytic anemia	11/28 (39.3)	2/23 (8.7)	10/89 (11.2)	0.001	C1 vs C2 0.026 C1 vs C3 0.003 C2 vs C3 0.725
Thrombocytopenia	6/28 (21.4)	3/23 (13.0)	10/89 (11.2)	0.388	
Low C3	25/28 (89.3)	7/23 (30.4)	38/89 (42.7)	<0.001	C1 vs C2 <0.001 C1 vs C3 <0.001 C2 vs C3 0.285
Low C4	17/28 (60.7)	7/23 (30.4)	24/89 (34.3)	0.004	C1 vs C2 0.062 C1 vs C3 0.003 C2 vs C3 0.740
Anti-dsDNA	21/25 (84.0)	11/19 (57.9)	41/85 (48.2)	0.006	C1 vs C2 0.108 C1 vs C3 0.006 C2 vs C3 0.446
ACLA IgG	3/23 (13.0)	2/16 (12.5)	11/71 (15.5)	0.963	
ACLA IgM	1/23 (4.3)	1/16 (6.3)	3/70 (4.3)	0.942	
Anti-β2-gpl IgG	2/22 (9.1)	1/15 (6.7)	9/68 (13.2)	0.714	
Anti-β2-gpl IgM	1/22 (4.5)	1/15 (6.7)	2/68 (2.9)	0.776	
Positive LAC	2/18 (11.1)	3/16 (18.8)	5/55 (11.2)	0.560	
Ongoing GC	23/28 (82.1)	20/23 (87.0)	60/85 (70.6)	0.180	
Ongoing HCQ	14/28 (50.0)	16/23 (69.6)	60/85 (70.6)	0.127	
Ongoing MTX	1/28 (3.6)	3/23 (13.0)	8/84 (9.5)	0.470	
Ongoing AZA	2/28 (7.1)	1/23 (4.3)	10/84 (11.9)	0.488	
ANA titre	1:640 (1:160-1:1280)	1:640 (1:320-1:640)	1:320 (1:160-1:640)	0.158	

Anti-BICD2	0.2 (0.1-0.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001	
Anti-fibrillarin	0.5 (0.2-0.6)	0.3 (0.2-0.5)	0.3 (0.3-0.4)	0.1	
Anti-Ku	0.3 (0.1-1.2)	0.1 (0.1-0.1)	0.1 (0.1-0.2)	< 0.001	
Anti-PM1-A	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.002	
Anti-RNA pol III	0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.1 (0.1-0.2)	< 0.001	
Anti-Th/To RPP25	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.001	
Anti-Th/To RPP38	0.1 (0.1-0.2)	0.0 (0.0-0.1)	0.1 (0.0-0.1)	< 0.001	
Anti-dsDNA	103.1 (9.7-116.3)	4.1 (0.6-13.8)	5.5 (1.1-19.6)	< 0.001	C1 vs C2 <0.001 C1 vs C3 <0.001 C2 vs C3 0.449
Anti-RNP	5.6 (1.4-182.0)	1.0 (0.4-13.1)	1.8 (0.3-165.0)	0.044	C1 vs C2 0.018 C1 vs C3 0.114 C2 vs C3 0.411
Anti-Sm	1.2 (0.4-67.1)	0.3 (0.2-0.7)	0.2 (0.1-0.7)	< 0.001	C1 vs C2 0.008 C1 vs C3 <0.001 C2 vs C3 0.093
Anti-Ro52	0.9 (0.43-79.0)	141.9 (38.5-196.3)	0.3 (0.2-0.8)	< 0.001	C1 vs C2 <0.001 C1 vs C3 <0.001 C2 vs C3 <0.001
Anti-Ro60	19.7 (1.5-561.4)	583.7 (453.5-583.7)	1.4 (0.4-12.6)	< 0.001	C1 vs C2 <0.001 C1 vs C3 <0.001 C2 vs C3 <0.001
Anti-La	2.3 (0.5-11.6)	6.8 (2.7-90.4)	0.3 (0.2-0.7)	< 0.001	C1 vs C2 0.038 C1 vs C3 <0.001 C2 vs C3 <0.001
Anti-Scl70	0.9 (0.4-3.6)	0.3 (0.2-0.5)	0.3 (0.2-0.5)	< 0.001	
Anti-Jo1 (test 1)	0.1 (0.1-0.3)	0.1 (0.1-0.2)	0.1 (0.0-0.1)	< 0.001	
Anti-CENP	0.9 (0.6-1.1)	0.7 (0.4-0.9)	0.4 (0.2-0.6)	< 0.001	
Anti-DFS70	0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.1 (0.0-0.1)	0.938	
Anti-Rib P	2.1 (0.23-61.4)	0.4 (0.1-1.2)	0.2 (0.2-1.4)	0.003	C1 vs C2 0.028 C1 vs C3 0.003 C2 vs C3 0.781
Anti-EJ	0.1 (0.1-0.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001	
Anti-HMGCR	0.1 (0.1-0.1)	0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.059	
Anti-Jo1 (test 2)	0.1 (0.0-0.1)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	< 0.001	
Anti-MDA5	0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.006	
Anti-Mi2	0.2 (0.1-0.5)	0.1 (0.1-0.2)	0.1 (0.1-0.2)	< 0.001	
Anti-NXP2	0.2 (0.1-0.3)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.003	
Anti-OJ	0.3 (0.2-0.3)	0.2 (0.2-0.3)	0.2 (0.2-0.2)	0.01	
Anti-PL12	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.249	
Anti-PL7	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.275	
Anti-SAE	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.705	
Anti-SRP	0.1 (0.1-0.4)	0.1 (0.1-0.1)	0.1 (0.1-0.1)	< 0.001	
Anti-TIF1y	0.2 (0.2-0.3)	0.2 (0.2-0.2)	0.2 (0.2-0.2)	< 0.001	

**Supplementary Table 4.** Comparison of clinical, laboratory and serological features of SJS patients among clusters. Data are shown as median (interquartile range) or number (percentage).

	Cluster 1 N=7	Cluster 2 N=129	Cluster 3 N=110	P
Age		55 (46-69)	64 (54-71)	<0.001
Sex (female)		125/129 (96.9)	105/110 (95.5)	0.736
Xerostomia		112/129 (86.8)	105/110 (95.5)	0.021
Xerophthalmia		118/129 (91.5)	104/110 (94.5)	0.357
Glandular swelling		36/129 (27.9)	15/110 (13.6)	0.007
Purpura		15/129 (11.6)	0/110 (0.0)	<0.001
Arthritis		78/129 (60.5)	42/110 (38.2)	0.001
Raynaud's phen.		35/129 (27.1)	28/110 (25.5)	0.769
Serositis		0/129 (0.0)	1/110 (0.9)	0.460
Pulmonary		7/129 (5.4)	11/110 (7.7)	0.182
PAH		0/129 (0.0)	0/110 (0.0)	
GMN		3/126 (2.3)	2/108 (1.8)	1.000
TIN		2/129 (1.6)	0/110 (0.0)	0.501
Myositis		2/129 (1.6)	1/110 (0.9)	1.000
CNS		2/129 (1.6)	2/110 (1.8)	1.000
PNS		5/129 (3.9)	3/107 (2.7)	0.729
Thyroiditis		37/92 (28.7)	39/71 (35.5)	0.262
Hepatic		2/127 (1.6)	3/107 (2.7)	0.664
Leukopenia		37/129 (28.7)	15/110 (13.6)	0.005
Hypergammagl.		85/129 (65.9)	29/110 (26.4)	<0.001
Cryoglobulinaemia		6/129 (4.7)	0/110 (0.0)	0.032
Monoclonal component		13/129 (10.1)	9/110 (8.2)	0.613
Lymphoma		3/129 (2.3)	0/110 (0.0)	0.252
Low C3		21/129 (16.3)	5/110 (4.5)	0.004
Low C4		20/129 (15.5)	2/110 (1.8)	<0.001
RF		53/129 (41.1)	25/110 (22.7)	0.003
Ongoing GC		69/129 (53.5)	51/110 (46.4)	0.272
Ongoing HCQ		84/129 (65.1)	59/110 (53.6)	0.071
Ongoing MTX		6/129 (4.7)	9/110 (8.2)	0.262
Ongoing AZA		7/129 (5.4)	2/110 (1.8)	0.184
Ongoing RTX		7/129 (5.4)	1/110 (0.9)	0.073
ANA positivity		120/120 (100)	79 /101 (78.2)	<0.001
ANA titre		1:640 (1:640-1:640)	1:640 (1:320-1:640)	0.541
Anti-BICD2		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.122
Anti-fibrillarin		0.3 (0.2-0.4)	0.3 (0.2-0.4)	0.886
Anti-Ku		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.191
Anti-PM1-A		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.882
Anti-RNA pol III		0.1 (0.1-0.2)	0.1 (0.1-0.2)	0.753
Anti-Th/To RPP25		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.471
Anti-Th/To RPP38		0.0 (0.0-0.1)	0.0 (0.0-0.1)	0.722
Anti-dsDNA		0.4 (0.2-1.0)	0.4 (0.2-0.7)	0.116
Anti-RNP		0.3 (0.2-0.6)	0.1 (0.1-0.6)	<0.001
Anti-Sm		0.3 (0.2-0.3)	0.2 (0.1-0.2)	<0.001

Anti-Ro52		196.3 (196.3-196.3)	0.4 (0.1-6.3)	<0.001
Anti-Ro60		583.7 (371.9-583.7)	0.7 (0.2-31.9)	<0.001
Anti-La		42.9 (11.5-195.8)	0.3 (0.1-0.4)	<0.001
Anti-Scl70		0.3 (0.2-0.4)	0.2 (0.1-0.4)	0.117
Anti-Jo1 (test 1)		0.1 (0.1-0.1)	0.1 (0.0-0.1)	<0.001
Anti-CENP		0.6 (0.4-0.9)	0.4 (0.2-0.8)	0.008
Anti-DFS70		0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.755
Anti-Rib P		0.1 (0.1-0.2)	0.1 (0.1-0.2)	0.001
Anti-EJ		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.991
Anti-HMGCR		0.1 (0.0-0.1)	0.1 (0.1-0.1)	0.140
Anti-Jo1 (test 2)		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.354
Anti-MDA5		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.778
Anti-Mi2		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.632
Anti-NXP2		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.623
Anti-OJ		0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.977
Anti-PL12		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.396
Anti-PL7		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.910
Anti-SAE		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.977
Anti-SRP		0.1 (0.1-0.1)	0.0 (0.0-0.1)	0.228
Anti-TIF1 $\gamma$		0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.254

**Supplementary Table 5.** Comparison of clinical, laboratory and serological features of UCTD patients among clusters. Data are shown as median (interquartile range) or number (percentage).

	Cluster 1 N=3	Cluster 2 N=18	Cluster 3 N=76	P
Age		46 (35-51)	38 (31-49)	0.563
Sex (female)		16/18 (88.9)	70/76 (92.1)	0.646
Xerostomia		4/18 (22.2)	19/76 (25.0)	1.000
Xerophthalmia		3/18 (16.7)	20/76 (26.3)	0.546
Arthritis		13/18 (72.2)	50/76 (65.8)	0.602
Raynaud's phen.		6/18 (33.3)	35/76 (46.1)	0.328
Serositis		1/18 (5.6)	3/73 (3.9)	0.579
Leukopenia		8/18 (44.4)	17/76 (22.4)	0.076
Thrombocytopenia		2/18 (11.1)	8/76 (10.5)	1.000
Hypergammagl.		9/18 (50.0)	17/76 (22.4)	0.037
Low C3		1/17 (5.6)	10/76 (13.2)	0.684
Low C4		0/18 (0.0)	3/76 (3.9)	1.000
Ongoing GC		5/18 (27.8)	23/76 (30.3)	0.836
Ongoing HCQ		11/18 (61.1)	51/76 (67.1)	0.629
Ongoing MTX		2/18 (11.1)	5/76 (6.6)	0.616
ANA positivity		18/18 (100)	76/76 (100)	n/a
ANA titre		1:320 (1:320-1:960)	1:480 (1:160-1:640)	0.795
Anti-BICD2		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.706
Anti-fibrillar		0.3 (0.3-0.5)	0.3 (0.2-0.4)	0.296
Anti-Ku		0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.649
Anti-PM1-A		0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.456
Anti-RNA pol III		0.2 (0.1-0.2)	0.1 (0.1-0.2)	0.023
Anti-Th/To RPP25		0.1 (0.1-0.1)	0.2 (0.1-0.1)	0.489
Anti-Th/To RPP38		0.1 (0.1-0.1)	0.0 (0.0-0.1)	0.005
Anti-dsDNA		2.4 (0.5-10.4)	1.0 (0.3-2.8)	0.041
Anti-RNP		0.4 (0.2-0.8)	0.2 (0.1-1.7)	0.125
Anti-Sm		0.3 (0.2-0.4)	0.2 (0.1-0.2)	0.001
Anti-Ro52		196.3 (53.5-196.3)	0.2 (0.1-0.5)	<0.001
Anti-Ro60		583.7 (449.2-583.7)	0.4 (0.1-6.0)	<0.001
Anti-La		15.5 (1.8-195.8)	0.3 (0.1-0.6)	<0.001
Anti-Scl70		0.3 (0.2-0.6)	0.3 (0.2-0.7)	0.550
Anti-Jo1 (test 1)		0.1 (0.1-0.1)	0.1 (0.0-0.1)	0.418
Anti-CENP		0.6 (0.3-1.2)	0.3 (0.2-0.6)	0.137
Anti-DFS70		0.1 (0.0-0.1)	0.1 (0.0-0.1)	0.573
Anti-Rib P		0.2 (0.1-0.3)	0.1 (0.1-0.3)	0.133
Anti-EJ		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.736
Anti-HMGCR		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.719
Anti-Jo1 (test 2)		0.0 (0.0-0.1)	0.0 (0.0-0.0)	0.424
Anti-MDA5		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.629
Anti-Mi2		0.2 (0.1-0.2)	0.1 (0.1-0.2)	0.177
Anti-NXP2		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.284
Anti-OJ		0.2 (0.2-0.2)	0.2 (0.2-0.3)	0.438
Anti-PL12		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.04
Anti-PL7		0.0 (0.0-0.0)	0.0 (0.0-0.0)	1.000

Anti-SAE		0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.258
Anti-SRP		0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.14
Anti-TIF1 $\gamma$		0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.921



**Supplementary Table 6.** Comparison of clinical, laboratory and serological features of IIM patients among clusters. Data are shown as median (interquartile range) or number (percentage).

	Cluster 1 N=3	Cluster 2 N=2	Cluster 3 N=74	Cluster 4 N=21	P
Age			59 (52-69)	55 (48-70)	0.456
Sex (female)			58/74 (78.4)	15/21 (71.4)	0.561
Heliotrope Rash			29/74 (39.2)	4/21 (19.0)	0.087
Gottron's papules			29/74 (39.2)	2/21 (9.5)	0.01
Mechanic's Hands			12/74 (16.2)	6/21 (28.6)	0.217
Fever			10/74 (13.5)	10/21 (47.6)	0.002
Arthritis			26/74 (35.1)	18/21 (85.7)	<0.001
Raynaud's phen.			12/74 (16.2)	8/21 (38.1)	0.038
Serositis			1/74 (1.4)	2/21 (9.5)	0.122
Myositis			57/74 (77.0)	12/21 (57.1)	0.071
Calcinosis			2/74 (2.7)	0/21 (0.0)	1.000
Cancer			3/74 (4.1)	0/21 (0.0)	1.000
Ongoing GC			59/74 (79.7)	18/21 (85.7)	0.754
Ongoing MMF			13/74 (17.6)	9/21 (42.9)	0.021
Ongoing MTX			29/74 (39.2)	3/21 (14.3)	0.033
Ongoing CYC			1/74 (1.4)	0/21 (0.0)	1.000
Ongoing RTX			10/74 (13.5)	5/21 (23.8)	0.31
Ongoing AZA			18/74 (24.3)	2/21 (9.5)	0.225
ANA positivity			64/70 (91.4)	12/17 (70.6)	0.035
ANA titre			1:320 (1:160-1:640)	1:160 (1:160-1:320)	0.12
Anti-BICD2			0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.348
Anti-fibrillarin			0.3 (0.2-0.4)	0.3 (0.2-0.5)	0.309
Anti-Ku			0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.252
Anti-PM1-A			0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.577
Anti-RNA pol III			0.1 (0.1-0.2)	0.1 (0.1-0.1)	0.432
Anti-Th/To RPP25			0.1 (0.1-0.1)	0.1 (0.1-0.1)	1.000
Anti-Th/To RPP38			0.0 (0.0-0.1)	0.0 (0.0-0.1)	0.961
Anti-dsDNA			0.3 (0.1-0.7)	0.3 (0.2-0.7)	0.807
Anti-RNP			0.2 (0.1-0.3)	0.1 (0.1-0.3)	0.707
Anti-Sm			0.1 (0.1-0.2)	0.2 (0.1-0.2)	0.07
Anti-Ro52			0.2 (0.1-0.6)	8.6 (0.3-161.9)	<0.001
Anti-Ro60			0.2 (0.1-0.8)	0.5 (0.1-4.7)	0.33
Anti-La			0.2 (0.1-0.3)	0.2 (0.2-0.6)	0.281
Anti-Scl70			0.2 (0.1-0.5)	0.2 (0.2-0.4)	0.884
Anti-Jo1 (test 1)			0.1 (0.0-0.1)	153.6 (153.6-153.6)	<0.001
Anti-CENP			0.3 (0.2-0.7)	0.4 (0.2-1.1)	0.176
Anti-DFS70			0.1 (0.0-0.5)	0.1 (0.0-0.2)	0.695
Anti-Rib P			0.1 (0.1-0.2)	0.1 (0.1-0.2)	0.636
Anti-EJ			0.1 (0.1-0.1)	0.1 (0.1-0.2)	0.127
Anti-HMGCR			0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.97

Anti-Jo1 (test 2)			0.0 (0.0-0.0)	10.7 (8.8-11.5)	<0.001
Anti-MDA5			0.1 (0.1-0.1)	0.1 (0.1-0.1)	0.804
Anti-Mi2			0.1 (0.1-0.2)	0.2 (0.2-0.2)	0.026
Anti-NXP2			0.1 (0.1-0.2)	0.2 (0.1-0.2)	0.413
Anti-OJ			0.2 (0.2-0.3)	1.0 (0.8-1.5)	<0.001
Anti-PL12			0.0 (0.0-0.0)	0.0 (0.0-0.1)	<0.001
Anti-PL7			0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.646
Anti-SAE			0.0 (0.0-0.0)	0.1 (0.0-0.1)	<0.001
Anti-SRP			0.0 (0.0-0.1)	0.1 (0.1-0.2)	<0.001
Anti-TIF1 $\gamma$			0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.257