A pleiotropic variant in *DNAJB4* is associated with multiple myeloma risk

Writing team: Marco Dicanio [1#], Matteo Giaccherini [1#], Alyssa Clay-Gilmour [2#], Angelica Macauda [3], Juan Sainz [4,5,6], Mitchell J. Machiela [7], Malwina Rybicka-Ramos [8], Aaron D. Norman [9,10], Agata Tyczyńska [11], Stephen J. Chanock [7], Torben Barington [12], Shaji K. Kumar [13], Parveen Bhatti [14,15], Wendy Cozen [16], Elizabeth E. Brown [17], Anna Suska [18], Eva Kannik [12], Robert Z. Orlowski [19], Marek Dudziński [20], Ramon Garcia-Sanz [21], Marcin Kruszewski [22], Joaquin Martinez-Lopez [23], Katia Bieder [24], Elżbieta Iskierka- Jazdzewska [25], Matteo Pelosini [26], Sonja I. Berndt [7], Małgorzata Raźny [27], Krzysztof Jamroziak [28], S. Vincent Rajkumar [13], Artur Jurczyszyn [18], Annette Juul Vangsted [12], Pilar Garrido Collado [5], Ulla Vogel [29], Jonathan N. Hofmann [7], Mario Petrini [30], Aleksandra Butrym [31], Susan L. Slager [9], Elad Ziv [32], Edyta Subocz [33], Graham G. Giles [34,35,36], Niels Frost Andersen [12], Grzegorz Mazur [37], Marzena Watek [38,39], Fabienne Lesueur [40], Michelle A. T. Hildebrandt [19], Daria Zawirska [41], Lene Hyldahl Ebbesen [12], Herlander Marques [42], Federica Gemignani [1], Charles Dumontet [43], Judit Várkonyi [44], Gabriele Buda [30], Arnon Nagler [24], Agnieszka Druzd-Sitek [45], Xifeng Wu [46], Katalin Kadar [44], Nicola J. Camp [47], Norbert Grzasko [48], Rosalie Waller [10], Celine Vachon [9]*, Federico Canzian [3]*, Daniele Campa[1]*

Supplementary table 1. SNPs associated with MM risk in InterLymph ($P<10^{-4}$)

Supplementary table 2: Minor allelic frequency (MAF) of the ten SNPs analyzed in the replication phase.

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Supplementary figure 1. Flowchart of the process performed to select the SNPs to be replicated in IMMEnSE and FinnGen

Supplementary table 1. SNPs associated with MM risk in InterLymph ($P<10^{-4}$)

SNP	Locus	Position	Gene	M/m[b]	OR (95%CI)	P_{value}	SNP	Locus	Position	Gene	M/m[b]	OR (OR 95%CI)	P_{value}
rs34517439	1p31.1	chr1:78450517	DNAJB4	C/A	1.30 (1.15-1.48)	4.70x10-5	rs1022206	3q13.13	chr3:110585338	-	T/C	1.18 (1.09-1.28)	8.61x10-5
rs17391694	1p31.1	chr1:78623626	-	C/T	1.31 (1.16-1.48)	1.23x10-5	rs11135441	5q15	chr5:95222277	ELL2	C/T	0.83 (0.76-0.90)	2.34x10-5
rs2279948	1p22.3	chr1:86691285	-	G/A	1.33 (1.15-1.54)	9.94x10-5	rs3777200	5q15	chr5:95234791	ELL2	C/T	0.82 (0.74-0.90)	1.73x10-5
rs6674512	1p22.3	chr1:86714253	-	G/A	1.40 (1.21-1.62)	8.71x10-6	rs56219066[a]	5q15	chr5:95242931	ELL2	T/C	0.82 (0.75-0.90)	2.22x10-5
rs17129031	1p22.3	chr1:86736892	-	T/C	1.37 (1.18-1.59)	4.18x10-5	rs3777189	5q15	chr5:95253108	ELL2	C/G	0.82 (0.74-0.90)	1.69x10-5
rs7577599[a]	2p23.3	chr2:25613146	DTNB	T/C	0.79 (0.71-0.88)	2.19x10-5	rs1423269[a]	5q15	chr5:95255724	ELL2	A/G	0.82 (0.74-0.90)	1.70x10-5
rs3769943	2q24.3	chr2:166186004	SCN2A	G/C	0.84 (0.77-0.92)	6.62x10-5	rs3777184	5q15	chr5:95262044	ELL2	G/C	0.81 (0.74-0.89)	1.64x10-5
rs10187103	2q24.3	chr2:166188694	SCN2A	C/T	0.84 (0.77-0.91)	6.06x10-5	rs4143832	5q31.1	chr5:131862977	AC116366.3	G/T	0.81 (0.73-0.90)	4.66x10-5
rs7420021	2q24.3	chr2:166188699	SCN2A	A/T	0.84 (0.77-0.92)	6.66x10-5	rs537930	5q31.1	chr5:134348703	-	G/T	0.83 (0.76-0.91)	5.09x10-5
rs7581427	2q24.3	chr2:166238034	SCN2A	T/C	0.84 (0.78-0.92)	8.24x10-5	rs1063348	6p21.32	chr6:32627923	HLA-DQB1	G/A	0.84 (0.77-0.92)	7.44x10-5
rs6763508[a]	3p22.1	chr3:41750989	ULK4	T/C	1.24 (1.11-1.37)	7.17x10-5	rs9372120[a]	6q21	chr6:106667535	ATG5	T/G	1.23 (1.11-1.35)	4.48x10-5
rs7651190	3p22.1	chr3:41765955	ULK4	A/G	1.25 (1.13-1.39)	2.32x10-5	rs2299864	6q21	chr6:106667994	ATG5	C/T	1.24 (1.12-1.37)	1.96x10-5
rs6599175[a]	3p22.1	chr3:41786009	ULK4	T/C	1.25 (1.12-1.38)	3.65x10-5	rs3804333	6q21	chr6:106727215	ATG5	C/T	1.24 (1.12-1.37)	2.19x10-5
rs9832037	3p22.1	chr3:41812032	ULK4	T/C	1.24 (1.12-1.37)	6.08x10-5	rs4487645[a]	7p15.3	chr7:21938240	DNAH11	C/A	0.84 (0.77-0.91)	5.15x10-5
rs73071352[a]	3p22.1	chr3:41828300	ULK4	A/G	1.26 (1.12-1.40)	6.10x10-5	rs1122979	7q36.1	chr7:150915071	ABCF2	G/A	1.29 (1.14-1.46)	5.35x10-5
rs6768542	3p22.1	chr3:41865474	ULK4	G/A	1.24 (1.12-1.38)	4.45x10-5	rs7812088	7q36.1	chr7:150919829	ABCF2	G/A	1.29 (1.14-1.46)	5.95x10-5
rs114714860	3p22.1	chr3:41882905	ULK4	G/C	1.26 (1.13-1.40)	1.56x10-5	rs13252276	8p23.1	chr8:10047203	-	C/T	0.77 (0.68-0.87)	3.10x10-5
rs6797165	3p22.1	chr3:41887777	ULK4	A/G	1.26 (1.14-1.40)	1.33x10-5	rs1948915[a]	8q24.21	chr8:128222421	PCAT1	T/C	1.21 (1.11-1.32)	8.04x10-6
rs2683696	3p22.1	chr3:41914898	ULK4	T/C	1.26 (1.14-1.40)	1.30x10-5	rs465530	12q14.3	chr12:65330766	LINC02389	G/T	1.18 (1.09-1.28)	4.94x10-5
rs79211428	3p22.1	chr3:41921810	ULK4	C/T	1.28 (1.15-1.43)	1.18x10-5	rs57968458[a]	17p11.2	chr17:16820099	-	G/A	1.33 (1.18-1.50)	4.99x10-6
rs1052501[a]	3p22.1	chr3:41925398	ULK4	T/C	0.79 (0.72-0.88)	1.53x10-5	rs28507905	17p11.2	chr17:16820513	-	C/T	1.33 (1.18-1.50)	1.90x10-6
rs1716983	3p22.1	chr3:41964128	ULK4	A/G	0.80 (0.72-0.89)	2.72x10-5	rs34562254[a]	17p11.2	chr17:16842991	TNFRSF13B	G/A	1.42 (1.26-1.61)	1.88x10-8
rs7622665	3p22.1	chr3:41970743	ULK4	C/T	0.80 (0.72-0.89)	3.42x10-5	rs4792800	17p11.2	chr17:16845167	TNFRSF13B	A/G	1.37 (1.22-1.55)	3.42x10-7
rs1717027	3p22.1	chr3:41987920	ULK4	C/T	0.80 (0.72-0.89)	2.59x10-5	rs4561508	17p11.2	chr17:16848750	TNFRSF13B	C/T	1.37 (1.21-1.55)	6.45x10-7
rs7372217	3p22.1	chr3:41990122	ULK4	A/G	0.80 (0.72-0.89)	2.79x10-5	rs4273077[a]	17p11.2	chr17:16849139	TNFRSF13B	A/G	1.32 (1.17-1.49)	1.04x10-5
rs6599192[a]	3p22.1	chr3:41992408	ULK4	A/G	0.80 (0.72-0.89)	2.51x10-5	rs57166795	17p11.2	chr17:16857177	TNFRSF13B	G/A	1.37 (1.21-1.55)	5.27x10-7
rs2272007[a]	3p22.1	chr3:41996136	ULK4	C/T	0.80 (0.72-0.89)	2.79x10-5	rs4985726	17p11.2	chr17:16863638	TNFRSF13B	C/G	1.35 (1.20-1.53)	1.57x10-6
rs9856633	3p22.1	chr3:42013850	-	G/A	0.80 (0.72-0.89)	4.31x10-5	rs8132680	21q22.12	chr21:36564709	RUNX1	T/C	1.21 (1.11-1.33)	2.96x10-5

[a] SNPs already known to be associated with the risk of developing MM; b: M= the most common allele in controls; m= the less common allele in controls

Supplementary table 2: Minor allelic frequency (MAF) of the ten SNPs analyzed in the replication phase.

SNP	Region	(Alleles) M/m	MAF Interlymph	MAF IMMEnSE	MAF FinnGen
rs34517439	1p31.1	C/A	0.09	0.08	0.13
rs6674512	1p22.3	G/A	0.06	0.06	0.07
rs10187103	2q24.3	C/T	0.31	0.32	0.17
rs1022206	3q13.13	C/T	0.42	0.40	0.37
rs4143832	5q31.1	G/T	0.17	0.21	0.23
rs537930	5q31.1	G/T	0.26	0.26	0.23
rs1063348 [a]	6p21.32	G/A	0.41	0.41	0.49
rs13252276	8p23.1	C/T	0.46	0.43	0.35
rs465530	12q14.3	G/T	0.49	0.48	0.40
rs8132680	21q22.12	T/C	0.25	0.26	0.22

[a]: this polymorphism is not present in FinnGen, and therefore the frequency reported was obtained from 1000Genome.

Supplementary table 3: effect sizes and P_{values} reported in GWAS catalog for the SNPs selected for replication.

SNP	Region	(Alleles) M/m_a	Trait	OR (95CI)	P_{value}
rs34517439	1p31.1	C/A	Height	1.03 (1.02-1.04)	1.00E-34
			Body mass index	1.04 (1.02-1.05)	4.00E-24
			Fat-free mass	1.46 (1.28-1.65)	5.00E-28
			Diastolic blood pressure	0.79 (0.72-0.88)	5.00E-21
			Hand grip strength	0.997 (0.995-0.998)	3.00E-12
			Lung cancer	1.14 (1.09-1.18)	2.00E-10
			Psoriasis	1.18 (NA)	4.00E-09
			Smoking initiation (ever regular vs never regular) (MTAG)	1.01 (1.00-1.02)	9.00E-09
			Hair color	NA	2.00E-08
			Lung adenocarcinoma	1.17 (1.10-1.23)	4.00E-08
			Lung cancer in ever smokers	1.15 (1.09-1.21)	7.00E-08
rs6674512	1p22.3	G/A	Male-pattern baldness	0.97 (0.94-0.99)	4.00E-10
rs10187103	2q24.3	C/T	Age of smoking initiation (MTAG)	0.99 (0.98-1.00)	5.00E-09
rs1022206	3q13.13	C/T	Balding type 1	-	2.00E-12
rs4143832	5q31.1	G/T	Eosinophil counts	-	1.00E-10
rs537930	5q31.1	G/T	Height	0.97 (0.94-0.99)	9.00E-09
rs1063348	6p21.32	G/A	Childhood steroid-sensitive nephrotic syndrome	3.33 (2.62-4.23)	9.00E-23
rs13252276	8p23.1	C/T	General factor of neuroticism	1.01 (1.00-1.02)	5.00E-09
rs465530	12q14.3	G/T	Acute graft versus host disease in bone marrow transplantation (recipient effect)	-	4.00E-08
rs8132680	21q22.12	T/C	Heel bone mineral density	0.98 (0.98-0.99)	3.00E-12

Supplementary figure 1. Flowchart of the process performed to select the SNPs to be replicated in IMMEnSE and FinnGen