

**Bangor University**

## **DOCTOR OF PHILOSOPHY**

### **Analysis of human germ lines genes for clinical applications**

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Bangor University

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<b>MeiCT</b>	<b>Hofmann</b>	<b>Original meiCT List</b>	<b>Drosophila</b>	<b>Known CTA</b>	<b>Rouseaux All</b>
ACTL9	MAGEB2	SYNGR4	PIWIL4	ACRBP	C1orf65
ACTRT1	MAGEB6	ARRDC5	PIWIL2	ACTL8	CALR3
ADAD1	DDX53	HSPB9	PIWIL3	ADAM2	KLHL10
ADAM2	SSX2	ACTRT1	PIWIL1	ADAM29	DNAJC5G
ASB17	SPANXA1	SSX5	YTHDC2	AKAP3	WDR88
BOLL	SAGE1	C12orf70	BICC1	AKAP4	MBD3L1
BRDT	MAGEC1	ODF4	DAZ2	ANKRD45	FAM71C
C1orf65	MAGE2B	C17orf98	DAZ3	ARMC3	WFDC11
C1orf141	CTAG1B	LRRRC69	DAZ4	ARX	SLCO6A1
C3orf22	SPANXN5	LUZP4	BOLL	ATAD2	C3orf48
C4orf17	MAGEA1	LYRM1	DAZL	BAGE	FBXO39
C5orf47	CTAG1A	MYL10	DAZ1	BAGE2	FMR1NB
C5orf48	SPANXD	C9orf11	SYCP1	BAGE3	MAGEB18
C8orf74	MAGEB1	SLC25A2	TXN	BAGE4	CCDC27
C9orf11	CPXCR1	CCDC18	TXNL1	BAGE5	ZNF645
C12orf12	SPANXE	CST8	ESRP1	BRDT	C11orf65
C12orf50	SPANXN4	NKX2-4	ESRP2	C15ORF60	DYDC1
C16orf78	PAGE2B	PRDM7	C16orf73	C21ORF99	C3orf30
C17orf98	MAGEB5	MAS1	TDRD1	CABYR	HIPK4
C19orf67	LOC203413	C20orf79	RNF17	CAGE1	C7orf45
C20orf79	XAGE5	BTG4	CHEK2	CALR3	C17orf66
C20orf201	SPANXB1	CCDC54	MAEL	CASC5	CCDC79
C22orf33	GAGE6	C4orf17	TAF6	CCDC110	AMAC1
CXorf27	CSAG2	SYCP3	TAF6L	CCDC33	POTED
CAPZA3	SPANXC	WDR20	MRE11A	CCDC36	C15orf32
CATSPER1	MAGEA2	CALM2	NANOS3	CCDC62	TSGA10IP
CCDC38	SSX3	STRA8	NANOS2	CCDC83	TEKT5
CCDC79	SPANXA2	TEX12	NANOS1	CDCA1	FAM71B
CCDC105	SPANXN3	DDX4	CPEB1	CEP290	TMCO5A
CCDC116	PAGE2	PSMA8	RP11-152F13.10	CEP55	TSGA13
CST8	MAGEB4	CYLC2	OVOL1	COX6B2	SPERT
CYLC1	CXorf48	TEPP	OVOL2	CPXCR1	C19orf75
CYLC2	SSX1	CCDC105	OVOL3	CRISP2	KLF17
DDX4	MAGEB3	CAGE1	NEK1	CSAG1	EXD1
DNAJC5G	FTHL17	C7orf72	NEK5	CSAG2	C18orf20
DUSP21	DKKL1	CCDC38	NEK3	CSAG3B	ADIG
FABP9	TSPY1	C11orf65	RPS19	CT16.2	ZCCHC13
FAM170A	CT70	C16orf46	RPS5	CT45A1	C9orf43
FAM71B	CT69	C16orf92	FKBP6	CT45A2	DKFZP434K028
FTMT	MAGEC2	USP50	TDRD9	CT45A3	ZSWIM2
GK2	GAGE8	MBD3L1	TDRD7	CT45A4	C9orf11
HEATR7B2L	GAGE4	C20orf201	DDX4	CT45A5	DDX53
HMGB4	GAGE7B	GLIPR1L1	TXN	CT45A6	CCDC116
IL31	PASD1	TDRD12	TXNL1	CT47A1	DKFZp761D191
IQCF1	GAGE7	ARL13A	TGIF2LX	CT47A10	LOC126536
IQCF3	GAGE2	CCDC79	TGIF2LY	CT47A11	Hs.662570
KLF17	MAGEC3	ODF3	TGIF2	CT47A2	Hs.220558
LUZP4	MAGEA9	FTMT	TUBG1	CT47A3	PWRN1
LYZL6	GAGE1	TNRC18		CT47A4	Hs.662373

MAGEB5	GAGE5	CYLC1	CT47A5	LOC440896
MBD3L1	PAGE3	PTPN20B	CT47A6	LOC253805
NT5C1B	HORMAD1	WDR27	CT47A7	Hs.177930
NUT	CTAGE1	TCTE3	CT47A8	LRRC52
ODF3		NT5C1B	CT47A9	Hs.519941
ODF4		C5orf47	CT47B1	C10o rf40
PAPOLB		C22orf33	CT66	Hs.547104
PDHA2		C5orf50	AA884595	GOLGA9P
PFN3		LEMD1	CT69	Hs.662304
PPP3R2		CXorf27	BC040308	Hs.562766
PRDM9		TMEM202	CT70	Hs.146758
PRPS1L1		ZCCHC13	BI818097	Hs.662309
RAD21L		C19orf67	CTAG1A	PLAC1L
RBM44		PRSS45	CTAG1B	Hs.156197
SATL1		FAM166A	CTAG2	DPY19L2P4
SEPT12		MAGEB5	CTAGE-2	LOC284788
SHCBP1L		DUSP21	CTAGE1	Hs.664588
SLC25A31		PAX5	CTAGE5	LOC340239
SMC1b		PFN3	CTCFL	LOC100130548
SPZ1		C5orf48	CTNNA2	Hs.585529
STRA8		C12orf12	CXORF48	Hs.656810
SYCP1		C1orf185	CXORF61	CCDC38
SYCP3		GLT6D1	CYCLIN A1	CSTT
TBC1D21		TMEM225	DCAF12	LOC285194
TCTE3		IL31	DDX43	SPATA22
TDRD12		C9orf128	DDX53	SPATA19
TEPP		MS4A13	DKKL1	C9orf79
TEX19		C11orf91	DMRT1	TPTE
TGIF2LX		FABP9	DNAJB8	HEATR4
TMEM146		AC005014.4	DPPA2	GOLGA6L2
TMEM225		TSSK1B	DSCR8	FLJ40434
TRIM42		EFCAB9	EDAG, NDR	Hs.662213
TRIML1		IQCF5	ELOVL4	Hs.572187
TSSK1B		KCNU1	FAM133A	GOLGA6L6
ZCCHC13		PAPOLB	FAM46D	LOC728099
ZSWIM2		IQCF3	FATE1	LOC100128554
		C17orf105	FBXO39	LOC100287035
		C4orf51	FMR1NB	Hs.680114
		CLDND2	FTHL17	RFX4
		PROK2	GAGE1	Hs.606987
		TEX19	GAGE12B	Hs.568804
		HORMAD1	GAGE12C	DCAF4L1
		CATSPER1	GAGE12D	C3orf56
		C1orf65	GAGE12E	FLJ25328
		TULP2	GAGE12F	LOC286359
		BRDT	GAGE12G	GAB4
		SEPT12	GAGE12H	ANKRD31
		SNTG1	GAGE12I	KRT72
		CATSPER3	GAGE12J	RAD9B
		TEKT5	GAGE13	RBM46

C1orf14	GAGE2A	Hs.662260
C9orf43	GAGE3	Hs.409982
ADAD1	GAGE4	LOC730441
SUNC1	GAGE5	OPN5
COX7B2	GAGE6	IQUB
C2orf70	GAGE7	C8orf74
APOBEC4	GAGE8	Hs.662207
LRRC63	GOLGAGL2 F/ZNF876P	
C12orf42	GPAT2	ASZ1
SLC25A41	GPATCH2	TBC1D26
TRIML1	HIWI	LOC152586
KDM4D	MIWI	CPA5
SOX30	PIWI	ANKRD7
SPO11	HORMAD1	PRM1
DAZL	HORMAD2	SMCP
TDRD1	HSPB9	DAZL
PRSS54	IGSF11	RPGRIP1
ADAM2	IL13RA2	TULP2
SPAM1	IMP-3	FKBP6
GALNTL5	JARID1B	BRDT
SPACA1	KIAA0100	AKAP4
TP53TG5	LAGE-1B	ZBPB
PLCZ1	LDHC	LDHC
SPACA3	LEMD1	CRISP1
DMRTC2	LIPI	Hs.601545
DMRTB1	LOC130576	CETN1
SPATA16	LOC196993	GSTTP1
C4orf35	LOC348120	LYZL6
C6orf146	LOC440934	AKAP3
FAM135B	LOC647107	PPP1R2P9
SLC25A31	LOC728137	ADAM20
BOLL	LUZP4	LOC645529
TGIF2LX	LY6K	TP53TG5
ASB17	MAEL	C6orf10
TRIM42	MAGEA1	MAGEB3
AL353588.1	MAGEA10	CDY2A
CCDC116	MAGEA11	ADAM2
LYZL6	MAGEA12	SOX30
ZSWIM2	MAGEA2	TNP2
PDHA2	MAGEA2B	CYLC2
C3orf30	MAGEA3	BPY2
FAM194A	MAGEA4	PRM2
DNAJC5G	MAGEA5	CRISP2
SPDYA	MAGEA6	CCIN
SPZ1	MAGEA8	LDHAL6B
FAM170A	MAGEA9	RGSL1
C12orf50	MAGEA9B	TSSK1B
C16orf78	LOC728269	TKTL1
TBC1D21	MAGEB1	TSSK2
PDILT	MAGEB2	IRGC

HSFY2	MAGEB3	RFPL3S
FAM71B	MAGEB4	H2AFB1
DYDC1	MAGEB5	ODF1
DDI1	MAGEB6	PDHA2
C8orf74	MAGEC1	HIST1H2AL
U66059.56	MAGEC2	LOC645961
HEATR7B2	MAGEC3	GK2
KLF17	MCAK	ZNRF4
HSFY1	MMA1B	PRPS1L1
CCDC63	MORC1	SPINT3
IQCF1	MPHOSPH1	LOC283079
TMEM146	NLRP4	ADAM3A
UBQLN3	NOL4	PGK2
UMODL1	NR6A1	ADCY10
RBM44	NXF2	RPL10L
CAPZA3	NXF2B	CCDC83
C10orf67	NY-ESO-1	SPANXC
C3orf22	ODF1	OXCT2
ACTL9	ODF2	RNF17
FIGLA	ODF3	DKKL1
C15orf55	ODF4	TCP11
SATL1	OIP5	FSCN3
CCIN	OTOA	TXNDC3
UBL4B	PAGE1	UBQLN3
CCDC73	PAGE2	ACTL7B
C9orf153	PAGE2B	FNDC8
RNF133	PAGE3	ACTL7A
PPP3R2	PAGE4	CCT8L2
GK2	PAGE5	CST8
H2AFB1	PASD1	LUZP4
RP5-860F19.6	PBK	EDDM3B
SYCP1	PEPP2	MS4A5
C1orf141	PIWIL2	TCEB3B
TXNDC8	PLAC1	USP29
TSSK2	POTEA	CTAGE1
TSGA13	POTEB	RSPH6A
PRPS1L1	POTEC	SPACA1
C2orf61	POTED	C1orf14
FSCN3	POTEE	INSL6
ZDHHC11B	POTEG	DEFB126
ANKRD42	POTEH	PHF7
NLRP14	PRAME	DDX4
TRIM69	PRM1	ACSBG2
C2orf53	PRM2	FAM163A
PTPN20A	PRSS54	GOLGA8E
CCDC96	PRSS55	MYCBPAP
ALX1	PTPN20A	HORMAD1
DLX6	RBM46	FBXW10
PPP4R4	RGS22	SPATA16
TEKT3	ROPN1	STK31

LIN28	RQCD1	CCDC135
MAEL	SAGE1	KIF2B
C6orf81	SEMG1	C1orf49
C2orf65	SLCO6A1	C4orf17
AC007405.7	SPA17	TTLL2
C20orf195	SPACA3	FAM186B
ATP1A4	SPAG1	DKFZp434F142
ZIC5	SPAG17	WDR87
DNAJC5B	SPAG4	TTY8B
SYCE2	SPAG6	SLC25A2
SMCP	SPAG8	SPZ1
IQCD	SPAG9	TTY12
C18orf54	SPANXA1	FSCB
ADAM18	SPANXA2	VN1R3
C10orf122	SPANXB1	Hs.217079
C19orf18	SPANXB2	ZNF540
SEL1L2	SPANXC	MAEL
TNP1	SPANXD	MS4A14
RNF17	SPANXE	RIMBP3B
ACRV1	SPANXN1	Hs.666896
C13orf28	SPANXN2	HMGB4
SYCE1	SPANXN3	HSF5
CSRNP3	SPANXN4	MARCH10
ZFP42	SPANXN5	CCDC42
C10orf96	SPATA19	C1orf223
H1FNT	SPEF2	SPATA8
TMCO2	SPINLW1	SPACA4
PBX4	SPO11	C16orf82
TEX14	SSX1	Hs.432394
ARTN	SSX2	ZDHHC19
PKDREJ	SSX2B	LOC348120
C20orf135	SSX3	C20orf79
MSH4	SSX4	LOC100329135
CXorf41	SSX4B	TPPP2
C6orf118	SSX5	SPATA4
AGBL3	SSX6	POM121L10P
CCDC67	SSX7	Hs.662423
NXF2B	SSX9	IMP5
MESP2	SYCE1	LYPD4
C19orf45	SYCP1	PRSS54
C1orf129	TAF7L	MS4A6E
TKTL2	TAG	C15orf55
RAD9B	TDRD1	TSPYL6
FAM154A	TDRD4	LOC780529
LYZL4	TDRD6	LELP1
C7orf34	TEKT5	BOD1P
DNAJB7	TEX101	RNF133
HORMAD2	TEX14	C2orf84
PTCHD3	TEX15	C13orf28
LRRIQ4	TFDP3	LOC254312

C12orf71	THEG	PLCZ1
CCDC110	TMEFF1	LOC728460
SALL4	TMEFF2	LOC100131928
NOL4	TMEM108	ZPBP2
PIWIL1	TMPRSS12	ADAD1
NLRP4	TPPP2	TBC1D21
PRSS50	TPTE	Hs.636150
IQCH	TSGA10	COX8C
C13orf16	TSP50	IQCF5
C9orf117	TSPY1D	C14orf148
KLHL10	TSPY1E	TMEM31
TDRD5	TSPY1F	LOC285827
ZBBX	TSPY1G	Hs.112596
SPESP1	TSPY1H	RNASE11
PFN4	TSPY1I	Hs.517091
PIWIL2	TSPY2	C4orf35
CBY3	TSPY3	C22orf33
EPHA6	TSSK6	Hs.535454
TEX101	TTK	Hs.662336
MORN3	TULP2	C6orf201
ALS2CR11	VENTXP1	Hs.98945
CCDC158	XAGE-3B	PRM3
CPA6	XAGE-4	NUP210L
TMCO5A	RP11-167P23	Hs.655296
C11orf85	XAGE1	HDGFL1
VWA3B	XAGE1B	Hs.535746
PGK2	XAGE1C	C20orf173
LRRC67	XAGE1D	GALNTL5
DAZ1	XAGE1E	DEFB129
OXCT2	XAGE2	C10orf82
TTLL13	XAGE2B	LOC729461
RNF148	CTD-2267G17	LOC100134040
TRPM8	XAGE3	LOC645355
PIP5KL1	XAGE5	ROPN1
POLN	ZNF165	LOC613126
C5orf36	ZNF645	PRNT
C19orf57		Hs.116324
RNF212		GMCL1L
TTC6		H2BFM
		LOC732275
RASSF9		LOC494558
CDRT4		Hs.666913
FBXO15		RNF151
C2orf77		IQCF2
ARMC3		DMRTC2
C16orf71		IQCF3
TTC23L		CAPZA3
DMC1		BOLL
FHL5		UBQLNL
WDR69		C12orf12

GRK4	Hs.86761
ACSBG2	Hs.446169
MICALCL	Hs.369473
SPATA9	DNAJB8
SPATA4	C2orf53
ALS2CR12	Hs.190267
DCST1	ACTRT2
C10orf82	FLJ46321
C2orf73	Hs.661446
SAMD13	LOC283480
C1orf49	LOC474358
FHAD1	Hs.551951
MND1	C6orf146
PSMC3IP	ODF3L2
CCDC103	Hs.585699
C7orf31	Hs.658502
GTSF1	Hs.181895
PLD6	LOC100130700
RIBC2	Hs.149004
NAIF1	Hs.507924
MESP1	HORMAD2
EPYC	SPATA12
C9orf93	Hs.121392
CCDC87	Hs.662283
GPAT2	C3orf22
KCNG1	ADAM6
QRICH2	LOC338864
AKAP3	Hs.350698
TEX15	Hs.659210
C11orf70	C2orf57
MMEL1	C12orf50
CCDC81	WBSCR28
EFHB	LOC151658
TSSK6	Hs.98394
LIPF	Hs.666920
C9orf135	Hs.666899
ZPBP	H1FNT
ZDHHC19	Hs.666888
ANKRD55	Hs.603767
ATF7IP2	Hs.624137
IZUMO1	Hs.603759
	Hs.667736
	DDI1
CCNA1	LOC151300
PEBP4	FAM47C
STAG3	TPD52L3
CCDC113	C17orf74
CEP72	C16orf78
C2orf74	C10orf62
C3orf25	DMRTB1



NKAPL	SPATA3
C20orf85	C12orf54
MYCBPAP	C20orf71
CCDC65	HEATR7B2
NDST3	FAM47B
ZNF558	Hs.621235
RBM11	C19orf41
C3orf62	LOC348761
C11orf20	BEYLA
AC008743.7	Hs.122199
C4orf36	Hs.112680
SLAMF7	FAM194A
GSTO2	Hs.125998
MOV10L1	CDRT15
RFX3	C15orf43
PTPN4	LOXHD1
REC8	LOC645733
CCDC130	C2orf51
ANKRD7	SPATC1
COL4A3BP	HIST1H2BA
IQCG	Hs.666891
DNAL1	Hs.666898
LRRC6	FLJ25694
HDHD1A	PAPOLB
CCT6B	FAM187B
LRRCC1	LOC401351
CCDC146	FAM24A
NIPSNAP3A	ACTL9
PGBD1	C9orf144B
ALS2CR8	LOC643406
FAM50B	CC2D2B
PIH1D2	SPACA3
CCDC109A	FAM47A
LCA5L	LOC340178
C1orf59	KCTD19
WDR63	C3orf46
C2orf63	CCDC54
ZNF2	CCDC63
ICA1L	MAGEB6
TUBA1A	C12orf37
TTC21A	NBPF4
C2orf69	KIAA1257
CCDC159	TPTE2P2
SYCP2	FLJ43944
SRGAP1	VCY
EFCAB7	HIST1H3C
RANBP17	TUBA3C
GTF2A1L	LOC441601
RP11-521B24.1	PIWIL1
C19orf41	DPEP3

BTG4  
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FAM71A  
ALS2CR11  
OR2H1  
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LOC728883  
CPXCR1  
ADAM29  
C11orf64  
SPINLW1  
VCX2  
MAGEB4  
ACRV1  
RBMV1E  
GK3P  
CYLC1  
SPAM1  
ADAM30  
ACRBP  
TXNDC2  
TAF7L  
SEPT12  
PPP3R2  
C20orf141  
FAM71F1  
GTSF1L  
LYZL1  
C14orf48  
LOC157381  
SUN5  
LOC415056  
ADAM7  
NT5C1B  
C9orf144B  
GGN  
Hs.253209  
Hs.710554  
TRIM40  
FAM26D  
HTRA4  
IGFBP1  
Hs.655287  
Hs.536920  
LOC100127950  
C14orf81  
CSH1  
ADAM12

HSD3B1  
PSG5  
CGB5  
KISS1  
PSG7  
SIGLEC6  
INSL4  
PSG11  
GNGT1  
HIST1H1T  
PSG2  
PSG4  
PSG1  
CSH2  
PSG9  
PSG6  
ALPPL2  
PRG2  
SLC22A11  
LGALS13  
PLAC4  
Hs.560509  
XAGE2B  
Hs.654772  
Hs.656025  
BCAR4  
Hs.529729  
Hs.42265  
C21orf105  
Hs.656897  
Hs.641200  
Hs.574781  
Hs.641022  
Hs.656801  
XAGE3  
Hs.112924  
Hs.666901  
Hs.656747  
Hs.671084  
Hs.667725  
ISM2  
Hs.656795  
Hs.656741  
Hs.656768  
FLJ90680  
Hs.657599  
EBI3  
LGALS14  
VWA5B1  
CCBP2

SVEP1  
CYP19A1  
CSHL1  
PSG3  
FLJ11292  
PAPPA  
Hs.657576

<b>Rouseaux Testis Germline</b>	<b>Rousseaux Placenta</b>
C1orf65	TRIM40
CALR3	FAM26D
KLHL10	HTRA4
DNAJC5G	IGFBP1
WDR88	Hs.655287
MBD3L1	Hs.536920
FAM71C	LOC100127950
WFDC11	C14orf81
SLCO6A1	CSH1
C3orf48	ADAM12
FBXO39	HSD3B1
FMR1NB	PSG5
MAGEB18	CGB5
CCDC27	KISS1
ZNF645	PSG7
C11orf65	SIGLEC6
DYDC1	INSL4
C3orf30	PSG11
HIPK4	GNGT1
C7orf45	HIST1H1T
C17orf66	PSG2
CCDC79	PSG4
AMAC1	PSG1
POTED	CSH2
C15orf32	PSG9
TSGA10IP	PSG6
TEKT5	ALPPL2
FAM71B	PRG2
TMCO5A	SLC22A11
TSGA13	LGALS13
SPERT	PLAC4
C19orf75	Hs.560509
KLF17	XAGE2B
EXD1	Hs.654772
C18orf20	Hs.656025
ADIG	BCAR4
ZCCHC13	Hs.529729
C9orf43	Hs.42265
DKFZP434K028	C21orf105
ZSWIM2	Hs.656897
C9orf11	Hs.641200
DDX53	Hs.574781
CCDC116	Hs.641022
DKFZp761D1918	Hs.656801
LOC126536	XAGE3
Hs.662570	Hs.112924
Hs.220558	Hs.666901
PWRN1	Hs.656747
Hs.662373	Hs.671084

LOC440896	Hs.667725
LOC253805	ISM2
Hs.177930	Hs.656795
LRRC52	Hs.656741
Hs.519941	Hs.656768
C10o rf40	FLJ90680
Hs.547104	Hs.657599
GOLGA9P	EBI3
Hs.662304	LGALS14
Hs.562766	VWA5B1
Hs.146758	CCBP2
Hs.662309	SVEP1
PLAC1L	CYP19A1
Hs.156197	CSHL1
DPY19L2P4	PSG3
LOC284788	FLJ11292
Hs.664588	PAPPA
LOC340239	Hs.657576
LOC100130548	
Hs.585529	
Hs.656810	
CCDC38	
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