

Table S4. Mechanisms and interaction effects (activation and inhibition) among transcription factors and other molecules which participate in the GO Mitotic Cell Cycle network, using the analyze network (TF) algorithm by Metacore™ (Clarivate Analytics) [<https://portal.genego.com/>] from upregulated DEGs based on FDR<0.05 list between broilers (TT) and layers (CC) breeds.

Interactions Report

Interactions Report									DEGs Upregulated FDR<0.05		DEGs Upregulated FDR<0.05
From								From		To	
Network Object "FROM"	Object Type	Network Object "TO"	Object Type	Interaction Effects	Mechanism	Link Info	References (PMID)	Input IDs	Fold Change	Input IDs	Fold Change
NF-AT1(NFATC2)	Transcription factor	PLK1	Protein kinase	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of PLK1.	34491912			PLK1	0.1533479
RelA (p65 NF-kB subunit)	Transcription factor	PLK1	Protein kinase	Activation	Transcription regulation	NF-kB subunit RelA transcriptionally activates PLK1.	21610149;25159142			PLK1	0.1533479
STAT3	Transcription factor	PLK1	Protein kinase	Activation	Transcription regulation	STAT3 probably binds to gene PLK1 promoter.	17498291;22108192;26405196;29339720;32962858;33126079			PLK1	0.1533479
NF-AT1(NFATC2)	Transcription factor	Alpha-centractin	Generic binding protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of Alpha-centractin.	34491912			ACTR1A	0.1594823
NF-AT1(NFATC2)	Transcription factor	Separase	Generic protease	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	27935966;34491912			ESPL1	0.1598843
NF-AT1(NFATC2)	Transcription factor	C10orf119	Protein	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of C10orf119.	34491912			MCMBP	0.1625428
NF-AT1(NFATC2)	Transcription factor	FAM33A	Protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912			SKA2	0.1698637
p63	Transcription factor	MRE11	Generic enzyme	Activation	Transcription regulation	p63 and p73 bind to the promoter regions of Rad51, BRCA2, and mre11. Moreover, deltaNp63 and deltaNp73 transactivate Rad51, BRCA2, and mre11	19390658;19816568			MRE11	0.1825779
FOXP3	Transcription factor	Tubulin beta 2C	Generic binding protein	Activation	Transcription regulation	Tubulin beta 2C has binding sites in promoter region for FOXP3 identified by chromatin immunoprecipitation.	17237761			TUBB4B	0.1873019
NF-AT1(NFATC2)	Transcription factor	Tubulin beta 2C	Generic binding protein	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of Tubulin beta 2C.	34491912			TUBB4B	0.1873019
RelA (p65 NF-kB subunit)	Transcription factor	ECT2	Regulators (GDI, GAP, GEF)	Inhibition	Transcription regulation	RelA (p65 NF-kB subunit) inhibits transcription of ECT2.	28579529			ECT2	0.1936667
STAT3	Transcription factor	ECT2	Regulators (GDI, GAP, GEF)	Inhibition	Transcription regulation	STAT3 binds to gene ECT2 promoter and suppresses ECT2	18065416;22328012			ECT2	0.1936667

HIF1A	Transcription factor	UBE2S	Generic enzyme	Activation	Transcription regulation	E2-EPF is a hypoxia-inducible gene directly regulated via HIF1.	21281817			UBE2S	0.1945732
c-Rel (NF-kB subunit)	Transcription factor	IRF4	Transcription factor	Activation	Transcription regulation	C-Rel (NF-kB subunit) can bind to gene IRF4 promoter and activates IRF4 expression.	10770796;16272311;17513759;30850343			MUM1	0.1989764
FOXP3	Transcription factor	IRF4	Transcription factor	Activation	Transcription regulation	FOXP3 binds to IRF4 promoter and stimulates IRF4 mRNA expression.	17220892;17237761;17440451;19182775;19766086;21439160;22579475;28903735			MUM1	0.1989764
STAT3	Transcription factor	IRF4	Transcription factor	Activation	Transcription regulation	STAT3 binds to the Rora, as well as the Batf, Irf4, Ahr, and Maf genes.	20493732;21215659;21436836;21442426;28910419;30413785			MUM1	0.1989764
RelA (p65 NF-kB subunit)	Transcription factor	ASAP	Protein	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of ASAP.	28579529			MAP9	0.2126209
RelA (p65 NF-kB subunit)	Transcription factor	WDHD1	Generic binding protein	Inhibition	Transcription regulation	RelA (p65 NF-kB subunit) inhibits transcription of WDHD1.	28579529			WDHD1	0.216176
c-Rel (NF-kB subunit)	Transcription factor	ATM	Protein kinase	Activation	Transcription regulation	c-Rel directly transactivates ATM, EP300 (p300), SFN (14-3-3sigma), TGF-beta1, MMP1 (matrix metalloproteinase 1) and	19502793			ATM	0.2279364
p63	Transcription factor	ATM	Protein kinase	Activation	Transcription regulation	ATM is a direct DeltaNp63 alpha transcriptional target.	20663147;29362488			ATM	0.2279364
c-Rel (NF-kB subunit)	Transcription factor	Cyclin D1	Generic binding protein	Activation	Transcription regulation	c-Rel (NF-kB subunit) can bind to gene Cyclin D1 promoter.	18226221;19847166;23552605			CCND1	0.2298516
HIF1A	Transcription factor	Cyclin D1	Generic binding protein	Inhibition	Transcription regulation	HIF-1 was able to directly bind to the promoter region of cyclin D1.	20179204;23289374;23300831;23555163;23839513;25313256;25681586;26151812;26364616;26497365;26702149;26920732;27708244;30979776;31884068;33931028			CCND1	0.2298516
p63	Transcription factor	Cyclin D1	Generic binding protein	Activation	Transcription regulation	p63 activates transcription of Cyclin D1.	23837456;24718831;27341130;27447744;31826234;33194023;33833226			CCND1	0.2298516

RelA (p65 NF-kB subunit)	Transcription factor	Cyclin D1	Generic binding protein	Activation	Transcription regulation	RELA (NF-kappaB p65 subunit) interacts with the CCND1 (Cyclin D1) promoter.	15652748;15691880;15755876;15870875;16298738;16331275;16498412;16518410;16682409;17008396;17404108;18174238;19016262;19444329;19800042;19880242;20462455;20509140;21056029;21131967;21901538;23037503;23172667;23552605;23563178;23591394;23981302;24508135;24531845;24760979;25331947;25412312;25661319;26874278;27166260;27443256;27811358;28696292;31757943;32627006;32816854;34764323			CCND1	0.2298516
p63	Transcription factor	CDK1 (p34)	Protein kinase	Activation	Transcription regulation	p63 and p73 bind to and stimulate activity of ADA, POLD2, Cyclin D3, Cdk1 and CDC25c promoters.	19861536;23229819;31826234			CDK1	0.2307478
RelA (p65 NF-kB subunit)	Transcription factor	CENP-E	Generic binding protein	Inhibition	Transcription regulation	RelA (p65 NF-kB subunit) inhibits transcription of CENP-E.	28579529			CENPE	0.2331247
RelA (p65 NF-kB subunit)	Transcription factor	Rod	Generic binding protein	Inhibition	Transcription regulation	RelA (p65 NF-kB subunit) inhibits transcription of	28579529			KNTC1	0.2402103
NF-AT1(NFATC2)	Transcription factor	MIS12	Generic binding protein	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of MIS12.	34491912			MIS12	0.2468404
NF-AT1(NFATC2)	Transcription factor	CENP-H	Generic binding protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912			CENPH	0.2581865
p63	Transcription factor	NFBD1	Generic binding protein	Inhibition	Transcription regulation	NFBD1 was identified as p63 target gene by using chromatin immunoprecipitation analysis and RT-PCR.	17036050;19390658;20023394			MDC1	0.2734507
STAT3	Transcription factor	NFBD1	Generic binding protein	Activation	Transcription regulation	Stat3 probably regulates transcription of NFBD1.	18555785;20064451;26261078			MDC1	0.2734507
NF-AT1(NFATC2)	Transcription factor	Aladin	Generic binding protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912			AAAS	0.30629
RelA (p65 NF-kB subunit)	Transcription factor	CDC20	Generic binding protein	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of CDC20.	25362179			CDC20	0.314848
RelA (p65 NF-kB subunit)	Transcription factor	HKLP2	Generic binding protein	Inhibition	Transcription regulation	RelA (p65 NF-kB subunit) inhibits transcription of HKLP2.	28579529			KIF15	0.37926
HIF1A	Transcription factor	BCAT1	Generic enzyme	Activation	Transcription regulation	HIF1A activates transcription of BCAT1.	32088728			BCAT1	0.428056
NF-AT1(NFATC2)	Transcription factor	CAP-E	Generic binding protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912			SMC2	0.4832643
STAT3	Transcription factor	HSP70	Generic binding protein	Activation	Transcription regulation	STAT3 binds to the sequence of the HSP70 promoter and stimulates HSP70 expression.	19185844;19754877;22069317			HSPA4;HSPA8;HSPA5	0.5945825

NF-AT1(NFATC2)	Transcription factor	HSC70	Generic enzyme	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of HSC70.	34491912			HSPA8	0.5945825
STAT3	Transcription factor	HSC70	Generic enzyme	Activation	Transcription regulation	STAT3 activates transcription of HSC70.	18555785;22069317			HSPA8	0.5945825
NF-AT1(NFATC2)	Transcription factor	NAA50	Generic enzyme	Inhibition	Transcription regulation	NF-AT1(NFATC2) inhibits transcription of NAA50.	34491912			MAK	0.6956068
RelA (p65 NF-kB subunit)	Transcription factor	NAA50	Generic enzyme	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of NAA50.	23603904			MAK	0.6956068
c-Rel (NF-kB subunit)	Transcription factor	INSC	Generic binding protein	Activation	Transcription regulation	c-Rel (NF-kB subunit) activates transcription of INSC.	26694615			INSC	0.7564133
RelA (p65 NF-kB subunit)	Transcription factor	HSP90 alpha	Generic binding protein	Activation	Transcription regulation	Interaction of purified RelA (p65 NF-kB subunit) with HSP90 alpha was shown by liquid-chromatography mass spectrometry and directed functional perturbation studies using RNA interference.	14743216;17724475;24523406			HSP90AA1	0.8349448
STAT3	Transcription factor	HSP90 alpha	Generic binding protein	Activation	Transcription regulation	STAT3 binds to gene HSP90 alpha promoter and activates HSP90 alpha expression.	12559950;17427945;21079652;23228483			HSP90AA1	0.8349448
c-Rel (NF-kB subunit)	Transcription factor	NFKBIA	Generic binding protein	Activation	Transcription regulation	Interaction of purified c-Rel (NF-kB subunit) with NFKBIA was shown by liquid-chromatography mass spectrometry and directed functional perturbation studies using RNA interference.	7937093;8262046;8887627;10706725;14743216;14961554;17513759;17579043;17675583;18508759;19797428;20740013;22011580;25159142;32817348				
NF-AT1(NFATC2)	Transcription factor	NFKBIA	Generic binding protein	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912				
NOTCH1 (NICD)	Transcription factor	NFKBIA	Generic binding protein	Inhibition	Transcription regulation	NOTCH1 (NICD) inhibits transcription of NFKBIA.	16838279;18560356				

RelA (p65 NF-kB subunit)	Transcription factor	NFKBIA	Generic binding protein	Activation	Transcription regulation	NFkappaBp65 binds to IkappaB promoter and activates expression of NFKBIA	8246997;8319912;9150141;9566883;9694722;9738011;9751059;9865693;990853;10364173;10498867;11413190;11533489;11981037;12162804;12419806;12718890;12967348;12972430;14685242;14743216;15102471;15226358;15308667;15464842;15657065;15799966;15892871;15975999;16163708;16408291;16467852;16675465;16792530;16817975;16928772;16951195;17254973;17362989;17409387;17537731;17579043;17612295;17622249;17675583;17707233;18029440;18045535;18204072;18276832;18334673;18401342;18408078;18455150;18508759;18583959;18987305;18988733;19338389;19342686;19556516;19668231;19747262;19797428;19854828;19874202;20007970;20368414;20534538;20634424;20685965;20713516;20740013;21098220;21108432;21173233;21464397;21483817;21862580;21945668;22189654;22623725;22696686;22723832;23188828;23247759;23297421;23392668;23422506;23527155;23715268;23898399;24019758;24129565;24303801;24459141;24500711;24634218;2467				
STAT3	Transcription factor	NFKBIA	Generic binding protein	Inhibition	Transcription regulation	STAT3 inhibits transcription of NFKBIA.	15958548;27668411;33805945				
STAT3	Transcription factor	Pin1	Generic enzyme	Activation	Transcription regulation	STAT3 activates transcription of Pin1.	22394374;29269260				
HIF1A	Transcription factor	CD40(TNFRSF5)	Generic receptor	Activation	Transcription regulation	HIF1A activates transcription of CD40(TNFRSF5).	34103524				
NF-AT1(NFATC2)	Transcription factor	CD40(TNFRSF5)	Generic receptor	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of CD40(TNFRSF5).	34491912				
RelA (p65 NF-kB subunit)	Transcription factor	CD40(TNFRSF5)	Generic receptor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of CD40(TNFRSF5).	11830590;12193701;16020513;17114447;27916733;28214900				
STAT3	Transcription factor	CD40(TNFRSF5)	Generic receptor	Activation	Transcription regulation	STAT3 probably regulates transcription of CD40(TNFRSF5) in human B-cell lymphoma.	18277385;34103524				
c-Rel (NF-kB subunit)	Transcription factor	NF-AT1(NFATC2)	Transcription factor	Activation	Transcription regulation	c-Rel (NF-kB subunit) activates transcription of NF-AT1(NFATC2).	25299780				

c-Rel (NF-kB subunit)	Transcription factor	NF-kB2 (p100)	Transcription factor	Activation	Transcription regulation	Interaction of purified c-Rel (NF-kB subunit) with NF-kB2 (p100) was shown by liquid-chromatography mass spectrometry and directed functional perturbation studies using RNA interference.	8152812;8413211;14743216;16191192;16595631;16973832;19270711;19494297;25159142;26186194;26324762;28514442;28767691				
c-Rel (NF-kB subunit)	Transcription factor	FOXP3	Transcription factor	Activation	Transcription regulation	JunB and c-Rel cooperatively enhance Foxp3 expression during induced regulatory T cell differentiation.	20064449;20064450;20072126;21371435;21472440;21490927;23200824;23297791;23405894;27217485				
c-Rel (NF-kB subunit)	Transcription factor	HIF1A	Transcription factor	Activation	Transcription regulation	c-Rel (NF-kB subunit) activates transcription of HIF1A.	10425220;18393939;31332228				
FOXP3	Transcription factor	c-Rel (NF-kB)	Transcription factor	Inhibition	Transcription regulation	FOXP3 inhibits transcription of c-Rel (NF-	17237765;21490927;28903735				
HIF1A	Transcription factor	RelA (p65 NF-kB subunit)	Transcription factor	Activation	Transcription regulation	HIF1A activates transcription of RelA (p65 NF-kB subunit).	19454749;21642357;23123196;24535079;25368386;25703326;25823824;26172294;26696754;27191981;31432144				
HIF1A	Transcription factor	c-Rel (NF-kB subunit)	Transcription factor	Activation	Transcription regulation	HIF1A activates transcription of c-Rel (NF-kB subunit).	25823824				
HIF1A	Transcription factor	p63	Transcription factor	Activation	Transcription regulation	HIF1A activates transcription of p63.	30655535;33920782				
HIF1A	Transcription factor	FOXP3	Transcription factor	Activation	Transcription regulation	HIF-1A interacts with Foxp3 in iTreg cells and HIF-1 mediates the degradation of Foxp3.	21871655;22579475;22988108;27557492;30185770;33438204				
HIF1A	Transcription factor	STAT3	Transcription factor	Activation	Transcription regulation	HIF1A can form an active complex with the transcriptional co-activator p300 and phosphorylated-STAT3 at the VEGF promoter.	15735682;18985005;19336759;21960021;24718784;26404487;29666476;34014492				
HIF1A	Transcription factor	HIF1A	Transcription factor	Activation	Transcription regulation	HIF1A activates transcription of HIF1A .	12764143;16010420;18003758;21042279				
IRF4	Transcription factor	FOXP3	Transcription factor	Inhibition	Transcription regulation	IRF4 inhibits transcription of FOXP3.	19088203;19182775;28824171	MUM1	0.1989764		
NF-AT1(NFATC2)	Transcription factor	c-Rel (NF-kB subunit)	Transcription factor	Activation	Transcription regulation	NF-AT1(NFATC2) binds to gene c-Rel (NF-kB subunit) promoter and activates c-Rel (NF-kB subunit) expression.	17617603				
NF-AT1(NFATC2)	Transcription factor	STAT3	Transcription factor	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of	34491912				
NF-AT1(NFATC2)	Transcription factor	NF-kB2 (p100)	Transcription factor	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of NF-kB2 (p100).	34491912				

NF-AT1(NFATC2)	Transcription factor	FOXP3	Transcription factor	Activation	Transcription regulation	NF-ATc2 binds to FOXP3 promoter and activates it.	15790681;16517728;18326816;19564342;20064450;20108139;21226022;22991461;25583478;26777750				
NF-AT1(NFATC2)	Transcription factor	NF-AT1(NFATC2)	Transcription factor	Activation	Transcription regulation	NF-AT1(NFATC2) activates transcription of NF-AT1(NFATC2).	9794241;12949491;15546140;15928679;34491912				
NF-kB2 (p100)	Transcription factor	HIF1A	Transcription factor	Activation	Transcription regulation	NF-kB2 (p100) activates transcription of HIF1A.	18393939				
p63	Transcription factor	p63	Transcription factor	Activation	Transcription regulation	p63 activates transcription of p63.	18198175;26203771;29339502;29440247;30713093;31551362				
RelA (p65 NF-kB subunit)	Transcription factor	c-Rel (NF-kB subunit)	Transcription factor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of c-Rel (NF-kB subunit).	7649478;8139561;11043773;12162804;14743216;15143182;15818410;17072328;17693123;18309928;18832697;19023096;19087197;19094066;19273289;19302050;19519322;19524538;19607980;20026420;20503182;20740013;21368872;21779400;23646894;23982206;24722732;25416956;26186194;26324762;26887983;28514442;29603325;32492432				
RelA (p65 NF-kB subunit)	Transcription factor	HIF1A	Transcription factor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) binds to HIF1A promoter and induces HIF1A expression	17272744;17898080;18393939;18432192;20813154;21565532;23123196;23185615;23311761;23713977;24042437;24213609;24316875;24477458;24535079;25028521;25749383;25823824;25879517;26154152;26647819;26743088;27144516;27191981;28000883;28257048;28882872;29343683;29535421;30628067;31332228;31391533				
RelA (p65 NF-kB subunit)	Transcription factor	p63	Transcription factor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) binds to p63 promoter and activates p63 expression.	20052674;21088498;24069219;31523027;34172737				
RelA (p65 NF-kB subunit)	Transcription factor	RelA (p65 NF-kB subunit)	Transcription factor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of RelA (p65 NF-kB subunit).	16331275;29485902;29898962;33298918				

RelA (p65 NF-kB subunit)	Transcription factor	NF-kB2 (p100)	Transcription factor	Activation	Transcription regulation	Interaction of purified RelA (p65 NF-kB subunit) with NF-kB2 (p100) was shown by liquid-chromatography mass spectrometry and directed functional perturbation studies using RNA interference.	8413211;14743216;16009713;16191192;16595631;16817975;16973832;17254973;17855547;19524538;21102550;22388891;23016877;23247759;24722732;24825921;25159142;26324762;26588041;28276104;28579529;29476964;30366905;32078488;34155144				
RelA (p65 NF-kB subunit)	Transcription factor	STAT3	Transcription factor	Activation	Transcription regulation	RelA (p65 NF-kB subunit) activates transcription of STAT3 .	12057007;16189514;16236134;16713569;17487688;18811964;19345327;20038813;21187858;21556775;22586032;23178493;23370526;25931145;28433552;28637784				
RelA (p65 NF-kB subunit)	Transcription factor	FOXP3	Transcription factor	Activation	Transcription regulation	Human proximal FOXP3 promoter is controlled by activation through the TCR involving PKC and the NF-kappaB subunit p65 and by inhibition through a negative feedback loop	18326816;19701891;20064450;20462637;20966256;21226022;21268019;21508258;22576743;23144749;23178569;25154413;26163261				
STAT3	Transcription factor	FOXP3	Transcription factor	Activation	Transcription regulation	STAT3 binds to gene FOXP3 promoter and activates FOXP3 expression.	16645171;17878325;18326816;19379825;20164832;20404810;22328012;25993445;26198700;28011648;28469791				
STAT3	Transcription factor	NF-kB2 (p100)	Transcription factor	Activation	Transcription regulation	STAT3 activates transcription of NF-kB2 (p100).	16651533;33184494				
STAT3	Transcription factor	p63	Transcription factor	Activation	Transcription regulation	Binding of the endogenous STAT3 to the Np63 promoter in Hep3B cells was demonstrated by ChIP assay. EMSA and ABCD assay shows direct binding of STAT3 to STAT3-RE of the Np63 promoter and such binding is stimulated by Np63.	18198175;22328012;22806179;25546438				

STAT3	Transcription factor	HIF1A	Transcription factor	Activation	Transcription regulation	Stat3 protein directly binds to the HIF-1 promoter and contributes to HIF-1 transcriptional regulation.	18644974;18985005;19020709;19265129;20924113;21102525;21827581;21871655;21960021;22328012;22402588;23486688;23604114;23612755;23991099;24435707;24525913;24658058;24718784;24820265;24981247;25193384;25492480;25655308;25833823;26154152;26324850;27011063;27220595;27325313;27633343;27806334;28257048;28345605;28499822;29343683;30036966;30454647;31068616;31286834;31332228;31481496;32142763;32369445;33332446;33753024;34363022;34702814				
STAT3	Transcription factor	NF-AT1(NFAT C2)	Transcription factor	Activation	Transcription regulation	STAT3binds and activates the NFATc2 gene.	20493732;21321078;28804544				