

December 2023

geneXplain[®] platform 7.3 release

Gene regulatory networks construction via API:

This release of the geneXplain platform introduces new Jupyter notebook Python sample code that allows construction of gene regulatory networks using the geneXplain platform API. You can view the sample code via the <u>Colab notebook</u> or you can download it from <u>here</u>.

Gene regulatory network is a collection of regulatory relationships between transcription factors and their target genes. Below you can find example visualizations of the gene regulatory networks constructed with the code linked above:

EPAS1 SOX6	K1 LRRFIP2	MXD1 DMRT2	ZFHX3	STAT4 BACH1
HOPX HOXC4 /	ASCL4 ZBED6	NR3C1 ZFHX4 SP1400	TSHZ1	C
ARID5B NKX2- ZKSCANB ZBTB41	ZEB1 THBA PROX1	DU3F3 ZIC4 ZBTB4	PRDM16	MEOX1
ZNF449 FL1 IRF8	X9 IRX4 NPAS2	BNC2 CUX1 SI	SP100 K3 IRX5	ATF6
TFAP2B GATA4 RARB ELF1 TI SP110 EDX 12 ZBTB1 EDX 12 ZBTB1	XIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	ZNF773 KLF4 KLF13	CASZ1	BX5
HEY2 ZNF25 TOKAZ ZNF334	ZNF510 ZNF382 ZBTB7C ZNF510 ZFP41 NI F37A ZNF248 ZFP41 NI	B7 ⁴ ZNF398 ZBTB7B MAZ - FOXE F-E2L1	VEZF1	KLF12 KLF9
NFIB NFKB1 NFATC2 Sp3	TCF-7 EGR1 ZNF MEF2C FOSE ZNE536	HIF-1alph: INCF2 BN Dp-2 148 ZNF77 NFKBIZ TEAL	NFE2L2 MECOM AP-2t	Deta ZHX1
ATF-5 CREB3L2 MEF2D JUN ATF-4 PHTF2 ZFP3 ZFPM2 MAF	SIX6 IRF2 FOXP1 HBP1	ZIC1 KLF2 FOS	SHOX2 PITX1 MAFK	AP-2gamma
ATF-1 EHF BBX BACH	X1 STAT: TSHZ2 KLF6 TT FOX ZBTB2, GRHL1 TBX2	HRB LF13 MITF ZB	TB47 ARNTL	AP-2epsilon
C-Fos	BX20 ARID5A PPARA	ZNF69 ZNF669 ZNF57 ETV1	ZNF20 ZNF490	
NF-YC HMG20A HMG2B3	TBX18 ZNF625 ZNF670	527 ZNF763 ZNF84	ZNF878	AP-2alpha ZNF555
NF-YB TOX-4 SMARCE1 HMG	SMAD9 ZNF563	ZNF440 ZNF124	ZNF564	

The generated diagrams are interactive, and a number of automatic layouts can be applied to the network graph. Manual click-and-move layout for each element of the network is possible as well.



The connections between the transcription factors and the genes they regulate are shown by black lines (edges). The thickness of each edge is proportional to the number of transcription factor binding sites found in the promoter of the respective gene.



Any diagram can be then exported as an image and used in your publications or other materials.

A video demonstration of how such gene regulatory networks can be constructed using the platform API was done <u>at this timepoint</u> of one of our recent <u>Coffee</u> <u>breaks with TRANSFAC</u>.

Database updates:

 \bigotimes HumanPSD[™] is updated to version 2023.2 (December 2023).

X TRANSFAC[®] is updated to version 2023.2 (December 2023).

X TRANSPATH[®] is updated to version 2023.2 (December 2023).