TRANSFAC® release 2019.3

The TRANSFAC® database on transcription factors, their genomic binding sites and DNA-binding motifs (PWMs), contains these new data features:

- **Increase in Drosophila melanogaster transcription factor interactions**

  More than 2,500 protein-protein interactions from the transcription factor network in fruit flies have been added. They were published in "Shokri, L. et al, A Comprehensive Drosophila melanogaster Transcription Factor Interactome, Cell Rep. 2019, 27(3):955-970, Pubmed PMID: 30995488" and in "Rhee, D. Y. et al., Transcription factor networks in Drosophila melanogaster, Cell Rep. 2014, 8(6):2031-2043, Pubmed PMID: 25242320".

- **miRNA target site import from miRTarBase**

  3,634 new experimentally verified miRNA target sites have been added from miRTarBase 7.0. The miRNAs and their mRNA sites are from a range of species, but predominantly from human and mouse. Also, 337 existing sites in TRANSFAC were updated with further experimental evidence from miRTarBase.

- **Matrix, Factor, Gene and Site flat files in JSON format**

  To simplify data integration and interchange, TRANSFAC® download customers can obtain the four flat files in JSON (JavaScript Object Notation) format in addition to the traditional format. JSON is supported by a rich infrastructure of tools in all modern languages and has become the de facto standard for data interchange.

- **Extended binding transcription factors for gene search result**

  When you want to find out which transcription factors bind and regulate a set of genes based on experimentally verified data, this can be done by concatenating searches, i.e. run a second "binding factors for gene" search using the result of a gene search (by keyword or as gene list upload) as input. The result of this second query now includes the regulatory effect (activation or repression) the factor has on the gene, if this is known.

- **Ensembl version update**

  Genomic information for genes, promoters, and ChIP fragments for the species human, mouse, rat, pig, macaque, Drosophila, and Arabidopsis is now based on Ensembl release 96.