

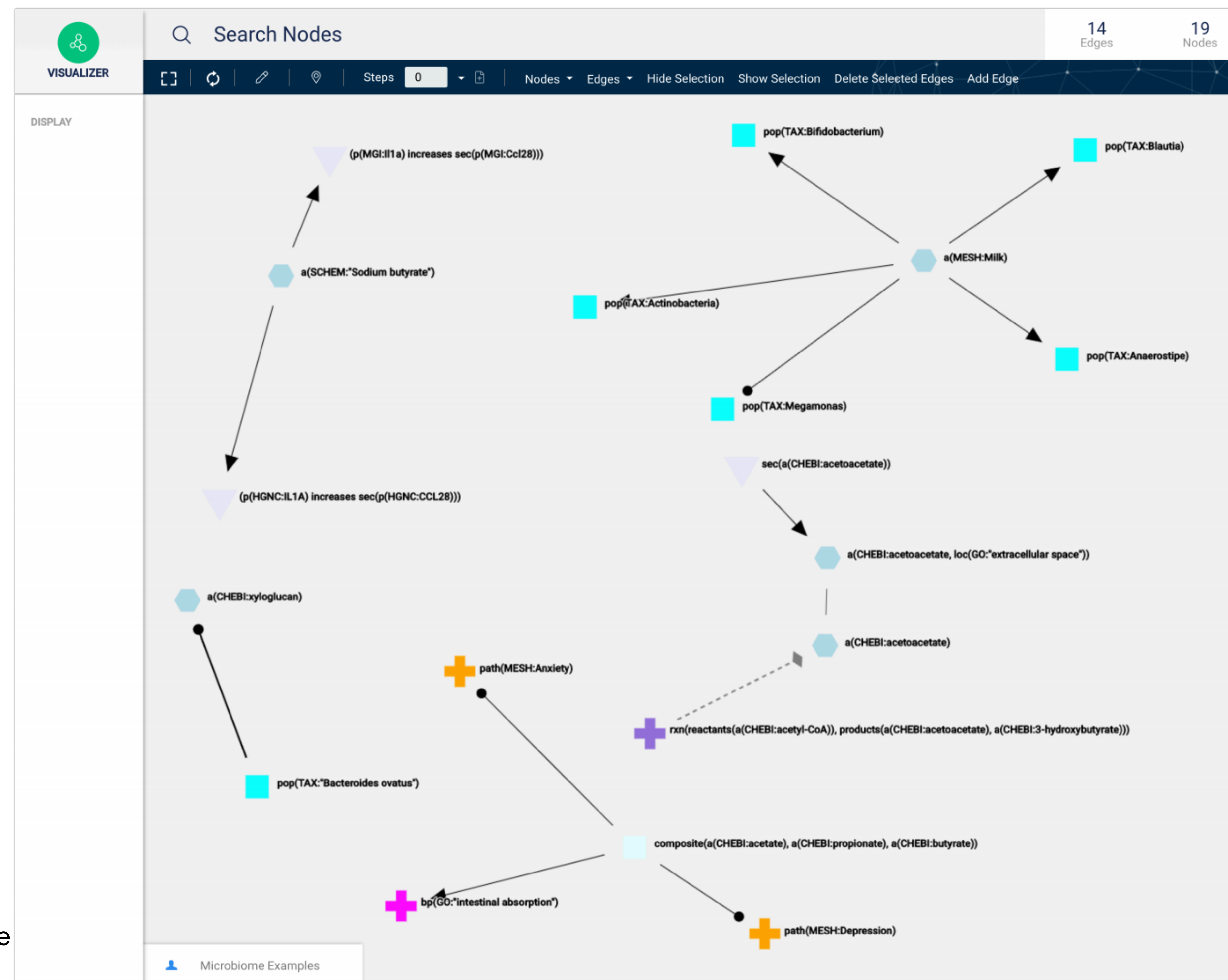
network of knowledge (networks are the native language of biologists)

BEL - Biological Expression Language

An open standards-based language for Biology

BEL, provides greatly enhanced readability, is computable and can be assembled into a visual

Biology is all about Networks



- Simple, standardized biological knowledge
- Search-able and Browse-able knowledgebase of biology
- Easy to extract network components with specified biological context

pre-BEL :

“... Northern blot analysis documented that two transcription factor genes chosen for further study, c-myc promoter-binding protein (MBP-1) [official symbol: ENO1] and X-box binding protein 1 (XBP-1), were up-regulated in U266 cells about 3-fold relative to the cell cycle-dependent beta-actin gene 12 h after IL-6 treatment ...”

BEL

- *p(HGNC:IL6) increases r(HGNC:ENO1)*
- *p(HGNC:IL6) increases r(HGNC:XBP1)*

- Know all Biology available

- Create comprehensive Network of Biology - can combine knowledge from:
 - Qiagen Ingenuity
 - Clarivate Analytics
 - Public BEL content
 - Private curated content

- Find causal links between biomarkers and drugs
- Find causal links between microbiome perturbations and host biological effects
- Target personalized therapeutic regimens based on DNaseq, RNASeq, and other molecular measures

(combination therapies, etc)

- Common language for Biology [BEL is an open standard]
- Standardized curation/knowledge units - BEL Nanopubs
- Standardized network/graph format - JSON Graph Format

BEL Nanopub Example

Citation: 16962653 [Pubmed]

Evidence: Genetic ablation of sin1 (MAPKAP1) abolished Akt-Ser473 phosphorylation and disrupted rictor-mTOR interaction but maintained Thr308 phosphorylation."

Assertions:

p(HGNC:MAPKAP1) increases p(HGNC:AKT1, pmod(Ph, S, 473)) **Annotations (Experimental context):**

MESH:Atherosclerosis [Disease]

UBERON:"cardiovascular system endothelium" [Anatomy] CL:"endothelial cell" [Cell]

MESH:"Muscle, Smooth, Vascular" [Anatomy]

EFO:U-266 [CellLine]
MESH:"Cell Membrane" [CellStructure]

BioDati Studio powers Network Biology

BioDati Studio supports biology by providing you with an interactive and easy to use

platform, which allows you to focus on what is really important: *the science*

- BEL is a computer parse-able language
- Makes biological knowledge easy to use in knowledge driven machine learning
- Create a comprehensive knowledge property-graph with biological context for every assertion
- Easy orthologization of knowledge between organisms
- Powerful terminology service - completions, synonyms, contextual filtering

TAX:9606 – human [Species]



<https://bel.bio> <https://biodati.com>