



Presented at NIK 2014

Kvik: Interactive exploration of genomic data from the NOWAC postgenome biobank

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Biology 101 & NOWAC

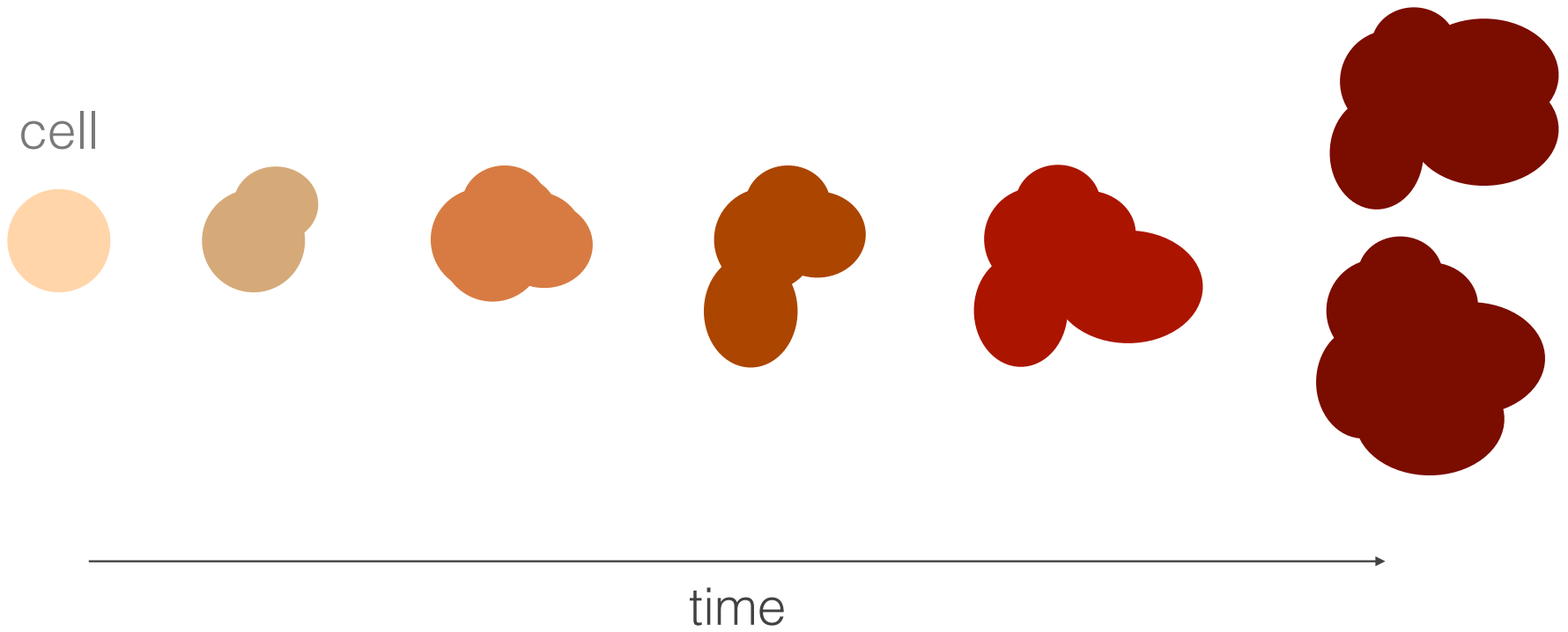
Kvik

Demo

Details

Evaluation

Cancer



Norwegian Women and Cancer NOWAC

lifestyle



cancer

smoking

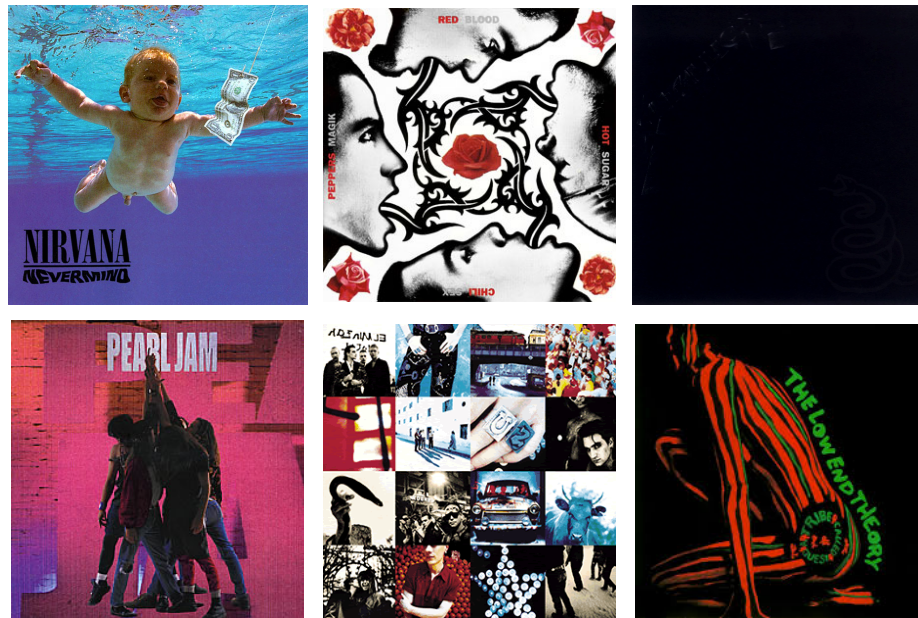
hormone therapy

exercise

diet

vitamins

Norwegian Women and Cancer NOWAC

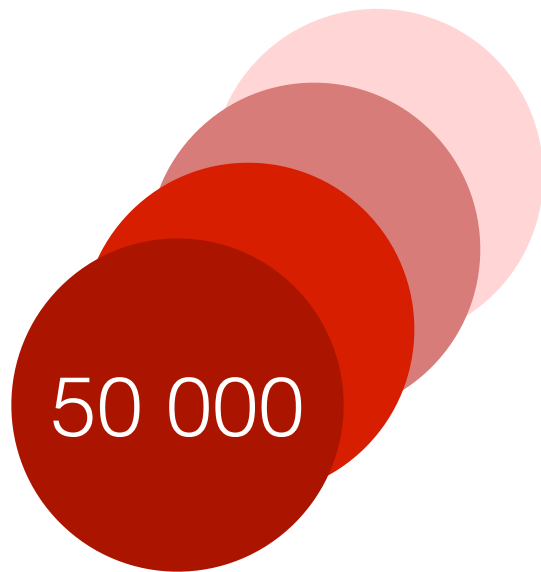


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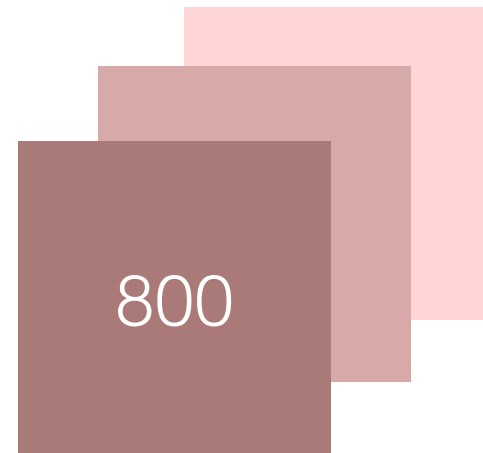
Norwegian Women and Cancer NOWAC



Norwegian Women and Cancer NOWAC

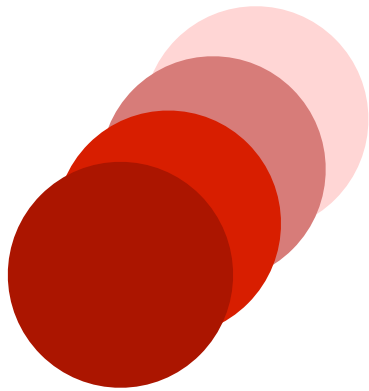


blood samples



biopsies

Norwegian Women and Cancer NOWAC



High-dimensional data

Gigabytes

Norwegian Women and Cancer **NOWAC**

smoking
hormone therapy
exercise
diet
vitamins

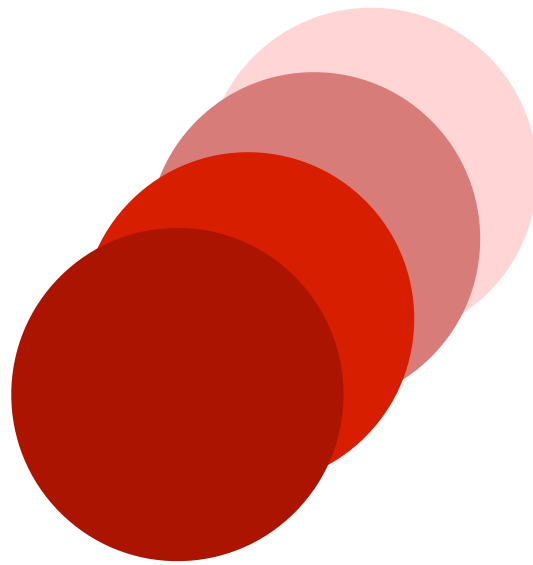


Questionnaires

NOWAC challenge



Data?



blood samples

Genomic Data

DNA

...gtgcatctgactcctgaggagaag...
...cacgtagactgaggactcctcttc...

Genomic Data

DNA

...gtgcatctgactcctgaggagaag...
...cacgtagactgaggactcctcttc...

transcription

RNA

gug **cau** cug acu ccu gag gag aag



Genomic Data

DNA

...gtgcatctgactcctgaggagaag...
...cacgtagactgaggactcctcttc...

transcription

RNA

gug **cau** cug acu ccu gag gag aag

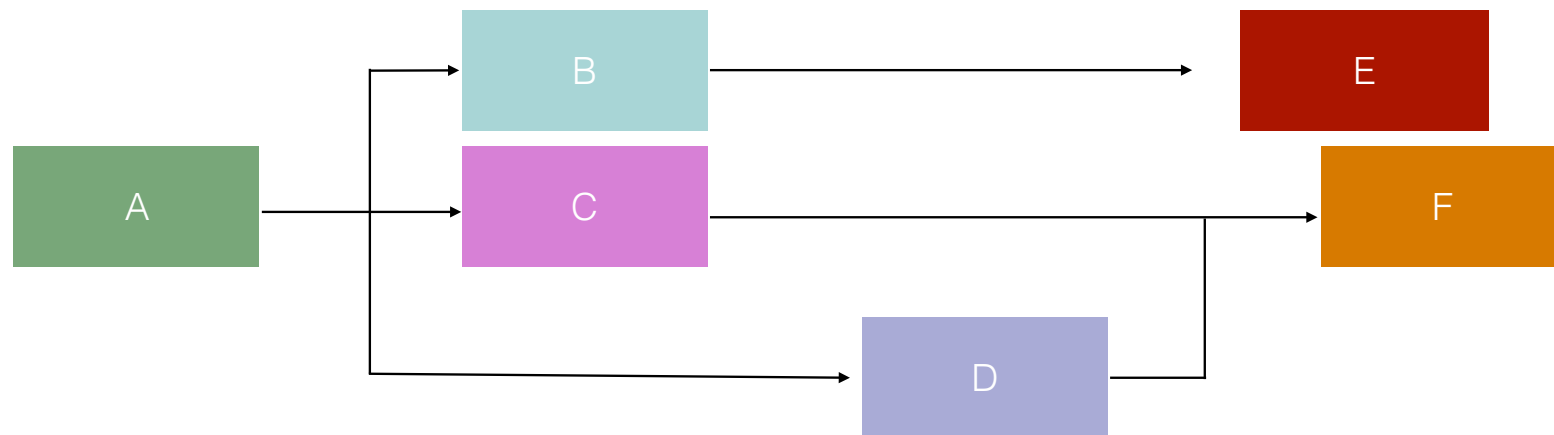
translation

Protein

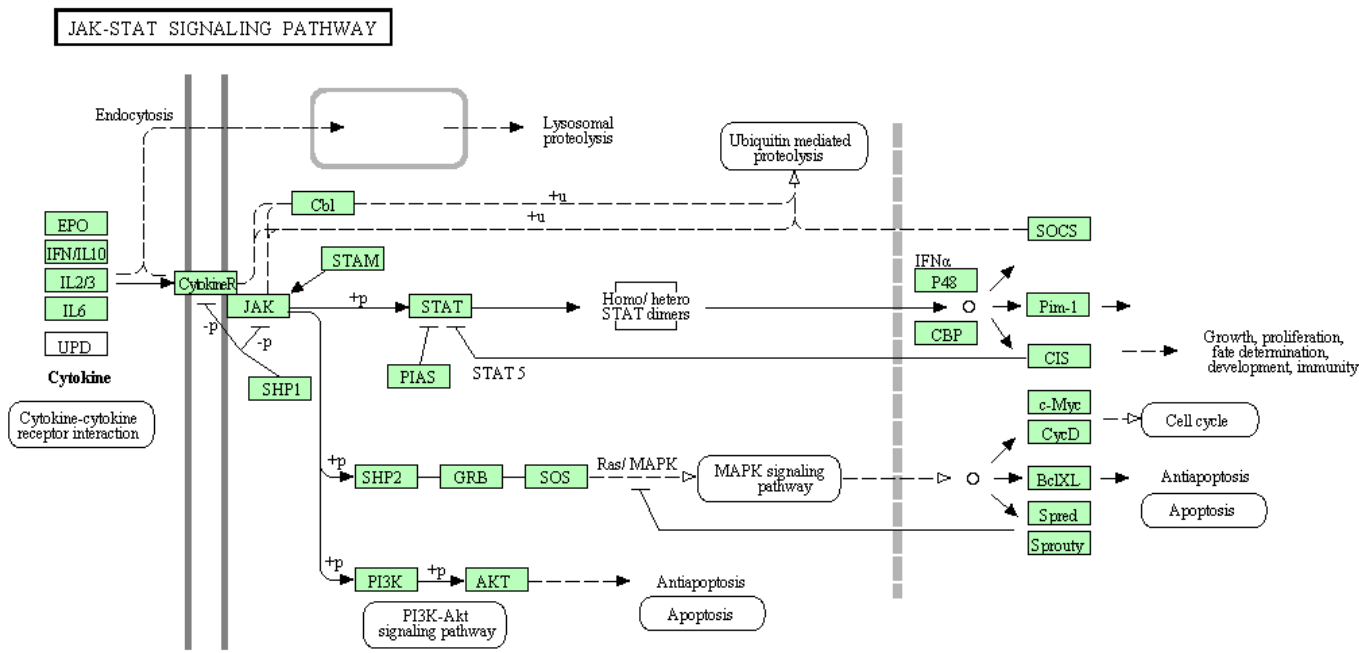
v **h** l t p e e k



Biological Pathways

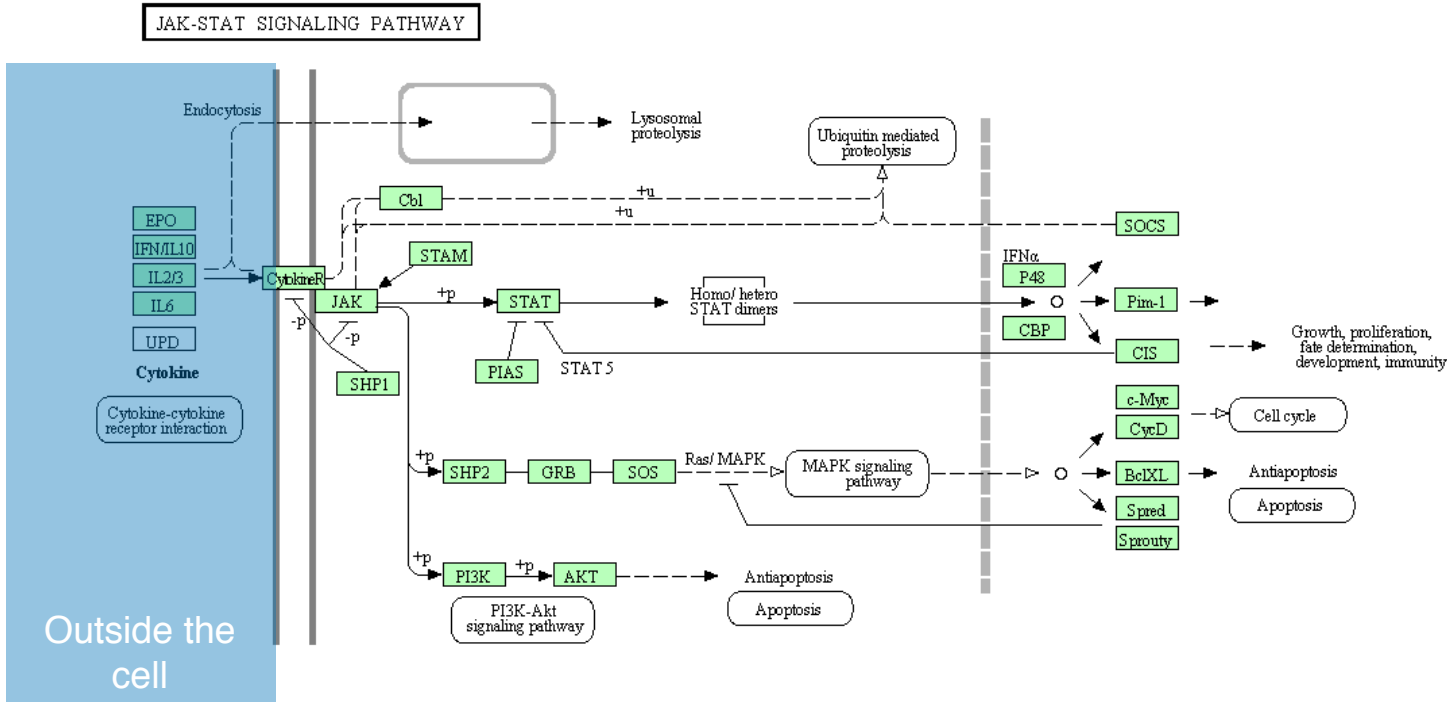


Pathways



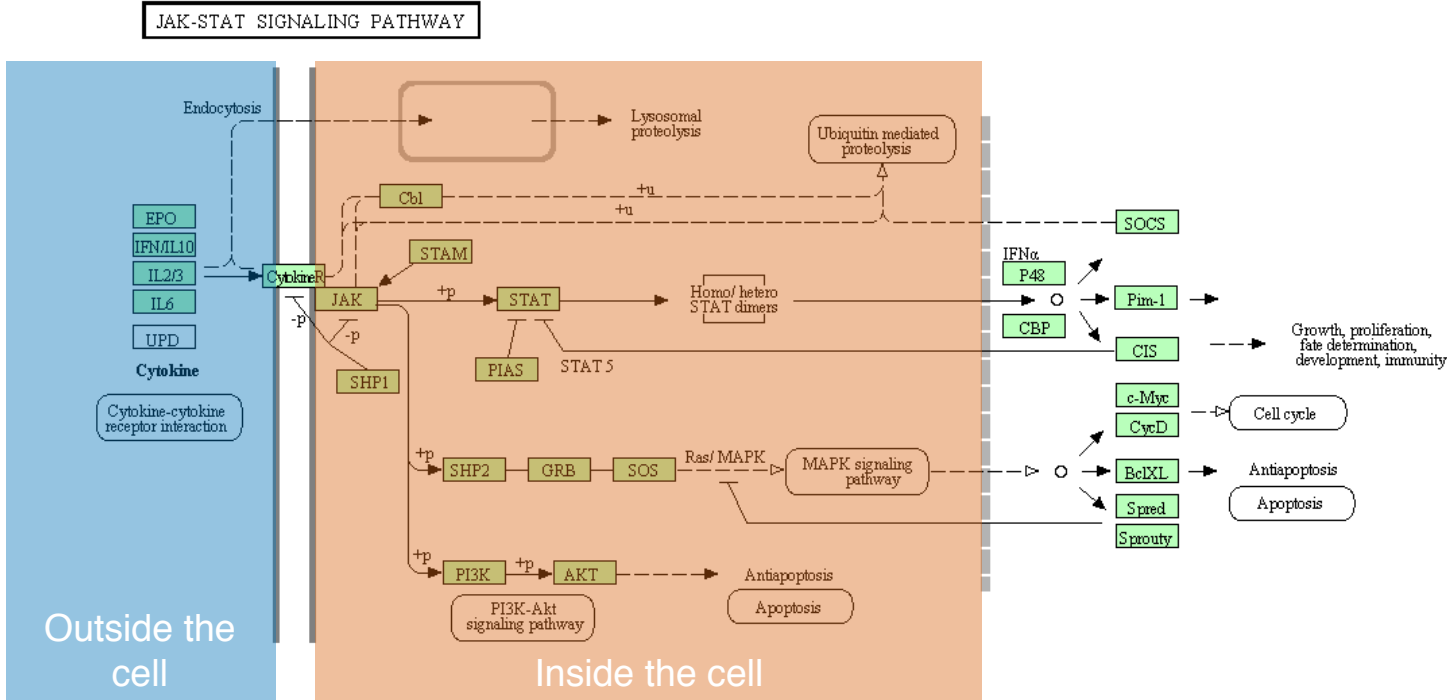
genome.jp/kegg-bin/show_pathway?hsa04630

Pathways



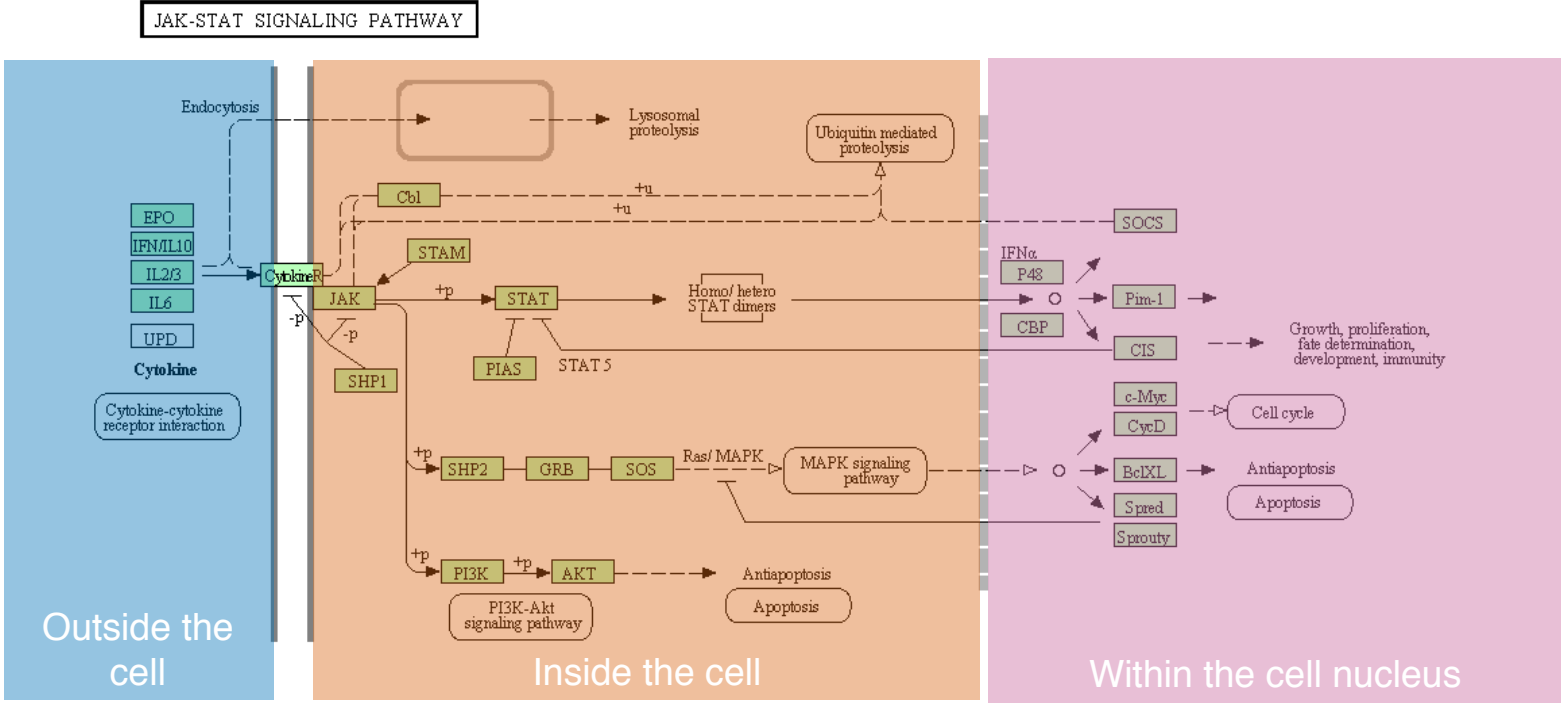
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Pathways



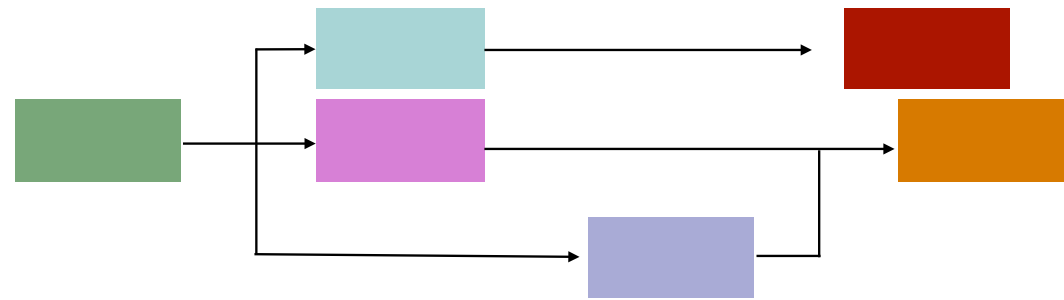
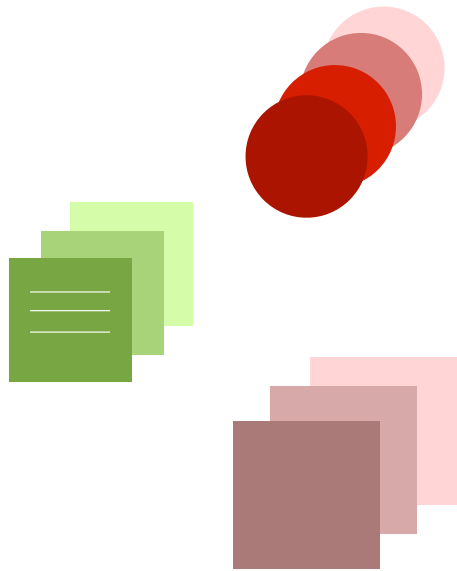
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Pathways

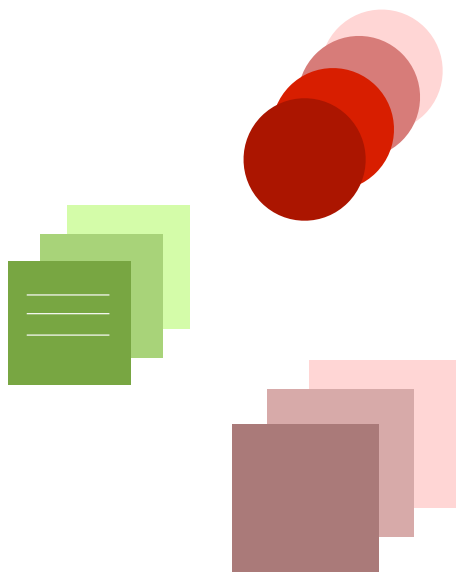


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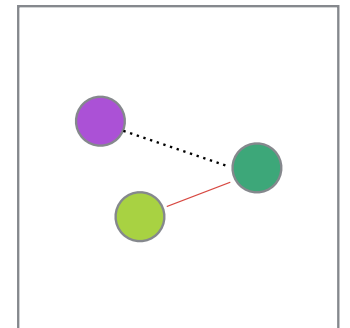
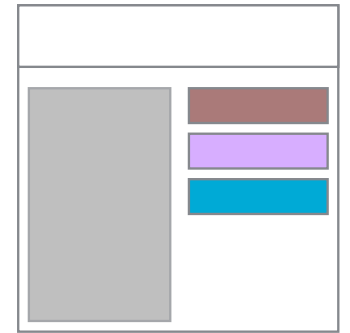
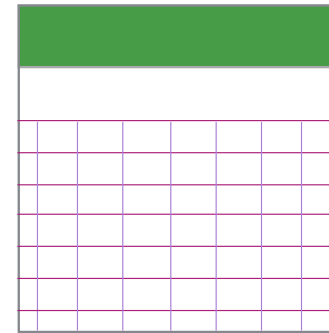
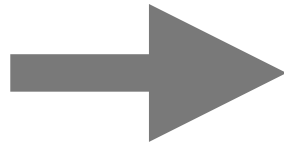
Kvik



NOWAC challenges



data sources



applications

Current workflow

expro.csv

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VIBRIO CHOLERAE INFECTION

Pathogen: Vibrio Cholerae

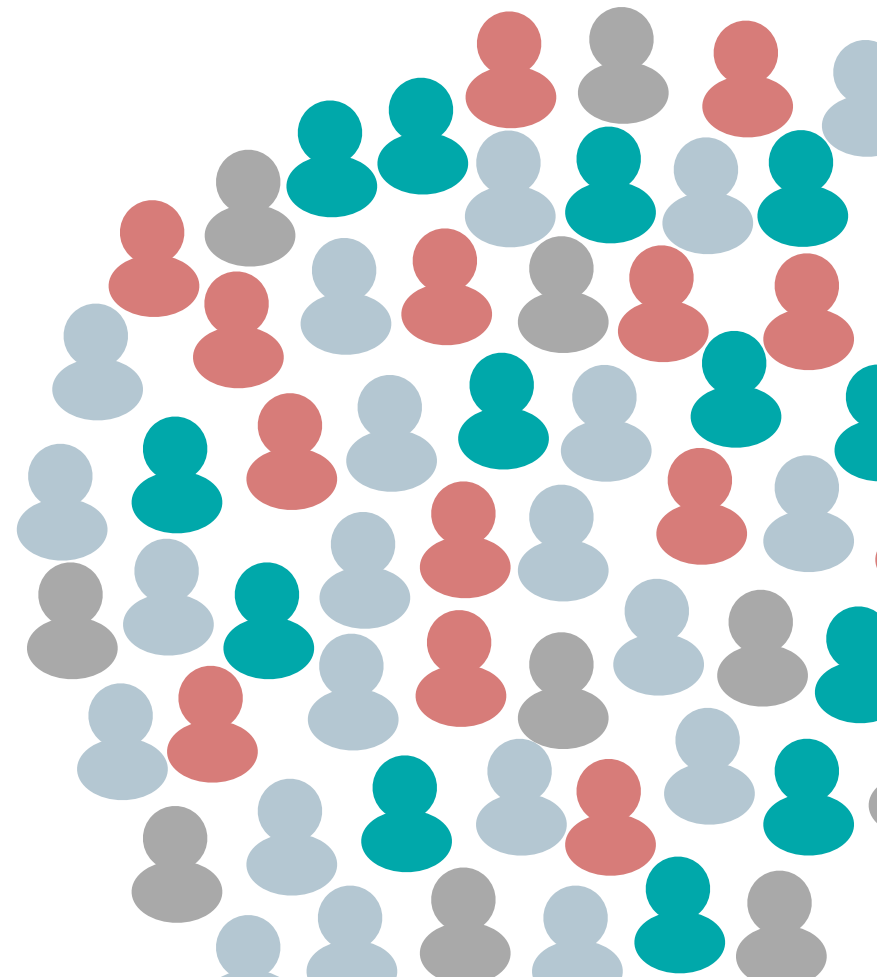
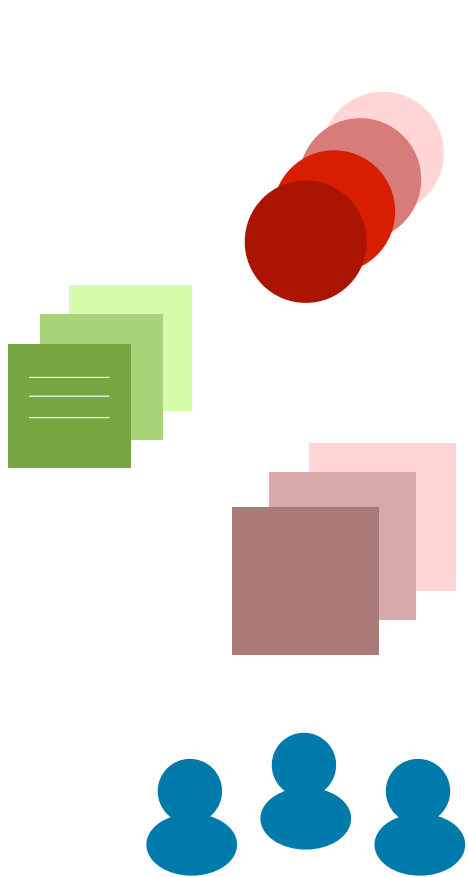
Host: Small Intestinal epithelial cell

The diagram illustrates the following processes:

- Attachment and Entry:** The bacterium enters the host cell via endocytosis, forming a vacuole.
- Survival and Replication:** The bacterium survives in the vacuole, protected from host defenses. It replicates and produces toxins.
- Toxin Production and Secretion:** The Type II secretion system secretes toxins into the host cytoplasm, including Cholera toxin (CT), enterotoxigenic toxin (ETC), and other factors like CtxA, CtxB, and CtxC.
- Cellular Effects:** The toxins disrupt the host cell's internal signaling and structure. Key effects include:
 - Disruption of Ion Transport:** CT and ETC activate PKA, which inhibits the CFTR channel, leading to decreased Cl⁻ secretion and increased Na⁺ and H₂O absorption.
 - Disruption of Tight Junctions:** The toxins lead to the displacement of junctional proteins (ZO-1, ZO-2) and the disruption of tight junctions, increasing paracellular permeability.
 - Hemolysis and Vacuolation:** The bacterium causes vacuolation and eventually hemolysis of the host cell.

05110 50913
(c) Kazuhisa Laboniz

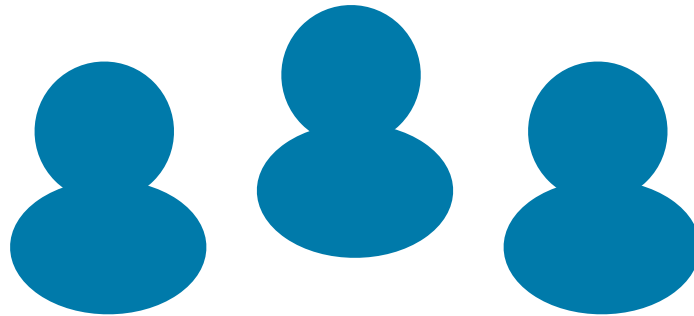
NOWAC challenges



Requirements

Interactivity, Scalability, **Simplicity**, **Familiarity**,
Heterogeneity, **Extendability** and Security,

Simplicity

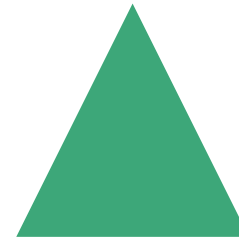
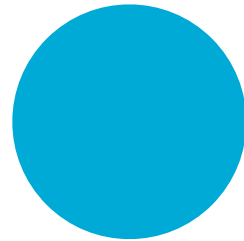


No new applications or plug-ins

Simplicity

HTML5

Familiarity



Use standardized visualizations
and representations

Familiarity

