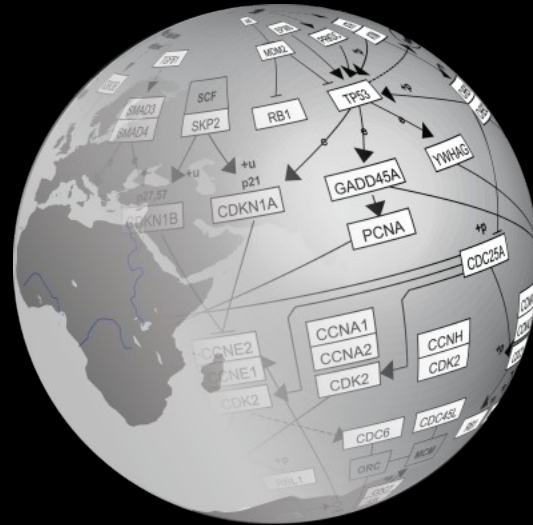


WikiPathways

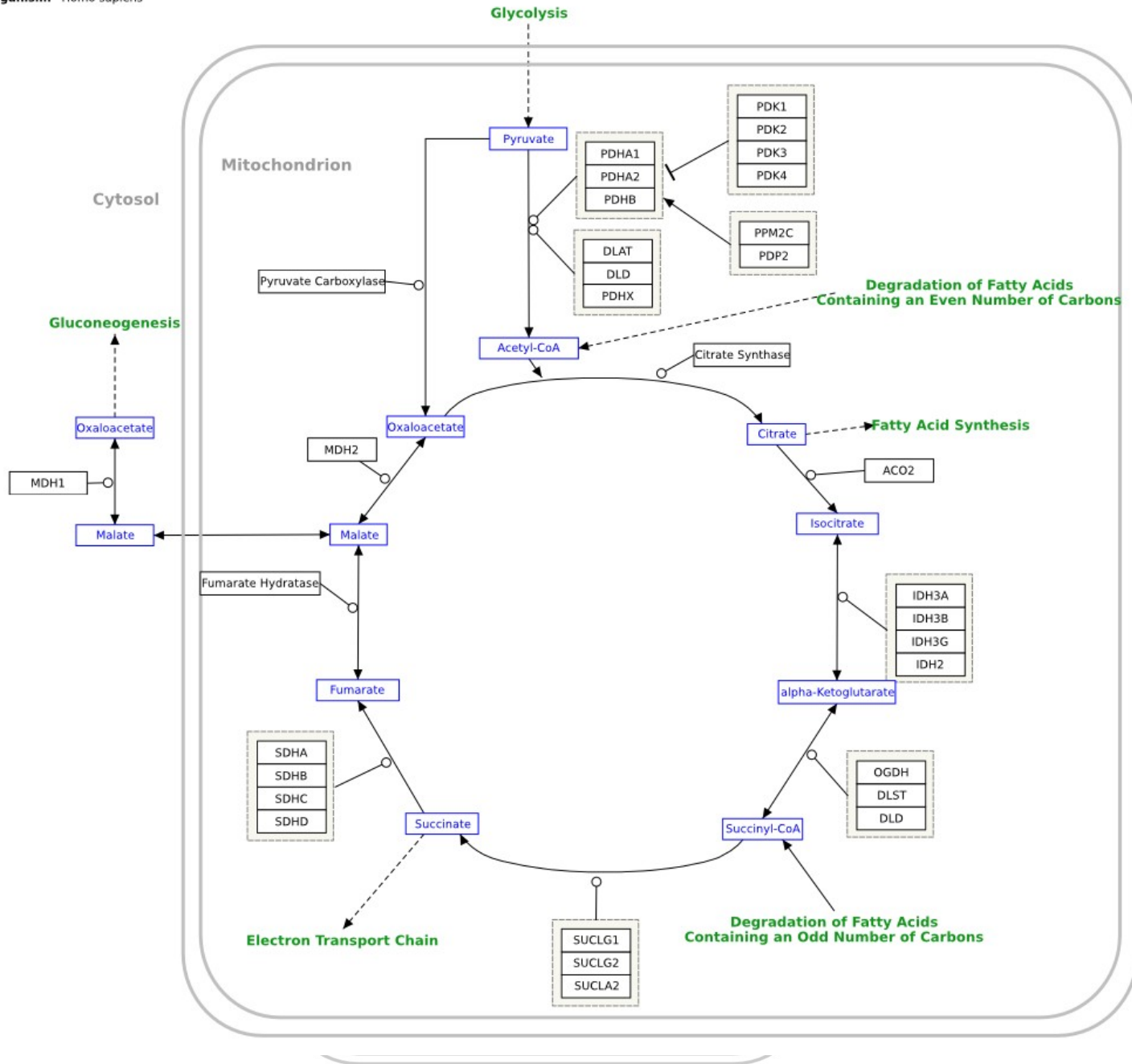
Community Curation of Biological Pathways

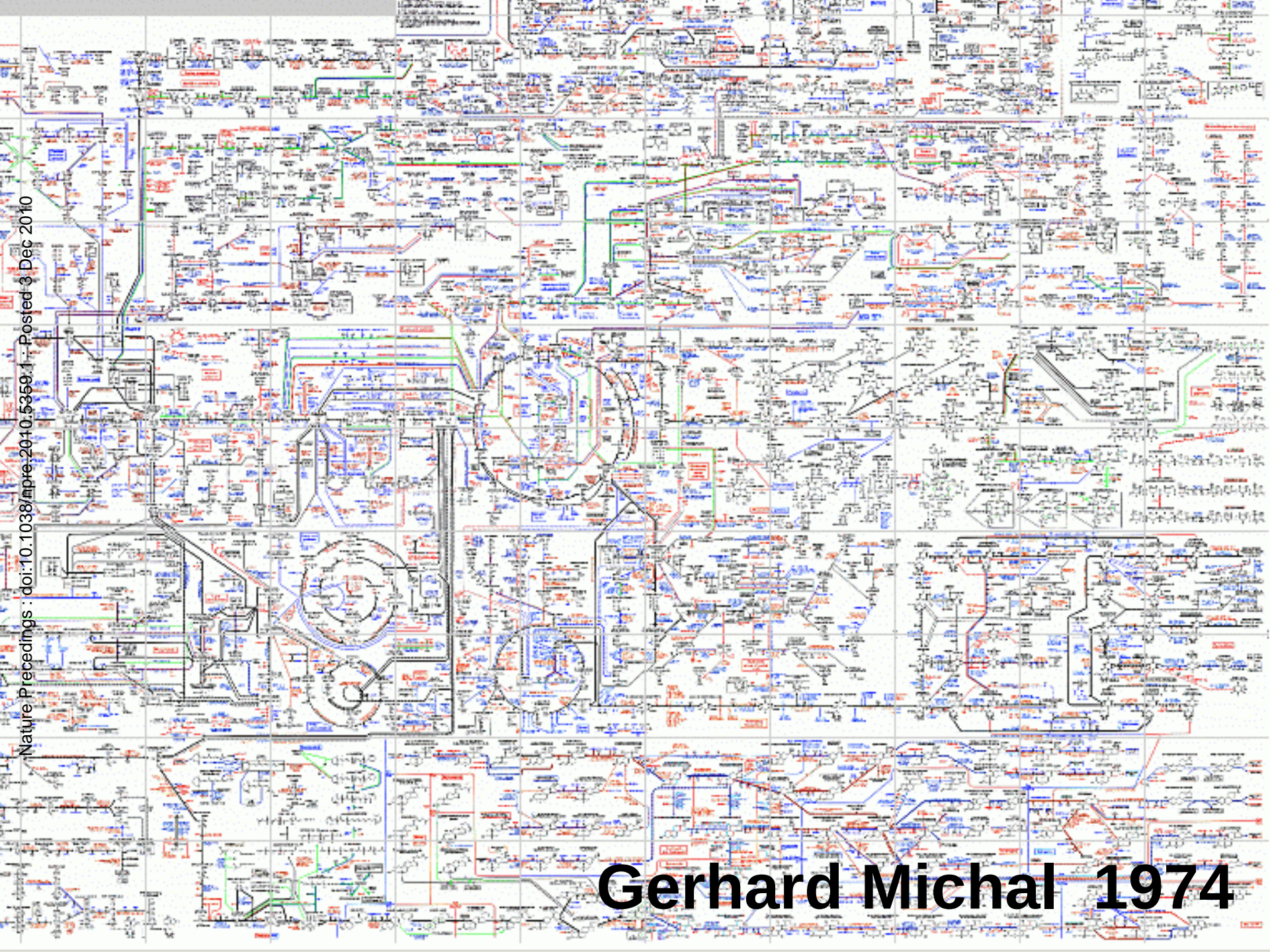


Alex Pico
Gladstone Institutes, UCSF

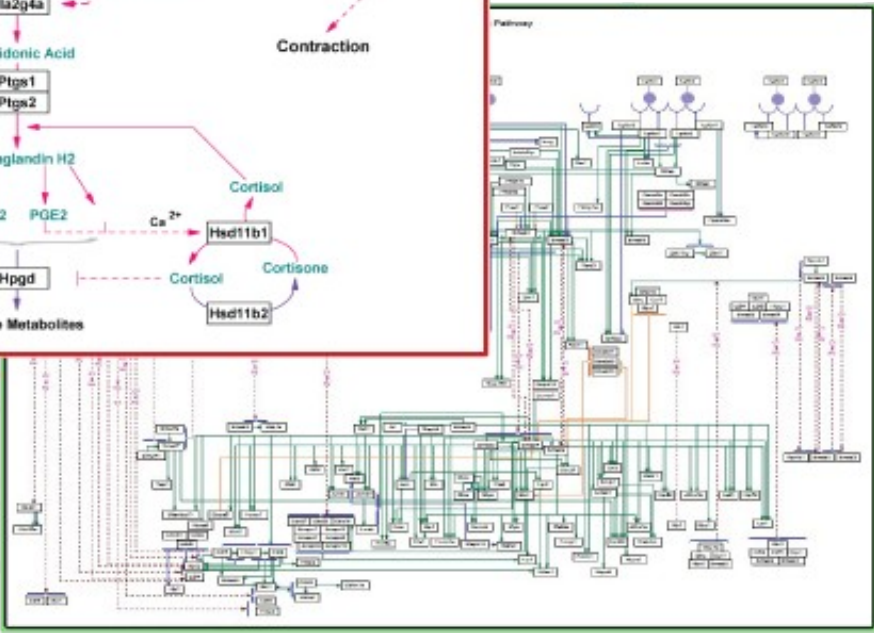
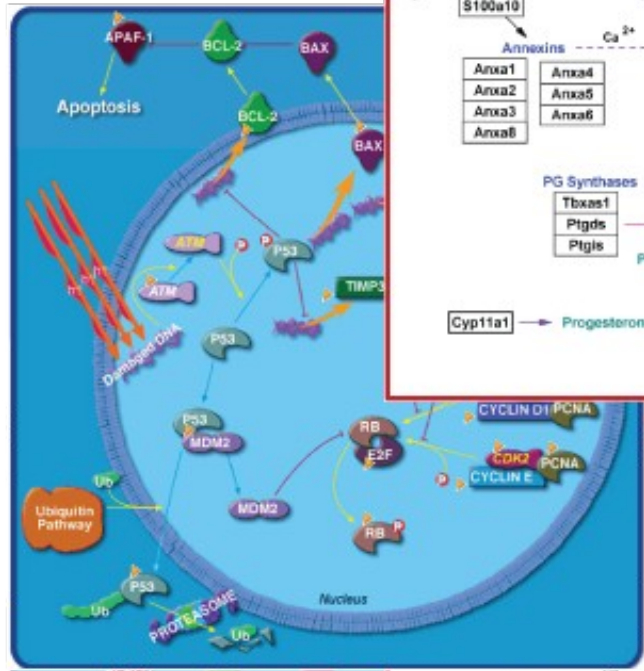
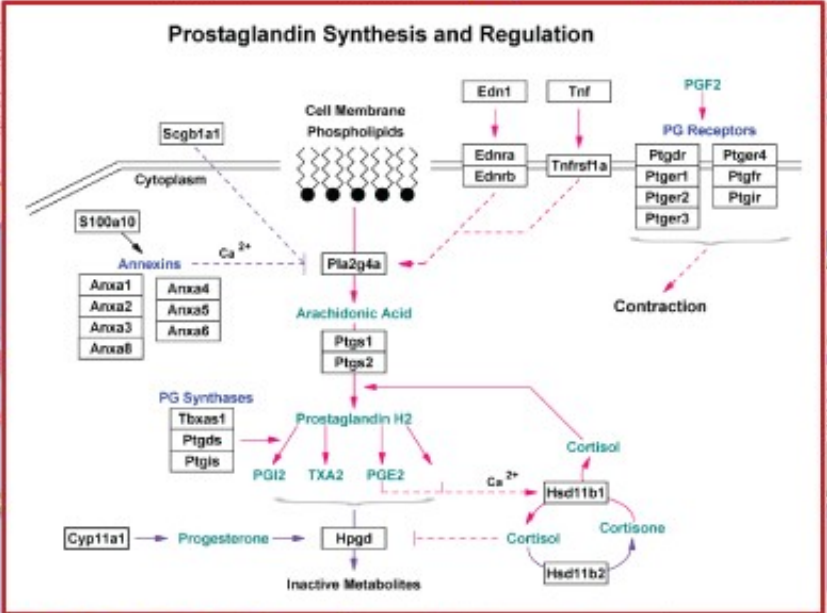
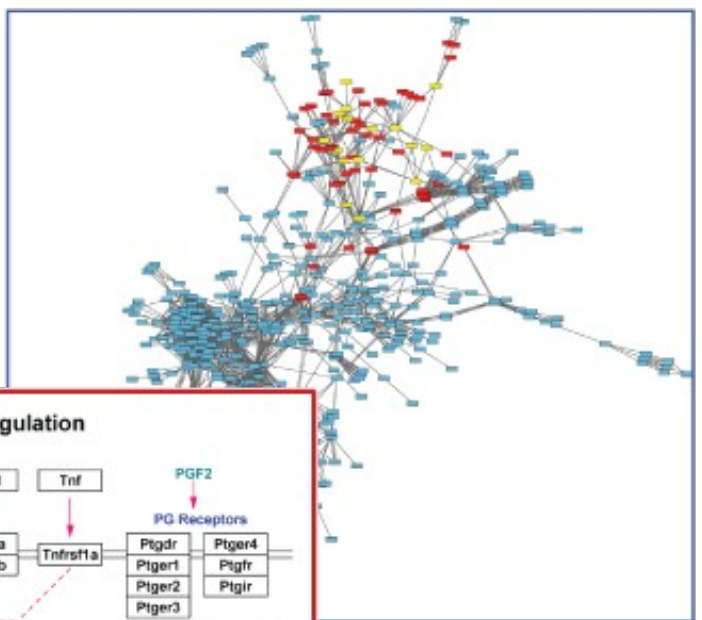
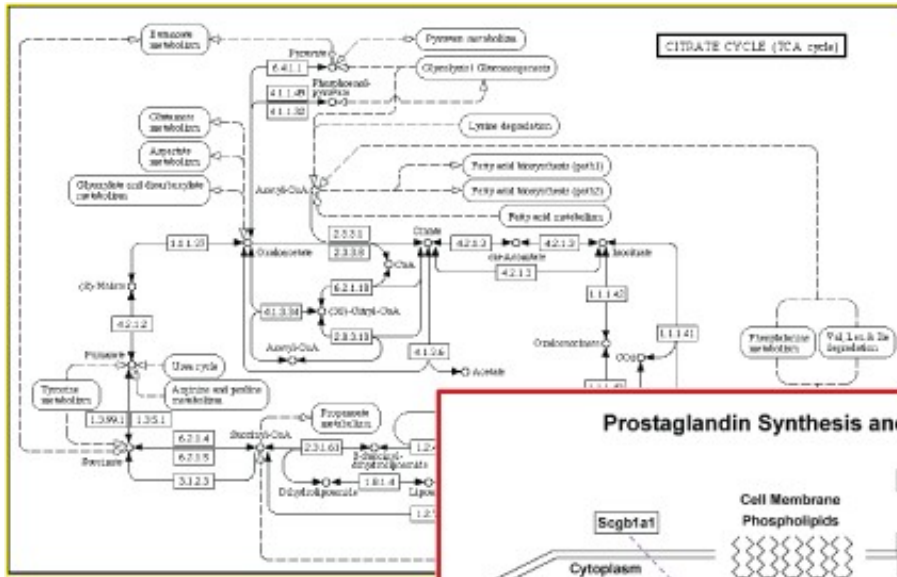
Pico, et al. (2008) *WikiPathways: pathway editing for the people*. PLoS Biol

Kelder, et al. (2009) *Mining Biological Pathways Using WikiPathways Web Services*. PLoS ONE





Gerhard Michal 1974



data

- + Collection
- + Annotation
- + Integration
- + Curation

ideas

synthesis

Biology Community

access

submit

Curators

curate

update

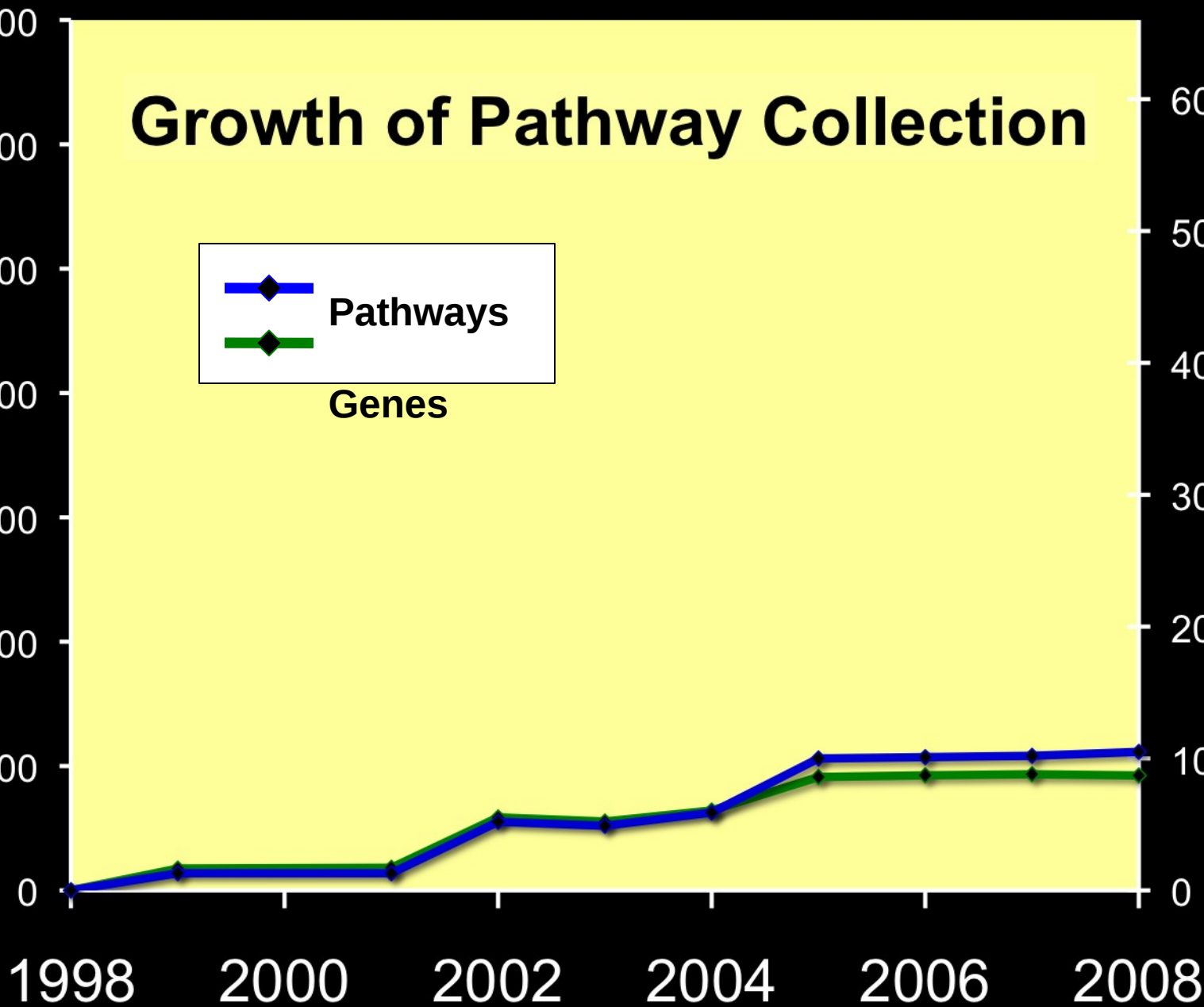
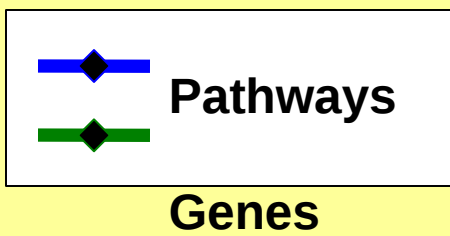
data-

base

Growth of Pathway Collection

Number of Genes

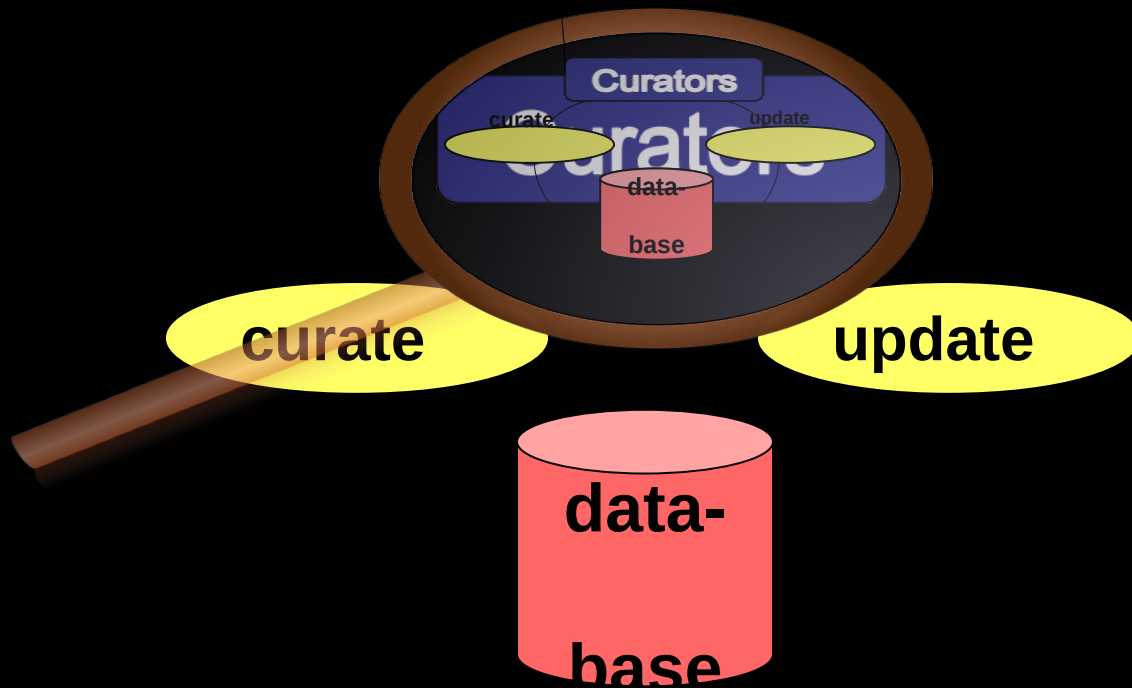
Number of Pathways



Biology Community

access

submit



Biology Community

curate

access

submit

update

The screenshot shows the WikiPathways website interface. At the top, there is a navigation bar with links like 'page', 'discussion', 'edit', 'history', 'delete', 'move', 'unprotect', and 'unwatch'. Below this is a welcome message: 'Welcome to WikiPathways BETA. In the new tradition of Wikipedia, WikiPathways is an open, public platform dedicated to the curation of biological pathways by and for the scientific community. More about WikiPathways...'. The main content area is divided into sections: 'Finding Pathways' with search and browse options, 'Contributing New Pathways' with a 'Create' button and a 'media-wiki' cylinder, and 'Today's Featured Pathway' which displays a detailed diagram of the 'p38 MAPK Signaling Pathway (BioCarta) (Rattus norvegicus)'. The diagram shows a complex network of proteins and their interactions, including components like 'p38', 'MAPK', and 'ERK'. A red cylinder with the text 'media-wiki' is overlaid on the 'Create' section, indicating the use of a media-wiki system for pathway creation.

Under the Hood

AlexanderPico my talk my preferences my watchlist my contributions log out

pathway discussion edit history delete move protect watch

Pathway:Homo sapiens:Krebs-TCA Cycle

Name: TCA Cycle
 Email: genmapp@glab.stone.isf.edu
 Availability: 2009, Glabstone Institutes
 Last modified: 2/14/02
 Organism: Homo sapiens
 Data source: GenMAPP 2.0

not working?

Edit pathway Download

BETA
WIKIPATHWAYS
 Pathways for the People

navigation

- Home
- Help

pathway

- Create
- Browse
- Wish List
- Download

overview

- Recent Changes
- Most Viewed
- Most Edited
- New Pathways

community

- About us
- Contact us
- GenMAPP Portal
- BIGCaT Portal

search

Google Custom Search

titles only

toolbox

- What links here
- Related changes
- Special pages
- Printable version
- Permanent link

Zoom: 100%

Backpage

Gene information

MDH1 | malate dehydrogenase 1 NAD (soluble)

Gene ID:	
Gene Symbol:	
Description:	Malate dehydrogenase 1
Chr:	

not working?

Download

Description

The **citric acid cycle**, also known as the tricarboxylic acid cycle (TCA cycle) rarely, the Szent-Gyorgyi-Krebs cycle) is a series of enzyme-catalysed chemical reactions of central importance in all living cells that use oxygen as part of cellular respiration. The components and reactions of the cycle occur in the matrix of the mitochondrion. The components and reactions of the cycle were established by seminal work from both **Albert Szent-Gyorgyi** and **Hans Krebs**. [From Wikipedia]

Bibliography

No bibliography

To add or edit bibliography, click the edit button below the pathway in the right click menu to add a literature reference in the right click menu to add a space to add a global reference to the pathway, or on a specific object only (e.g. an article describing a specific protein or interaction).

Categories

- Homo sapiens
- Metabolic Process

Description

The **[[wikipedia:citric acid cycle|citric acid cycle]]**, also known as the tricarboxylic acid cycle (TCA cycle) or the Krebs cycle, (or rarely, the Szent-Gyorgyi-Krebs cycle) is a series of enzyme-catalysed chemical reactions of central importance in all living cells that use oxygen as part of cellular respiration. The components and reactions of the citric acid cycle were established by seminal work from both **[[wikipedia:Albert Szent-Gyorgyi|Albert Szent-Gyorgyi]]** and **[[wikipedia:Hans Krebs|Hans Krebs]]**. [From **[[wikipedia:Main_Page|Wikipedia]]**]

not working?

Categories

- Cellular Process
- Metabolic Process
- Molecular Function
- Physiological Process

not working?

Source="GenMAPP 2.0" Version="20041216" Author="Nathan Salomonis" Organism="Homo sapiens">

<Comment>
 end
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 Width="900.0" Height="300.0">

= "GTF2B | general transcription factor IIB" | GraphId="bla" GroupRef="a10b">
 Width="900.0" Height="300.0">

TAF5 | TAF5 RNA polymerase II TATA box binding... | GraphId="d9c" GroupRef="d78a7">
 Width="900.0" Height="300.0">

TAF6 | TAF6 RNA polymerase II TATA box binding... | GraphId="f18" GroupRef="d78a7">
 Width="900.0" Height="300.0">

TAF7 | TAF7 RNA polymerase II TATA box binding... | GraphId="f19" GroupRef="d78a7">
 Width="900.0" Height="300.0">

TAF9 | TAF9 RNA polymerase II TATA box binding... | GraphId="fad" GroupRef="d78a7">
 Width="900.0" Height="300.0">

ILK | Integrin-linked kinase | GraphId="aa4" GroupRef="d78a7">
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TAF13 | TAF13 RNA polymerase II TATA box binding... | GraphId="d35" GroupRef="d78a7">
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GTF2E1 | general transcription factor IIE poly... | GraphId="f36" GroupRef="e9f40">
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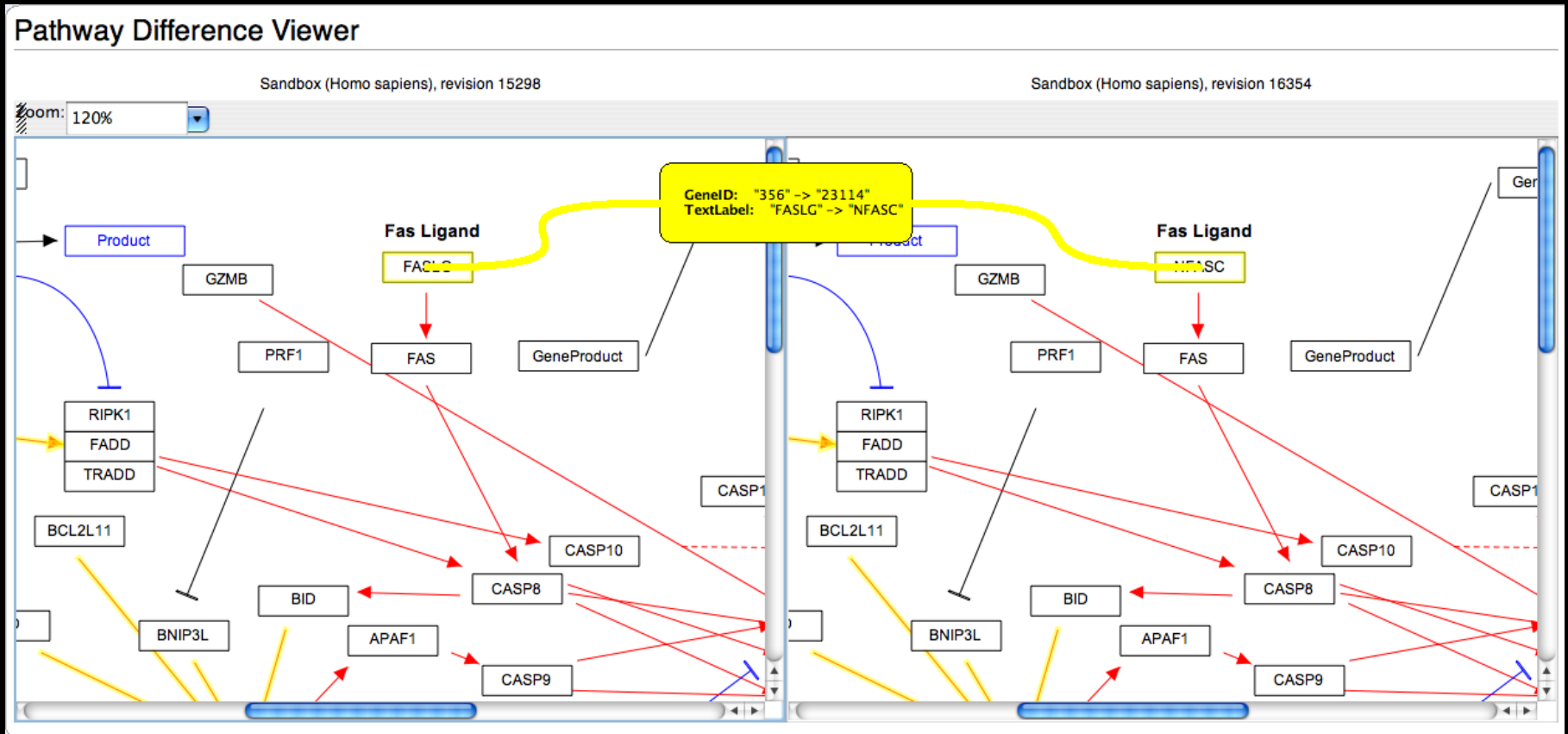
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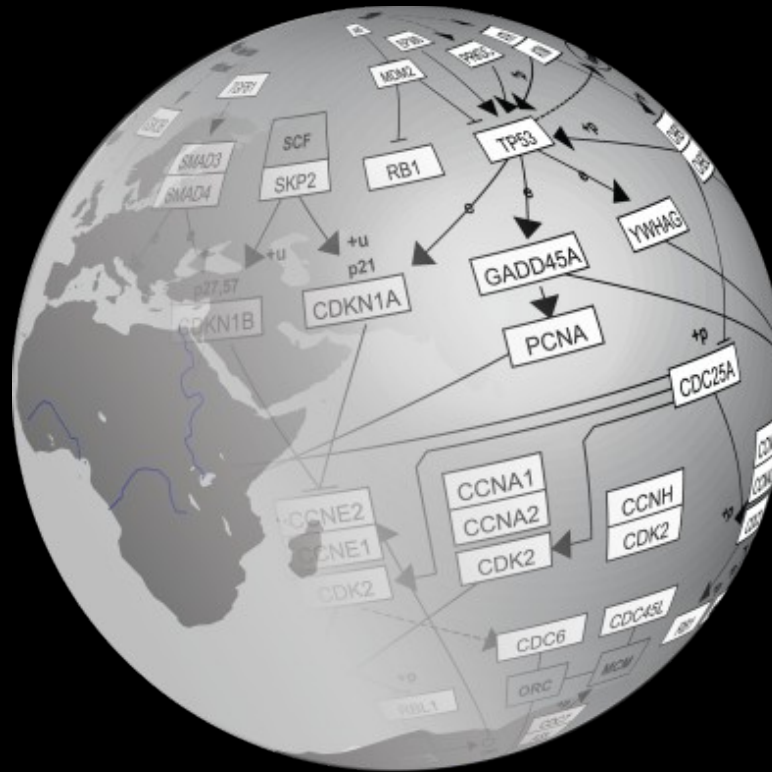
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Under the Hood



Demo



WikiPathways Today

- Lowering threshold for contributions
- Attribution for authors per pathway
- Utilizing pathways as research tools
- Facilitating communities

Future Development

- **More scripts bots**
- **Curator tools**

Future Development





- More scripts bots
- Curator tools

pathway discussion view source

Acetylcholine Synthesis (Mus musculus)

Andrew Kwa, Thomas Kelder





Curator's tools

Acetylcholine Synthesis (Mus musculus)    





Add curation tag: Tag text:





Add ontology tag:




Change permissions: Public Private




   


My pathways | My watched pathways



VEGF signaling pathway (Homo sapiens) 16 November 2010 Deleted    

Toll-like receptor signaling (Mus Musculus) 16 November 2010    

Glycogen metabolism (Mus musculus) 12 November 2010   

Cell cycle cancer (Homo sapiens) 18 October 2010   

ET-1 Synthesis (Rattus norvegicus) 10 October 2010 

Future Development

- More scripts bots
- Curator tools
- Social rewards



Contributing a new pathway



Author of most viewed pathway



Curating 5 pathways

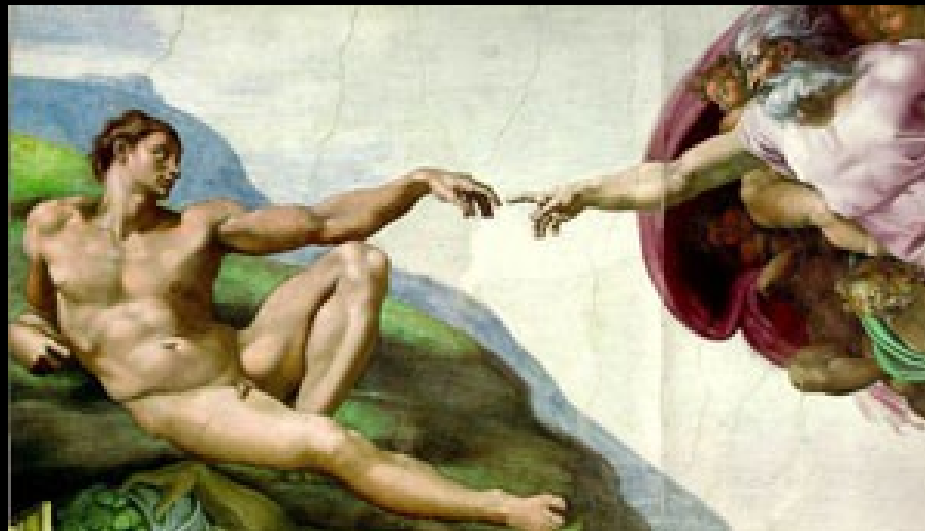
WikiPathways Milestones

- Online (Mar '07) ✓ *Success!*
- **First unknown user (Jan '08)**



WikiPathways Milestones

- Online (Mar '07) ✓ *Success!*
- First unknown user (Jan '08)
- **Email from “father of wiki”**





WIKIPEDIA
The Free Encyclopedia

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[Edit](#)

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Ward Cunningham

From Wikipedia, the free encyclopedia

"Howard Cunningham" redirects here. For the fictional character, see [Happy Days](#).

Howard G. "Ward" Cunningham (born May 26, 1949) is an [American computer programmer](#) who developed the first [wiki](#). A pioneer in both [design patterns](#) and [Extreme Programming](#), he started programming the software [WikiWikiWeb](#) in 1994 and installed it on the [website](#) of his software consultancy, [Cunningham & Cunningham](#) (commonly known by its domain name, **c2.com**), on March 25, 1995, as an add-on to the [Portland Pattern Repository](#). He currently lives in [Beaverton, Oregon](#) and is the [chief technology officer](#) for [AboutUs](#).

He has co-authored a book about wikis, titled *[The Wiki Way](#)*, and also invented [Framework for Integrated Tests](#). He was a keynote speaker at the first three instances of the [WikiSym](#) conference series on [wiki](#) research and practice.

Ward Cunningham





Ward Cunningham at the [Wikimedia Foundation](#) (2009)

“You may be interested, When I created the first wiki 13 years ago I had in the back of my mind the creation of a community of practicing software professionals (my discipline) that could engage in a "simplified scholarship" inspired by our best scientific disciplines. **Imagine my satisfaction when my internet techniques are found attractive by the communities that most inspired me.**”

Ward Cunningham, August

2008

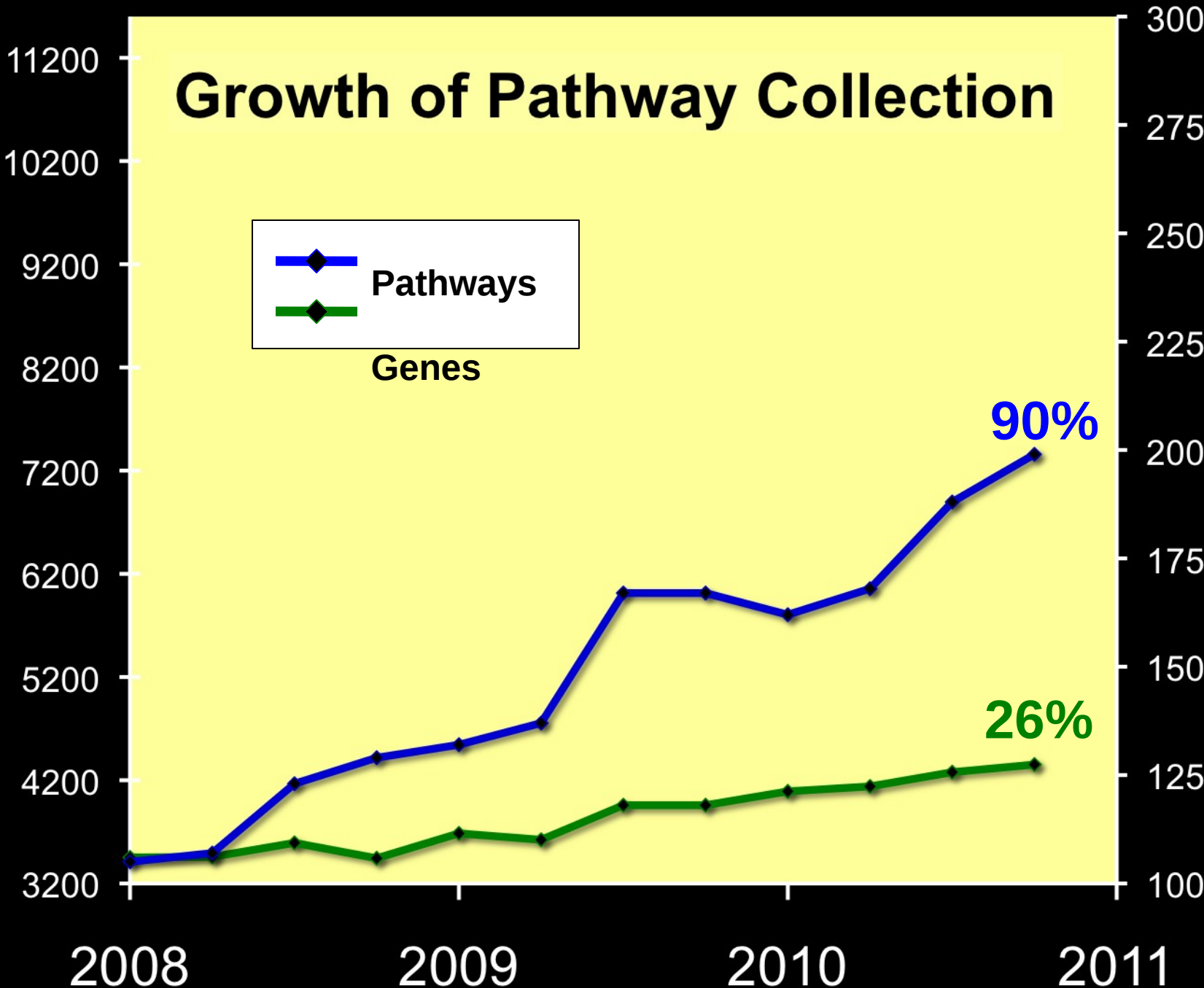
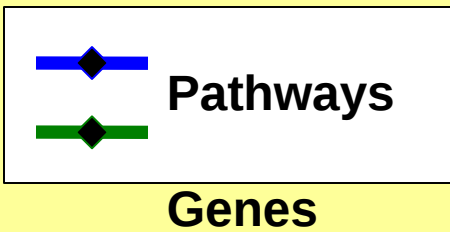
WikiPathways Milestones

- Online (Mar '07) ✓ *Success!*
- First unknown user (Jan '08) 
- Email from “father of wiki” 
- **Quantity and quality of content**

Growth of Pathway Collection

Number of Genes

Number of Pathways



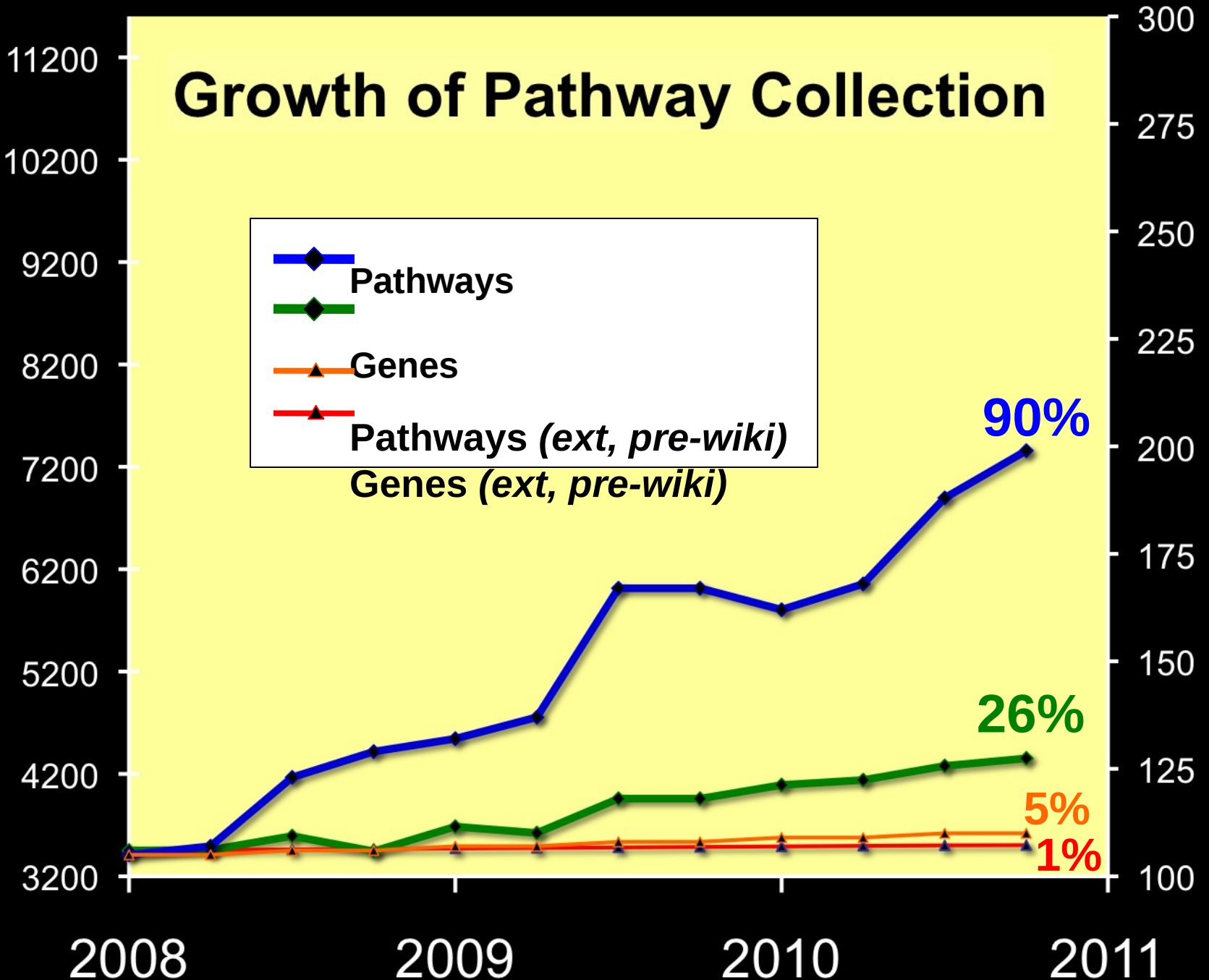
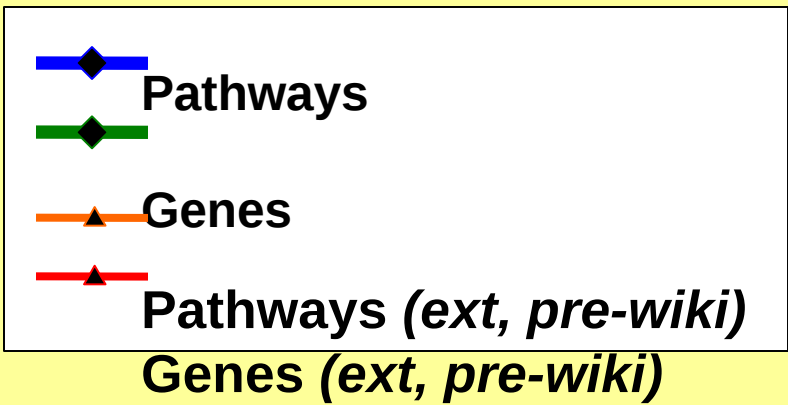
90%

26%

Growth of Pathway Collection

Number of Genes

Number of Pathways



90%

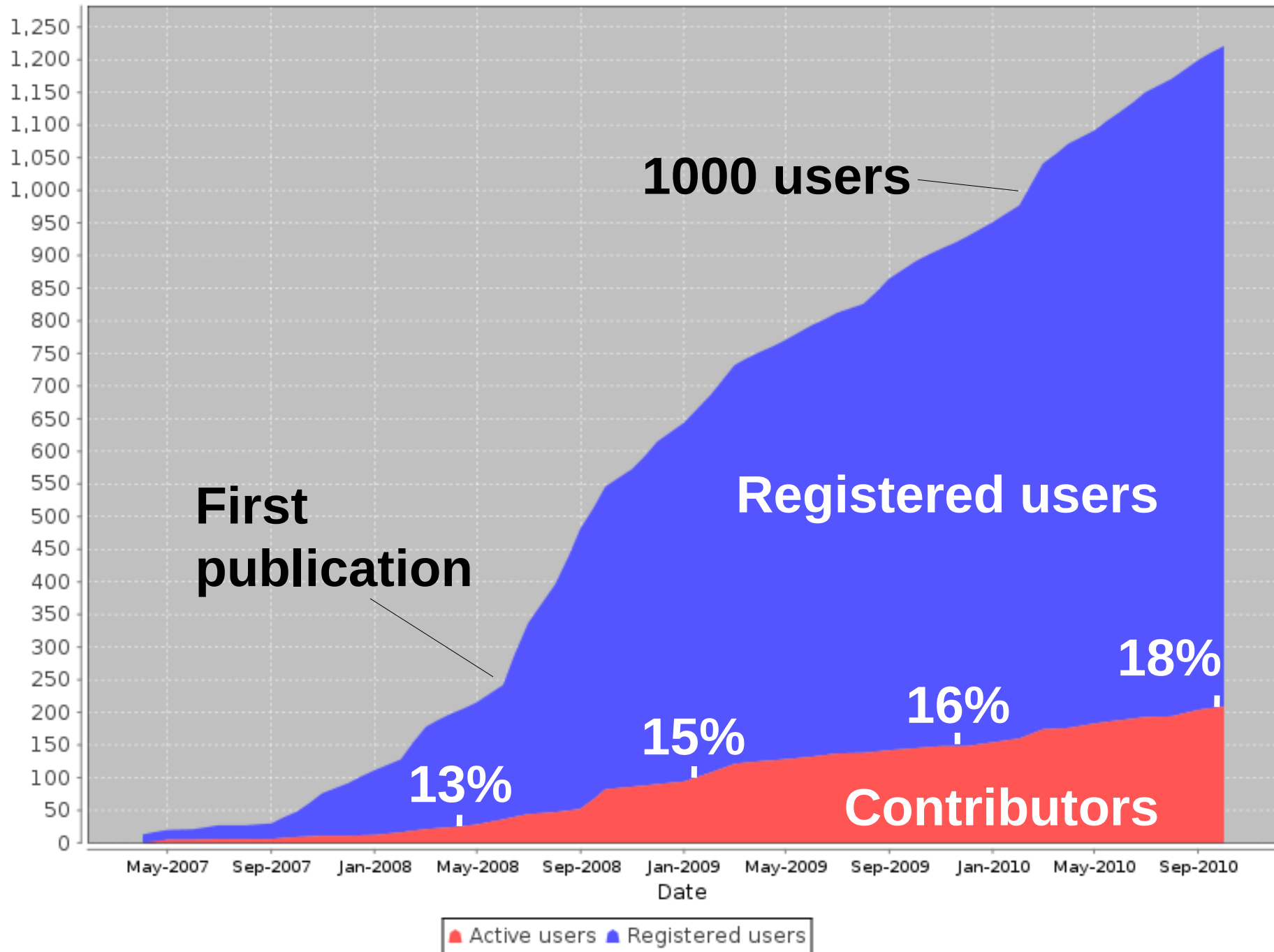
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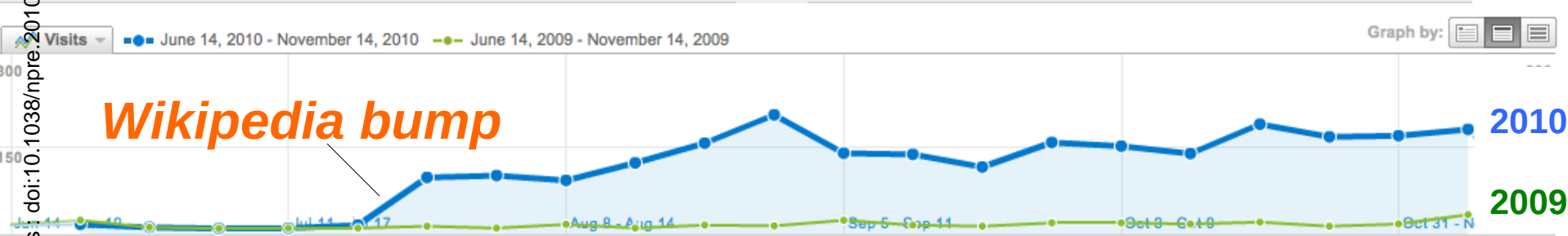
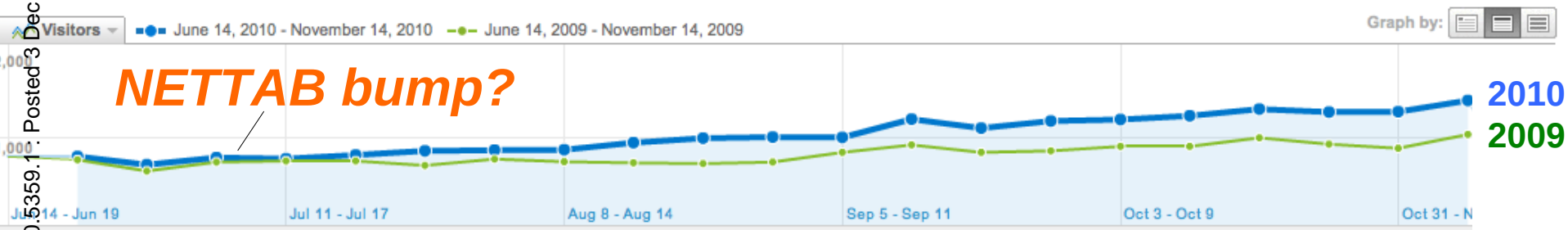
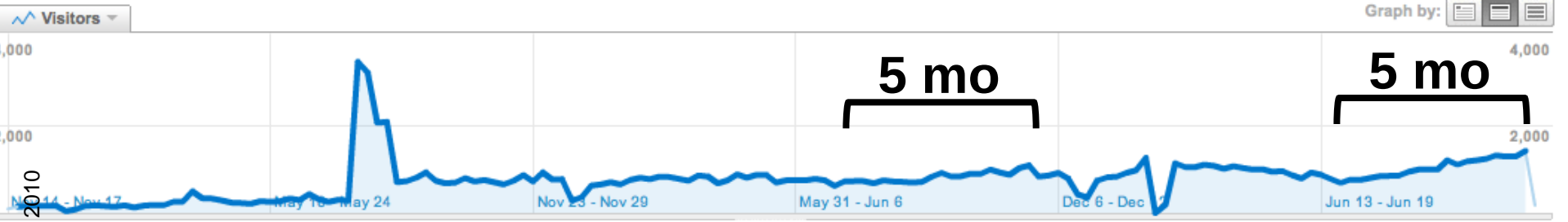
5%

1%

WikiPathways users

Nature Precedings : doi:10.1038/npre.2010.5359.1 : Posted 3 Dec 2010





July

Aug

Sept

Oct

Nov

Nature Precedings : doi:10.1038/npre.2010.5359.1 Posted 3 Dec 2010



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Nature Precedings : doi:10.1038/npre.2010.5359.1: Posted 3 Dec 2010

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Search

Pyruvate dehydrogenase (lipoamide) alpha 1

From Wikipedia, the free encyclopedia

Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial is an [enzyme](#) that in humans is encoded by the *PDHA1* [gene](#).

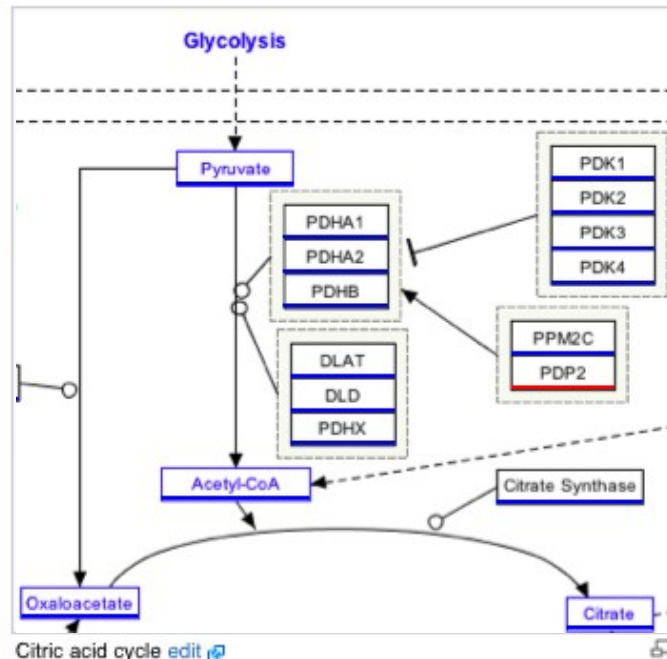
[edit](#)

The pyruvate dehydrogenase complex is a nuclear-encoded mitochondrial matrix multienzyme complex that provides the primary link between glycolysis and the tricarboxylic acid (TCA) cycle by catalyzing the irreversible conversion of pyruvate into acetyl-CoA. The PDH complex is composed of multiple copies of 3 enzymes: E1 (PDHA1); dihydrolipoyl transacetylase (DLAT; MIM 608770) (E2; EC 2.3.1.12); and dihydrolipoyl dehydrogenase (DLD; MIM 238331) (E3; EC 1.8.1.4). The E1 enzyme is a heterotetramer of 2 alpha and 2 beta subunits. The E1-alpha subunit contains the E1 active site and plays a key role in the function of the PDH complex (Brown et al., 1994).[supplied by OMIM]^[1]

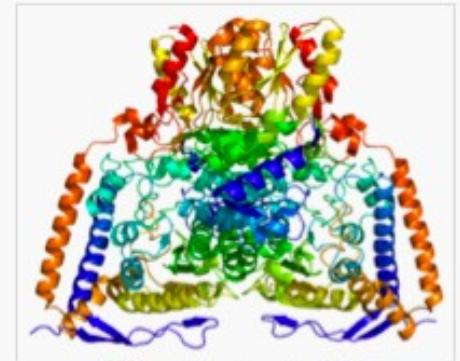
Interactive pathway map

[\[edit\]](#)

Click on genes, proteins and metabolites below to link to respective articles. ^[2]



Pyruvate dehydrogenase (lipoamide) alpha 1



PDB rendering based on 1ni4.

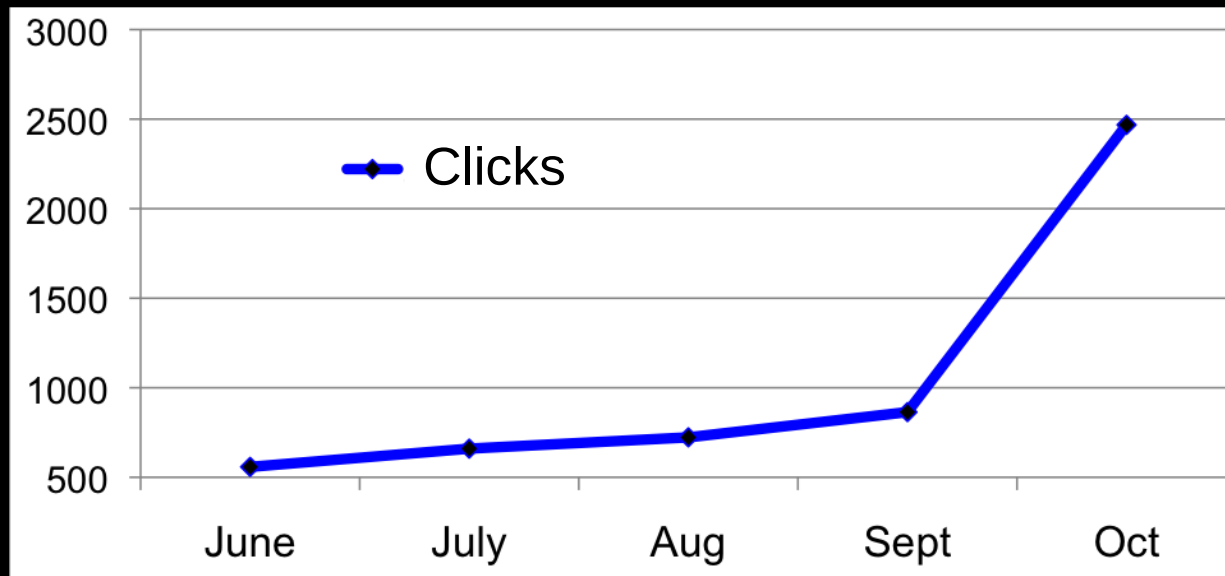
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Identifiers	
Symbols	PDHA1; PDHA; PDHCE1A; PHE1A
External IDs	OMIM: 300502 MGI: 97532 HomoloGene: 37282 GeneCards: PDHA1 Gene
Gene Ontology	[show]
RNA expression pattern	
<p>GeneAtlas Tissues</p>	

Who cares about biological wikis?



biology + wiki = academics

Who cares about biological wikis?



**Linkouts to Wikipedia
from NCBI taxonomy**

data

ideas

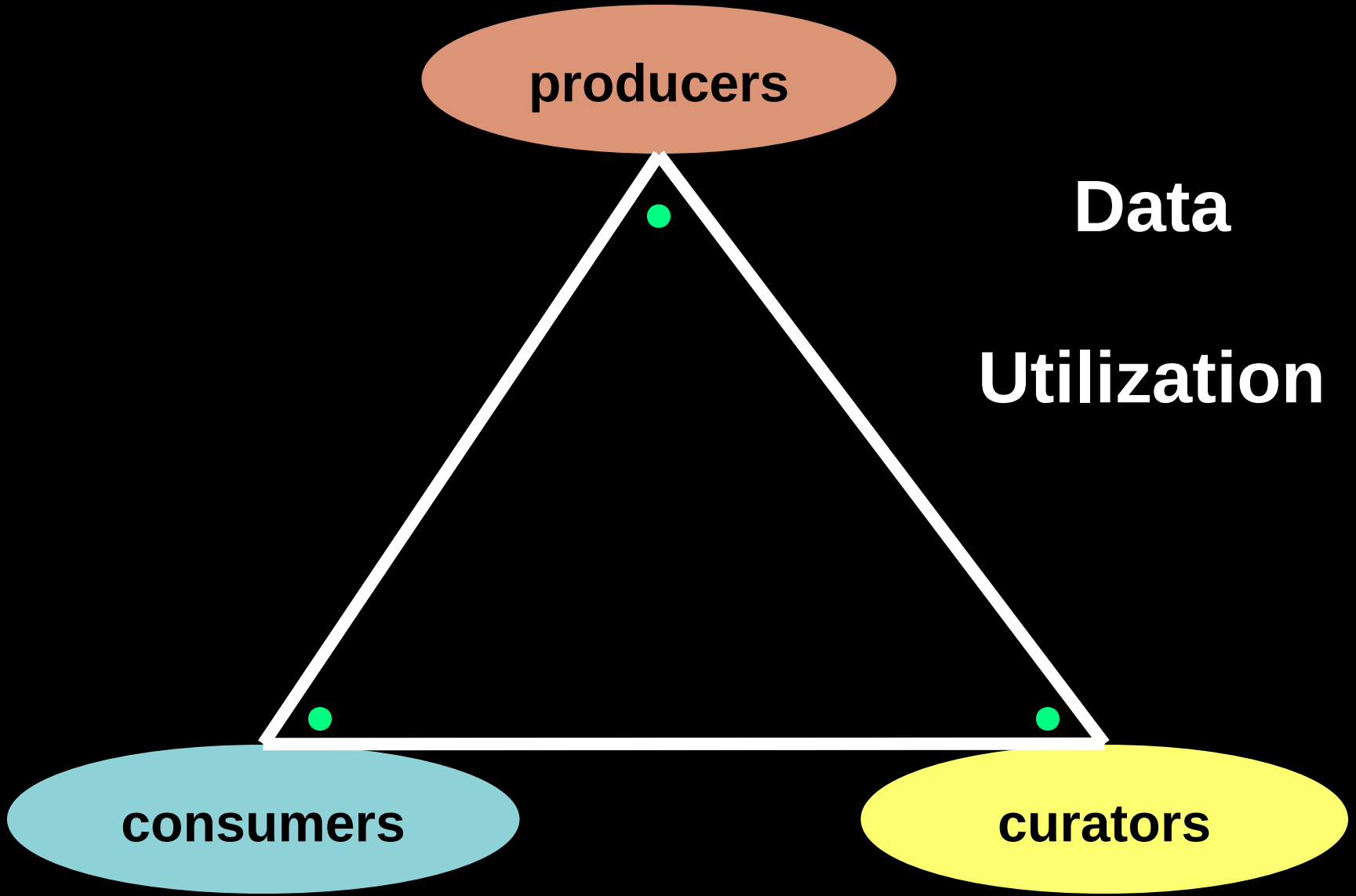
genes

pathways

resources

structures

protocols



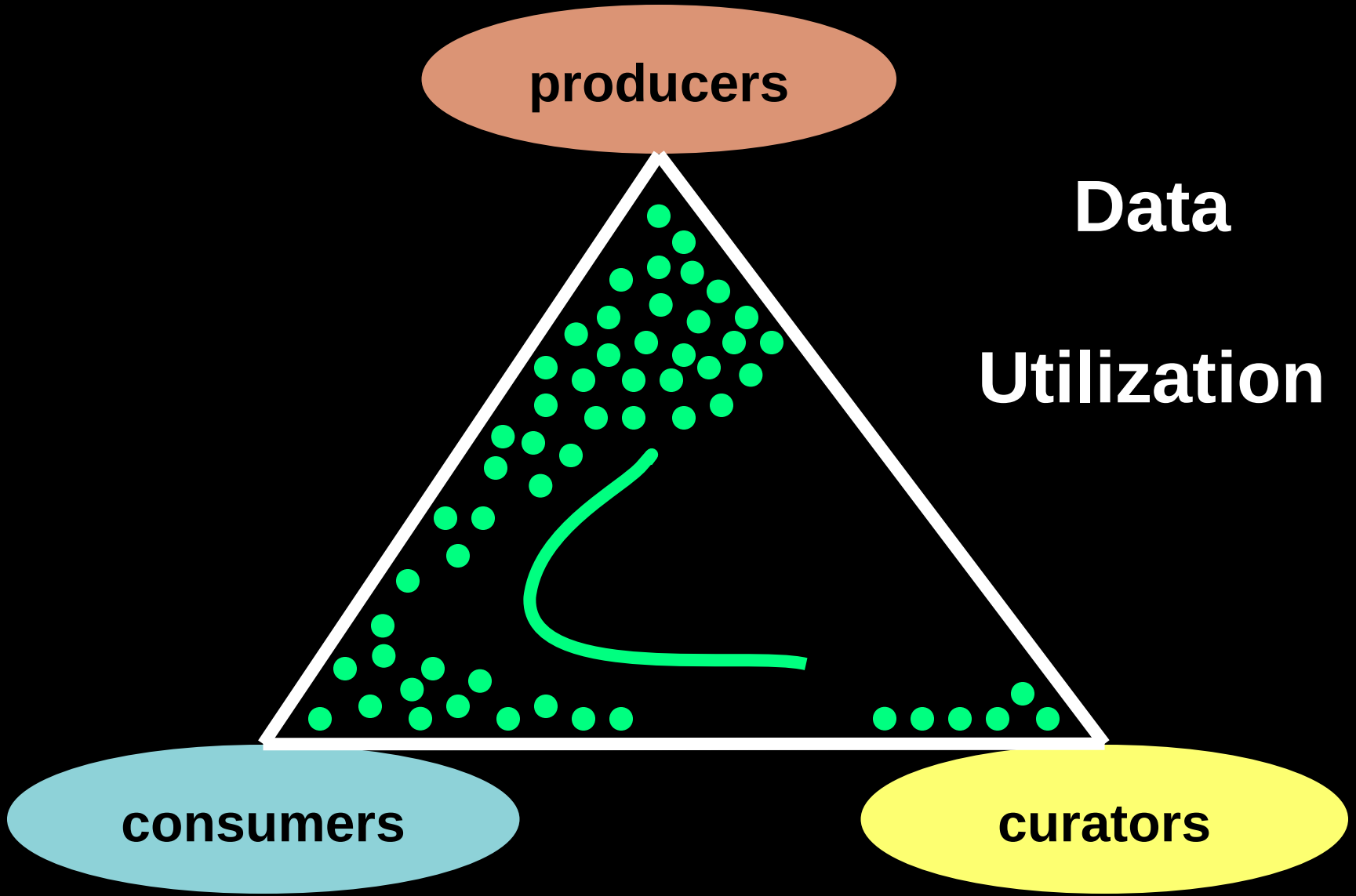
producers

Data

Utilization

consumers

curators



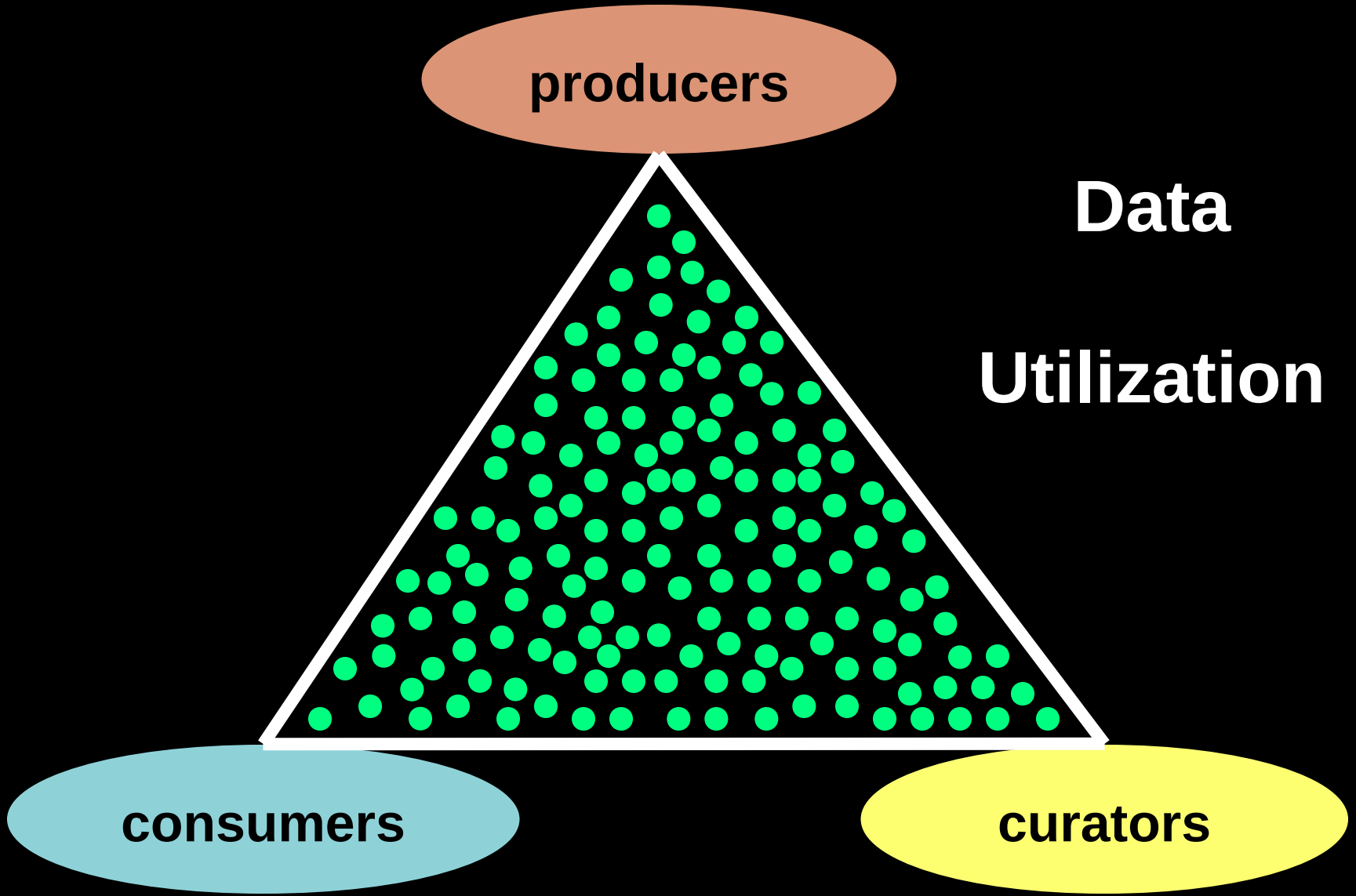
producers

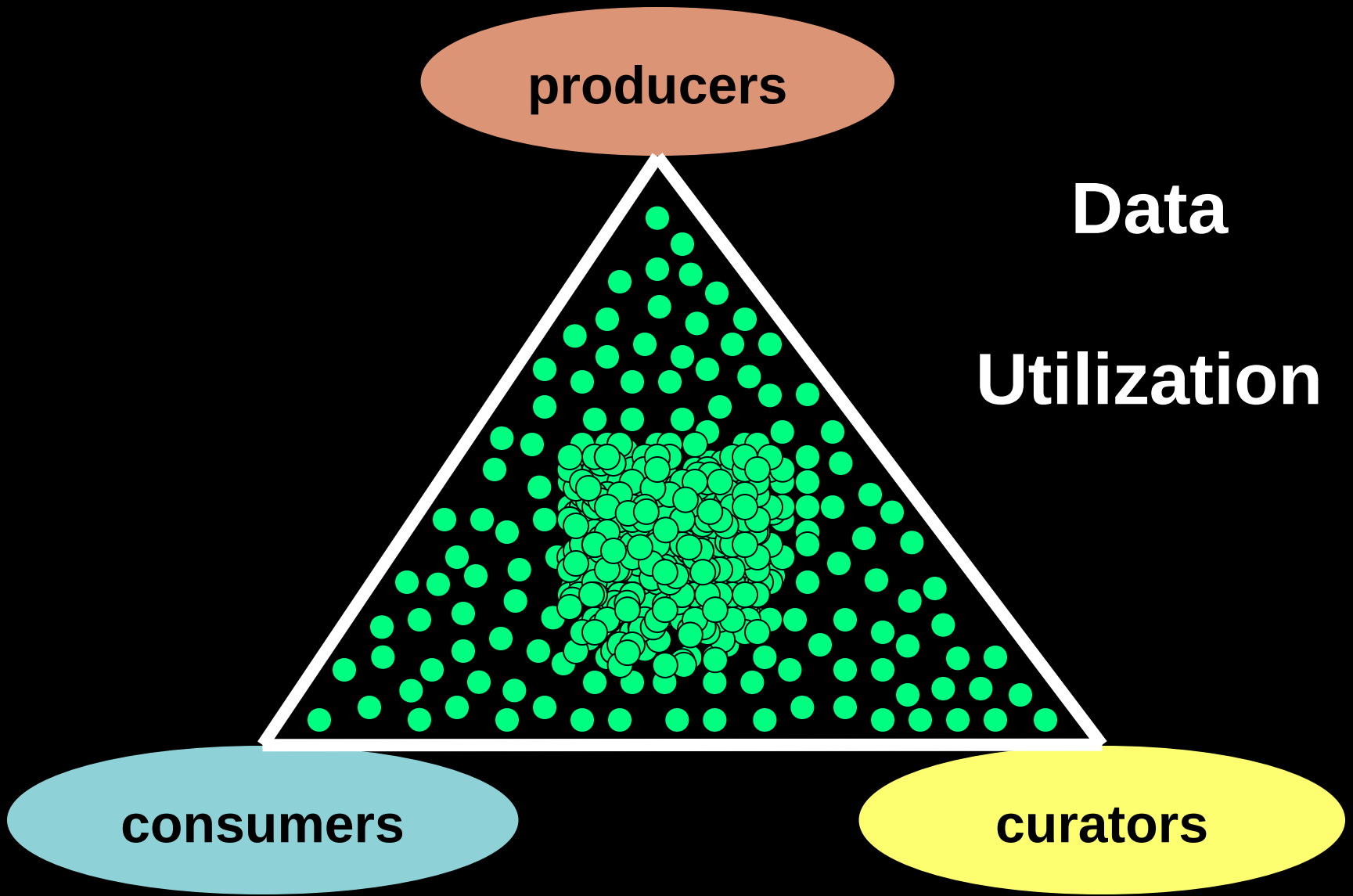
Data

Utilization

consumers

curators





Collaborative Development

- Oregon State University
 - Jaiswal lab (plant pathways)
- NIH, NCI
 - MIMs group (molecular interaction maps)
- Stanford University
 - PharmGKB (curation tools)
- Google Summer of Code
 - 1000 student and 150 organizations
 - 90 countries represented
 - *33 student fellowships paid for by Google*

Acknowledgements

BiGCaT Dept,
Maastricht, NL

Thomas Kelder
Martijn van Iersel
Martina Kutmon
Chris Evelo

PharmGKB, Stanford

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Rebecca Tang

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Conklin Lab, UCSF

Kristina Hanspers
Nathan Salomonis
Bruce Conklin

Jaiswal Lab, OSU

Pankaj Jaiswal
Justin Elser
Palitha dharmawardhana

GSoC, Google

Adem Bilican
Chetan Bansal
Jianjiong Gao
Bing Liu