

# **The role of the bioinformatician in 5 years:**

How AI tools are expected to change the way we work in the near future

Ali Balbaid  
Turki Sobahy  
Azari Bantan

# Bioinformatics

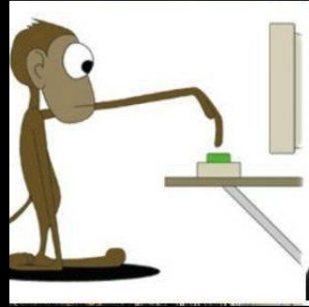


**What biologists  
think I do**

# Bioinformatics



**What biologists  
think I do**

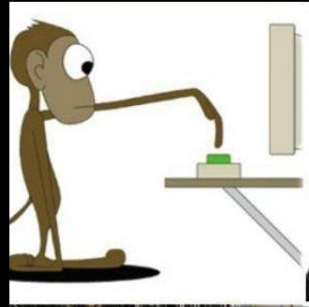


**What my PI  
thinks I do**

# Bioinformatics



**What biologists  
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**What my PI  
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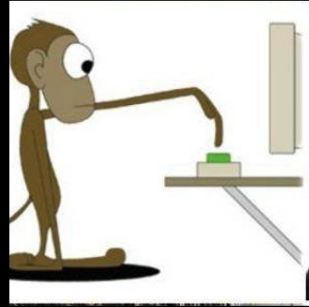


**What other bioinformaticians  
think I do**

# Bioinformatics



**What biologists  
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**What my PI  
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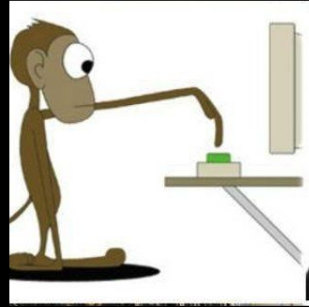


**What my friends  
Think I do**

# Bioinformatics



**What biologists  
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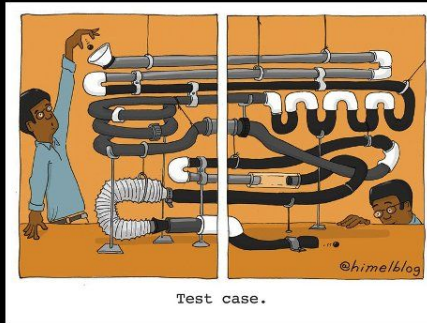
**What my PI  
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**What other bioinformaticians  
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**What my friends  
Think I do**

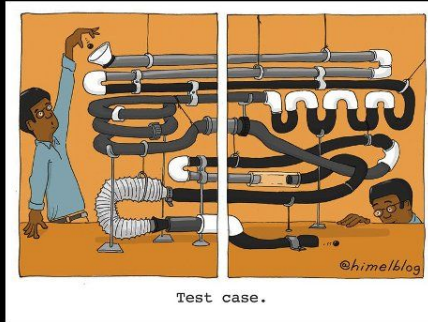


**What my mom  
thinks I do**

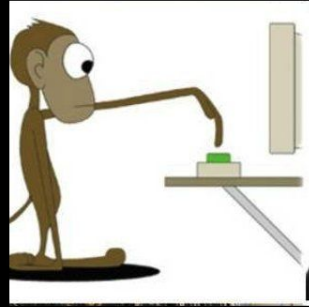
# Bioinformatics



**What biologists  
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**What my mom  
thinks I do**



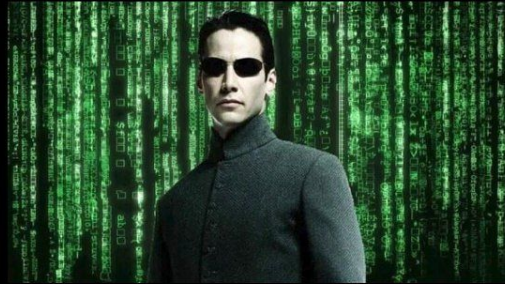
**What my PI  
thinks I do**



**What other bioinformaticians  
think I do**



**What my friends  
Think I do**



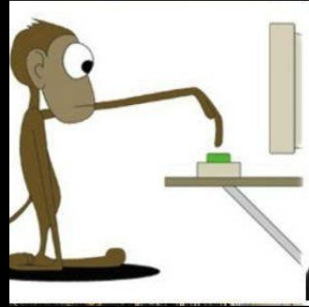
**What I think I do**



# Bioinformatics



**What biologists think I do**



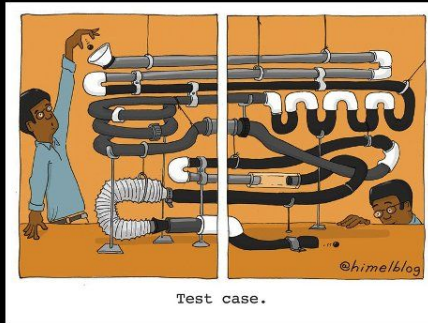
**What my PI thinks I do**



**What other bioinformaticians think I do**



**What my friends think I do**



**What my mom thinks I do**



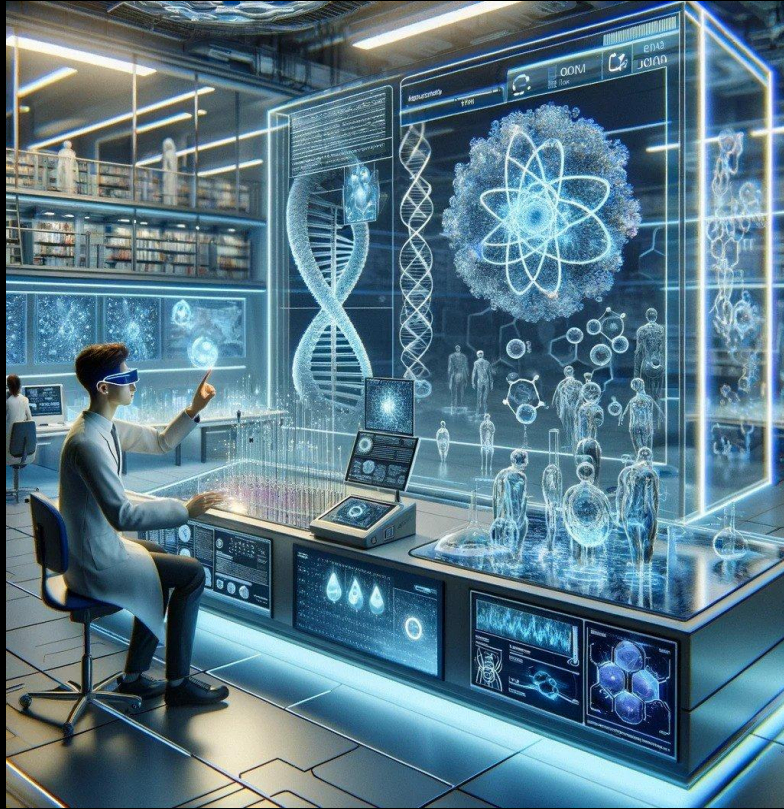
**What I think I do**



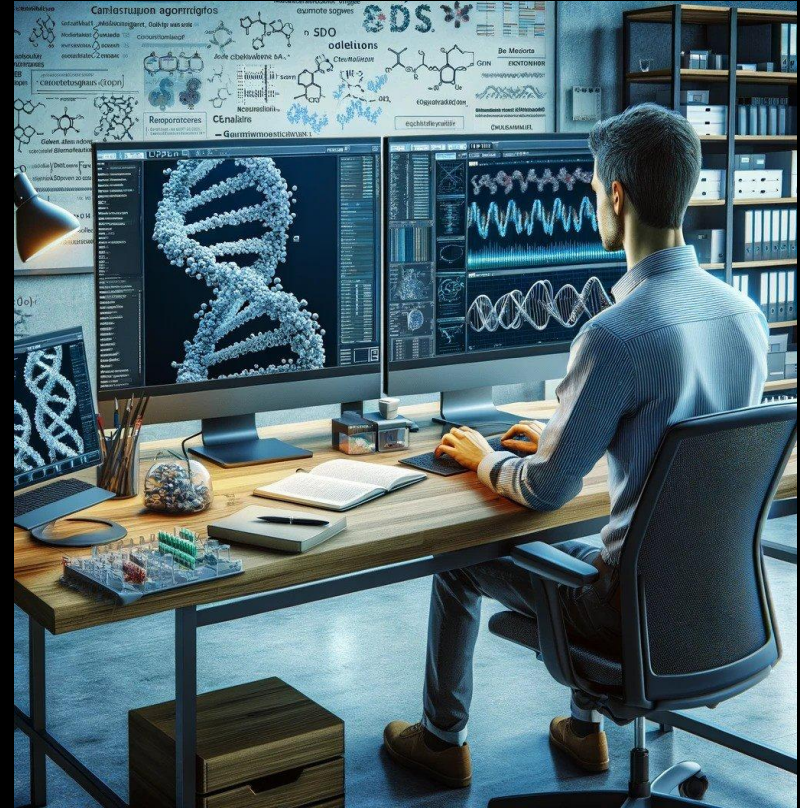
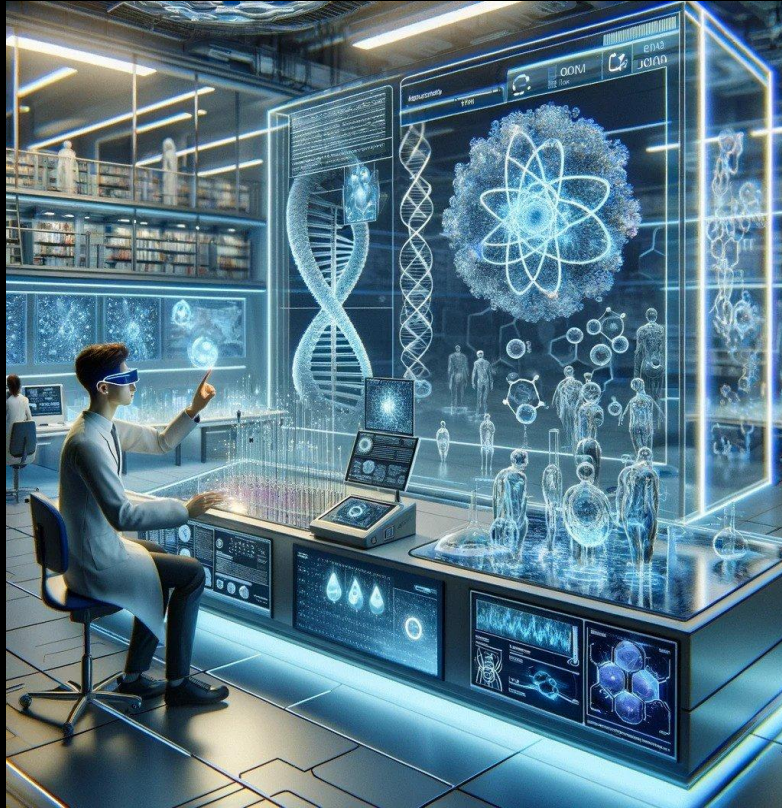
**What I actually do**



# What does chatGPT think it looks like?



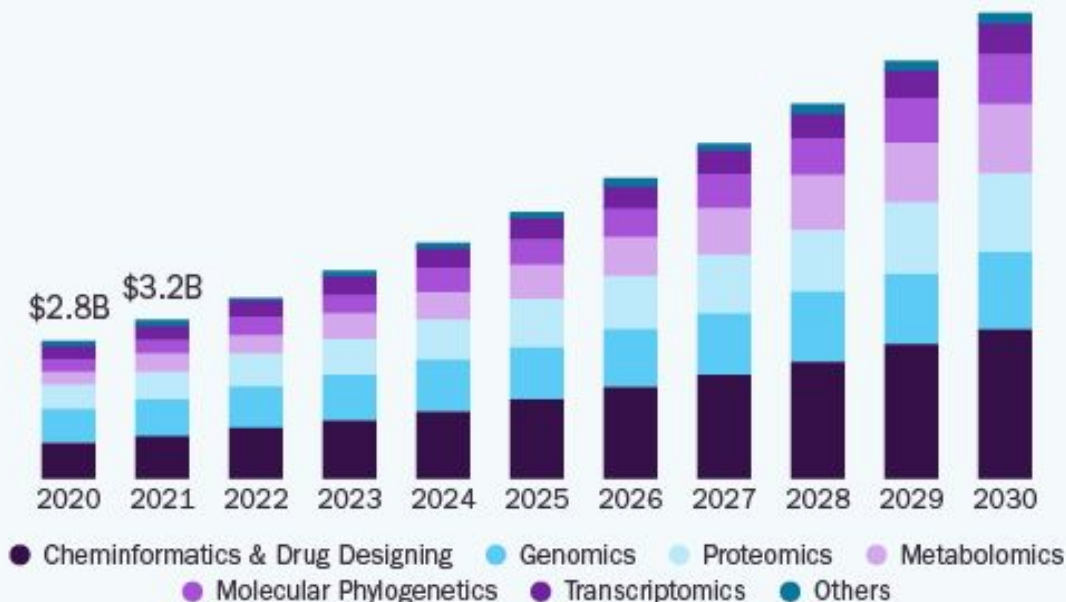
# What does chatGPT think it looks like?





## U.S. Bioinformatics Market

Size, by Application, 2020 - 2030 (USD Billion)



GRAND VIEW RESEARCH

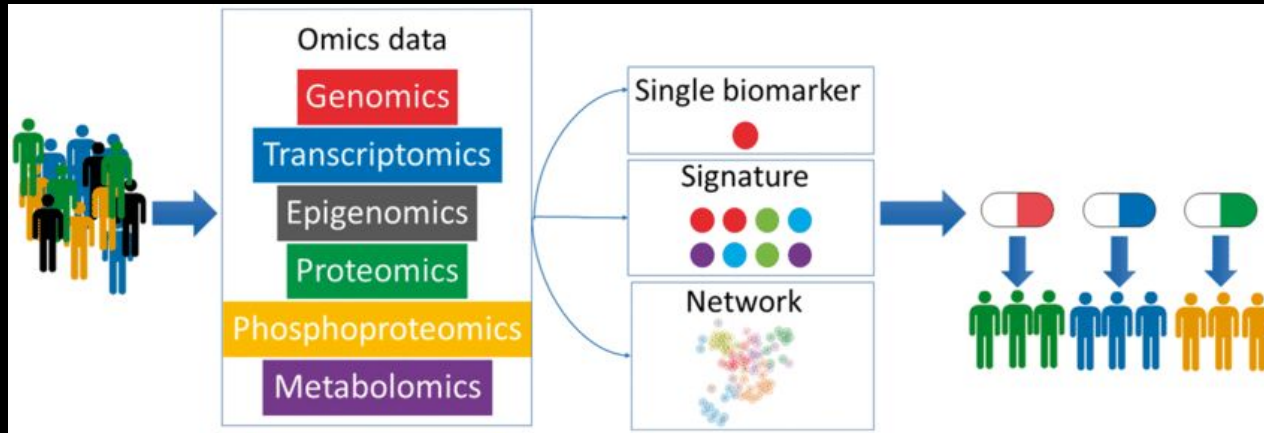
# 12.0%

U.S. Market CAGR,  
2023 - 2030

Source:  
[www.grandviewresearch.com](http://www.grandviewresearch.com)

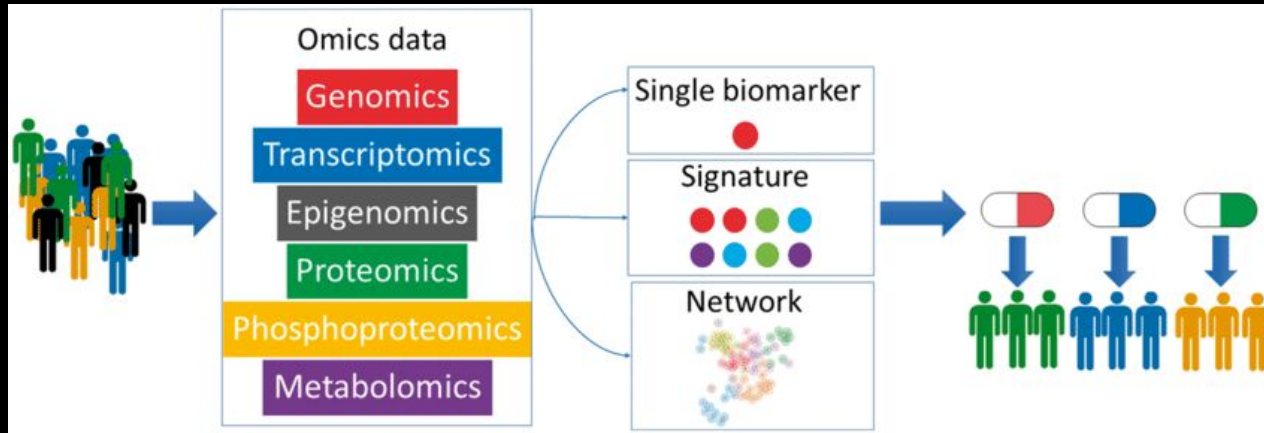
# **Snapshots of future roles in Bioinformatics ....**

# Personalized medicine



# Personalized medicine

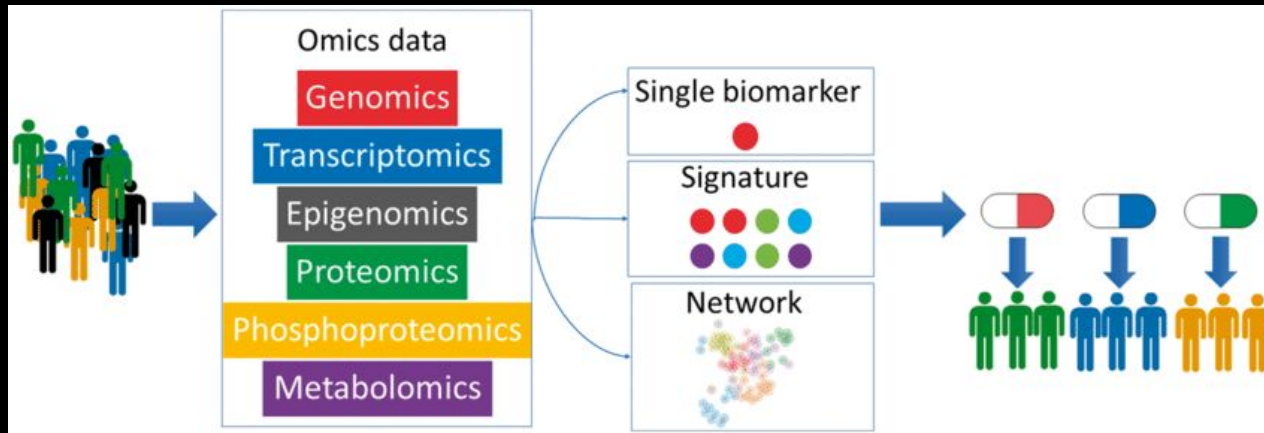
- Developing strategies for integrating omics (i.e., harmonizing data formats, interpretations...etc.)
- Interdisciplinary collaboration: Translating complex molecular information into actionable insights



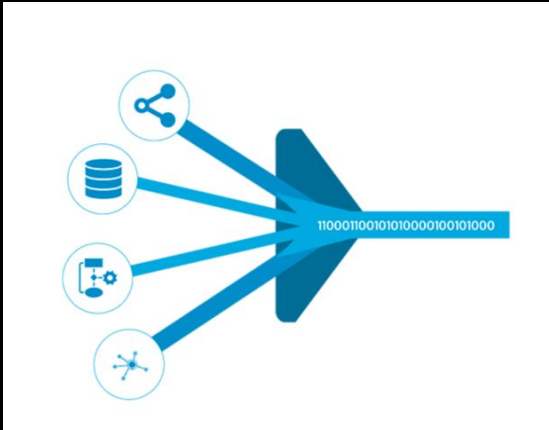


# Personalized medicine

“Automized pipelines for omics?”

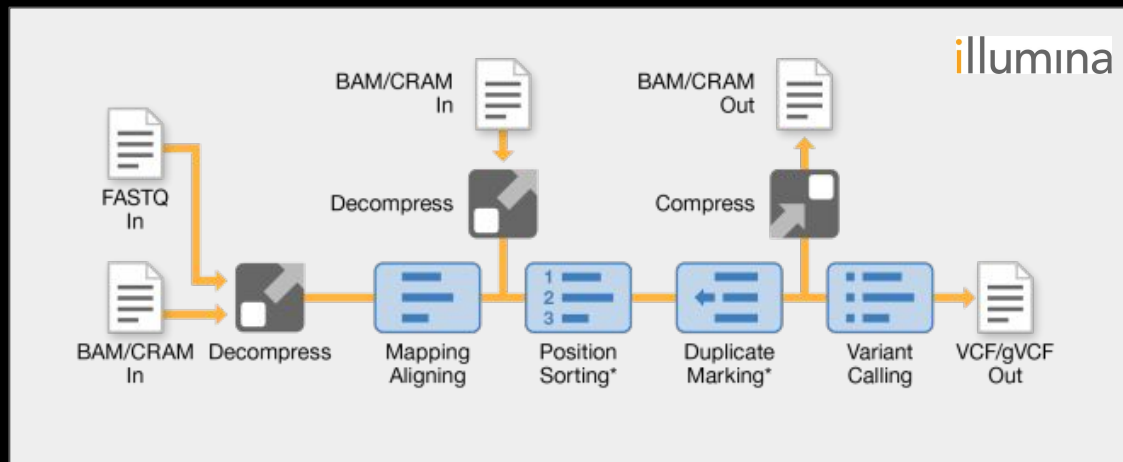


# Automation of Routine Tasks

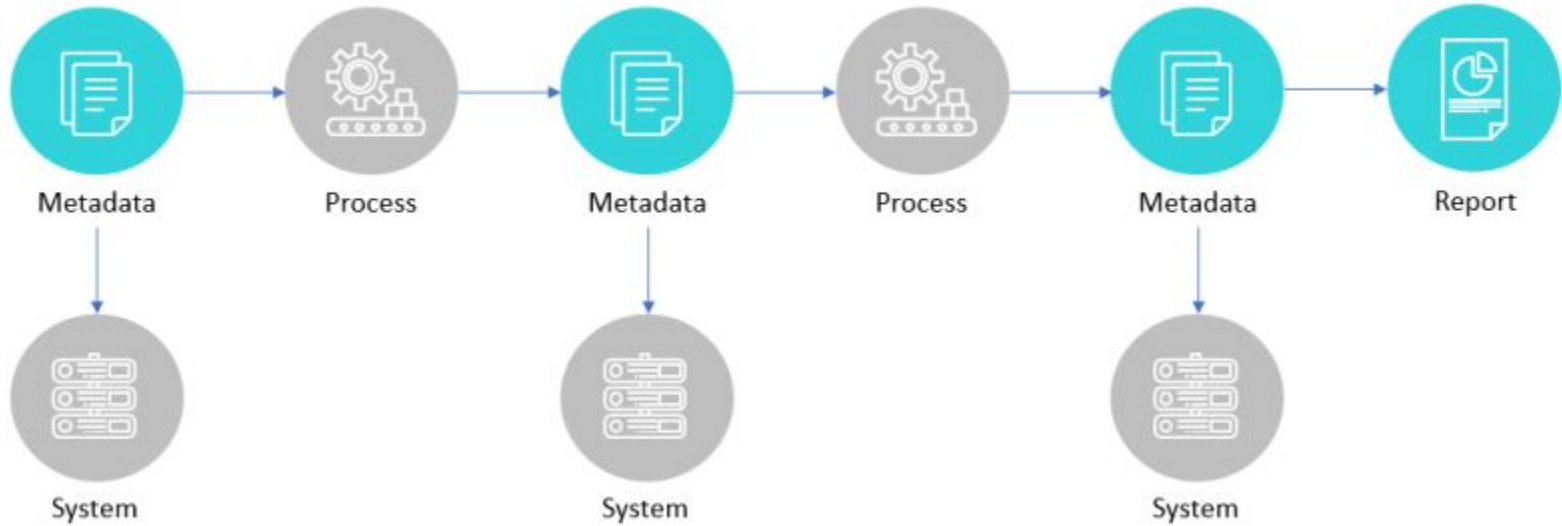


# Automation of Routine Tasks

Example ...



# Collaborative Research and Open Science



# Collaborative Research and Open Science

## Fold change

Quantity divided by its original amount / From Wikipedia, the free encyclopedia ⓘ

Biostatistics

Northern blot

Gene expression

...



DEAR WIKIWAND AI, LET'S KEEP IT SHORT BY SIMPLY ANSWERING THESE KEY QUESTIONS:

...



Can you list the top facts and stats about Fold change?

▼

Summarize this article for a 10 year old

▲

Fold change is a way to **measure** how much something has changed compared to its original amount. It helps us understand if there has been an increase or decrease in quantity. To calculate fold change, we divide the new amount by the original amount. For example, if you had 10 candies and now you have 20 candies, the fold change would be 2 because 20 divided by 10 equals 2. This tells us that the quantity of candies has doubled. Fold change is a useful tool for comparing changes in different things and understanding how much they have increased or decreased.

TELL US WHAT YOU THINK  

Last update: 7/27/2023. [Read More](#)

# Collaborative Research

## Fold change

Quantity divided by its original amount / From Wikipedia, the free encyclopedia

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DEAR WIKIWAND AI, LET'S KEEP IT SHORT BY SIMPLY ANSWERING THESE KEY QUESTIONS:

Can you list the top facts and stats about Fold change?

Summarize this article for a 10 year old

Fold change is a way to [measure](#) how much something has changed to understand if there has been an increase or decrease in quantity compared to the original amount. For example, if you had 10 candies and now you have 20, because 20 divided by 10 equals 2. This tells us that the quantity has increased by 2 times. This is useful for comparing changes in different things and understanding how much they have changed.

TELL US WHAT YOU THINK  

# Transcription factor

Protein that regulates the rate of DNA transcription / From Wikipedia, the free encyclopedia

Regulatory sequence

Transcriptional regulation

Histone acetyltransferase

...



DEAR WIKIWAND AI, LET'S KEEP IT SHORT BY SIMPLY ANSWERING THESE KEY QUESTIONS:



...

Can you list the top facts and stats about Transcription factor?

^

1. Transcription factors are proteins that control the rate of [DNA transcription](#).
2. They bind to specific DNA sequences and activate or repress [gene expression](#).
3. There are thousands of different transcription factors in human [cells](#).
4. They play a crucial role in development, cell differentiation, and disease.
5. Some transcription factors can switch genes on or off depending on environmental signals.
6. Mutations in [transcription factor](#) genes can lead to [genetic disorders](#).
7. Transcription factors interact with other proteins to form regulatory complexes.
8. They can recruit enzymes that modify chromatin structure for [gene](#) regulation.
9. Transcription factors have distinct DNA-binding domains that recognize specific sequences.
10. Their activity is tightly regulated through signaling pathways and [protein](#) modifications.

Note: The information provided here is a general overview and may not cover all aspects of transcription factor proteins comprehensively.

TELL US WHAT YOU THINK  

Last update: 8/5/2023. [Read More](#)

Summarize this article for a 10 year old

^

A [transcription factor](#) is a special [protein](#) that helps control how our [DNA](#) is used to make important molecules in our bodies. It acts like a traffic cop, deciding when and where certain genes should be turned on or off. This regulation of [DNA transcription](#) is crucial because it determines which proteins are made and when they are made. Think of it as a recipe book - the transcription factor decides which recipes get cooked up at different times, ensuring everything runs smoothly in our bodies.



## **Other things that will change**

**Personalized Medicine**

**Automation of Routine Tasks**

**Collaborative Research and Open Science**

**Enhanced Data Analysis and Interpretation**

**Predictive Modeling and Simulation**

**Ethical Considerations and Data Privacy**

## **Job postings to be on the look out for?**

- 1. AI/ML Algorithm Developer for Genomic Analysis**
- 2. Personalized Medicine Data Analyst**
- 3. Synthetic Biology Designer**
- 4. Computational Systems Biologist**
- 5. Bioinformatics Infrastructure Architect**
- 6. Health Data Scientist**
- 7. Environmental Genomics Specialist**
- 8. Bioinformatics Educator and Trainer**
- 9. Biotech Startup Entrepreneur**
- 10. Regulatory and Ethical Advisor for Genomic Data**