Algorithmic Concepts Computational Neuroscience

#### Genomics and Proteomics

Simulation and Modeling

Visualization

Immuno and Chemo-Informatics

Models

Databases and Data Management Transcriptomics Structural Variations Structural Bioinformatics

Structure Prediction Computational Methods

Computational Intelligence

Web Services in Bioinformatics

Pattern Recognition, Clustering and Classification

Biostatistics and Stochastic Models

Information Technologies

Methods

Pharmaceutical Applications

Systems Biology

Methods and Algorithms

**Algorithms** 

Data Mining and Machine Learning Algorithms and Software Tools

Formal Verification of Biological Systems

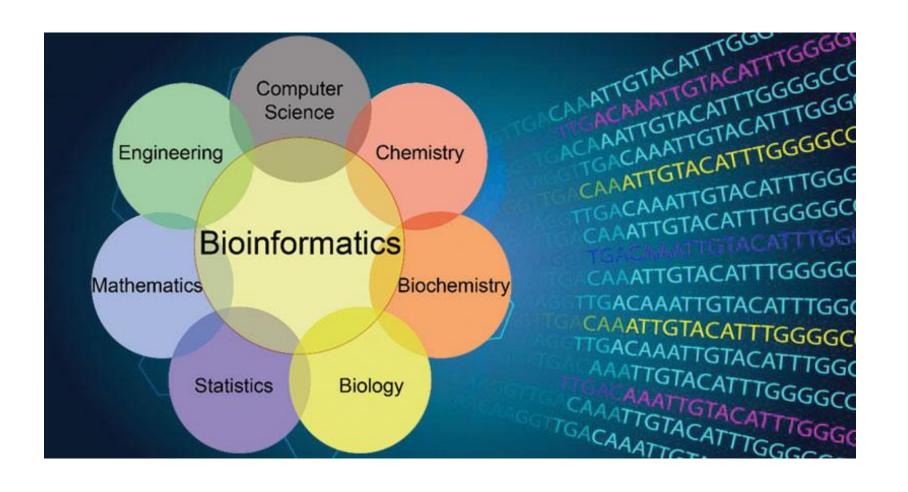
Model Design and Evaluation

Modelling Frameworks

**Next Generation Sequencing** 

Sequence Analysis Image Analysis

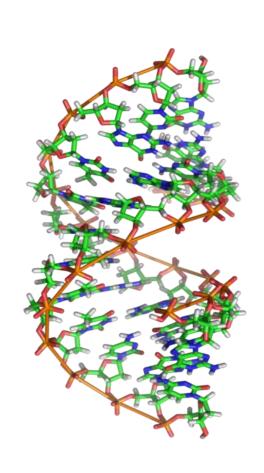
Computational Molecular Systems

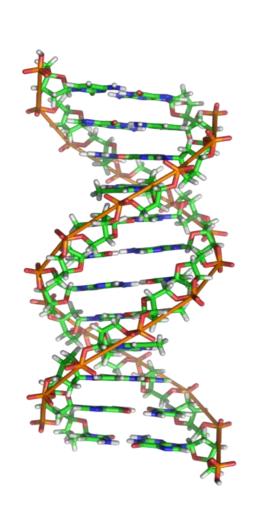


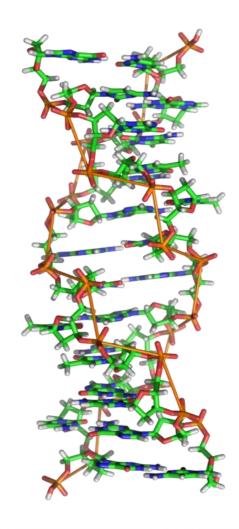
La bioinformática permite investigar, desarrollar y aplicar herramientas informáticas y computacionales para permitir y mejorar el manejo de datos biológicos.

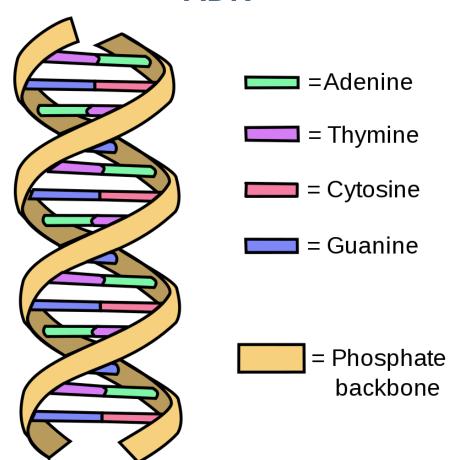
La bioinformática permite investigar, desarrollar y aplicar herramientas informáticas y computacionales para permitir y mejorar el manejo de **datos** biológicos.

#### UNIVERSIDAD DE BURGOS







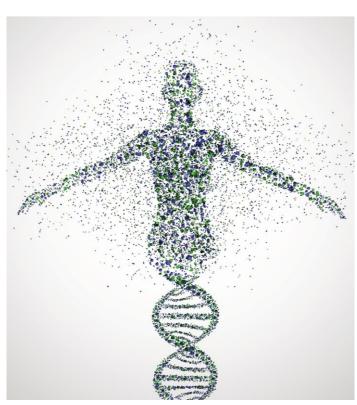


Human Genome Project

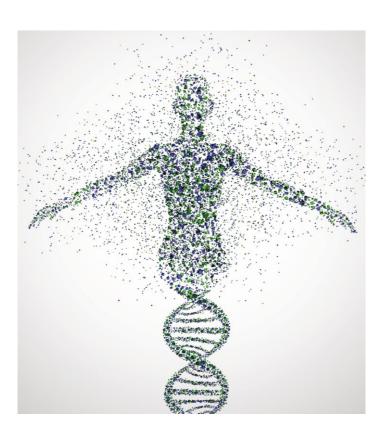


Human Genome Project





- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB



- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB



- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB



1.000.000\$

- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB

Coste del Human Genome Project:



1.000.000\$

- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB

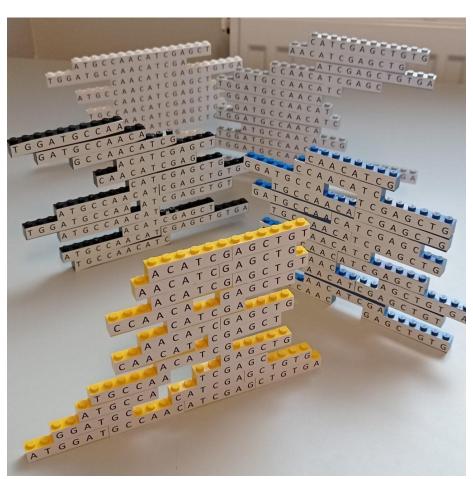
Coste del Human Genome Project:

3.000.000.000\$

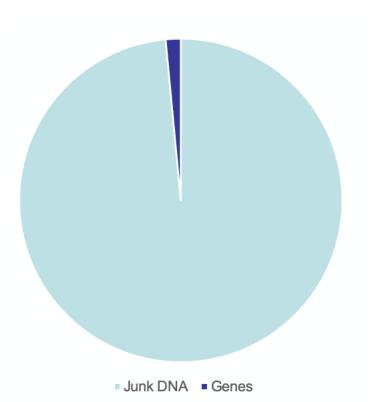


1.000.000\$

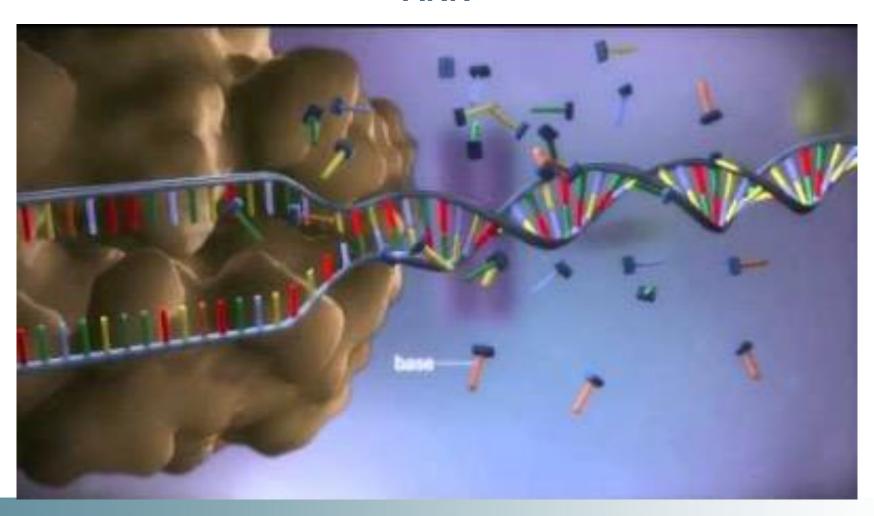
• Ensamblado:

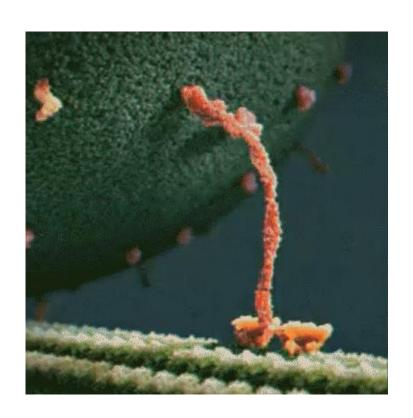


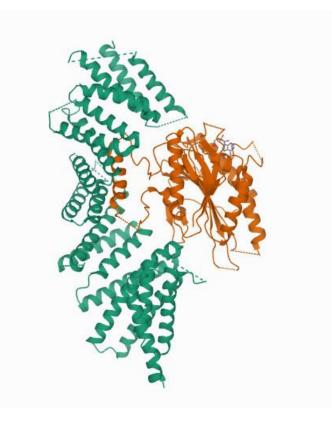
- Human Genome Project
- 3.000.000.000 bases
- 3.4 GB
- 1.5% del genoma: genes



## **ARN**

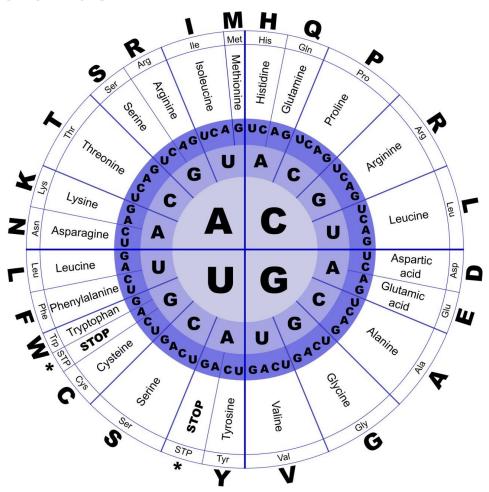






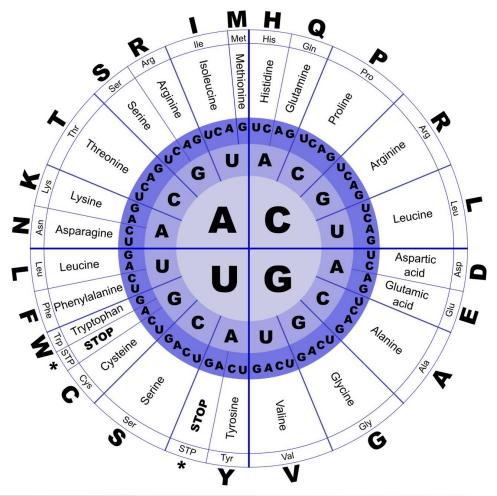
https://bit.ly/3D6ZPH

**ADN: ATGTGTCCATAG** 



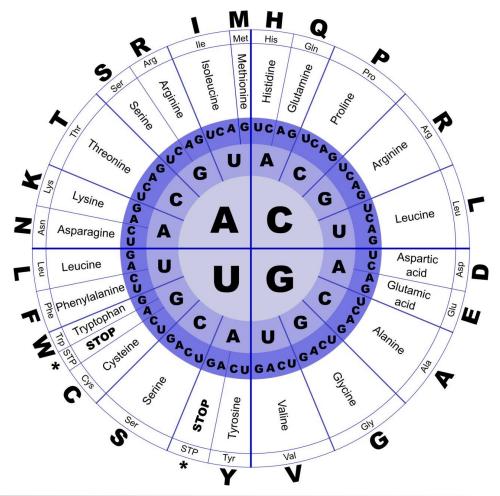
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ARN:



**ADN: ATGTGTCCATAG** 

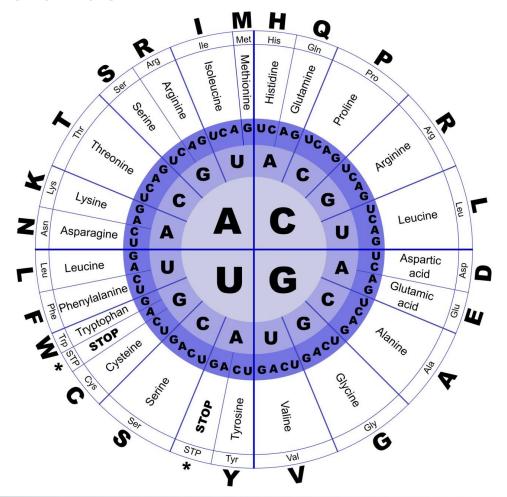
ARN: AUGUGUCCAUAG



**ADN: ATGTGTCCATAG** 

ARN: AUGUGUCCAUAG

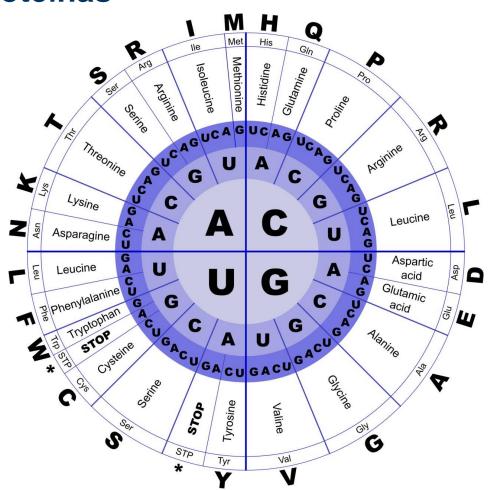
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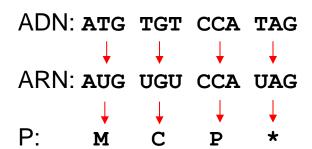


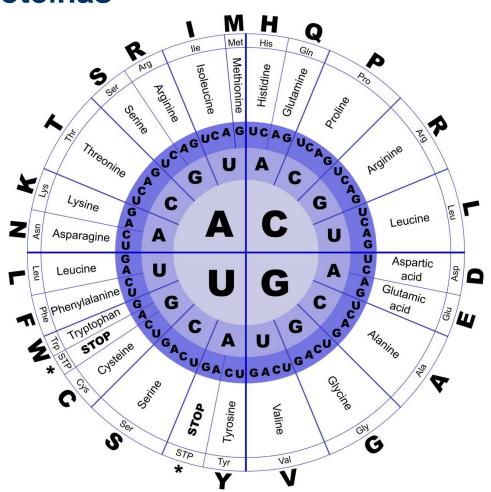
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ARN: AUG UGU CCA UAG

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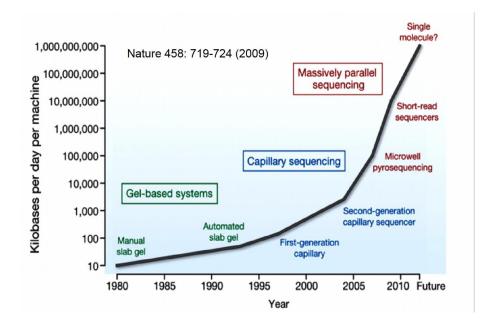






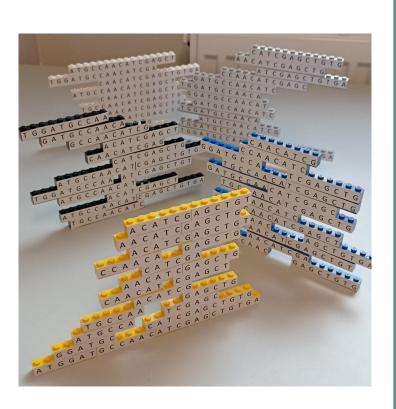
#### **Automatización**

- 0 y 1 A, C, G, T
- Menor coste → Más datos



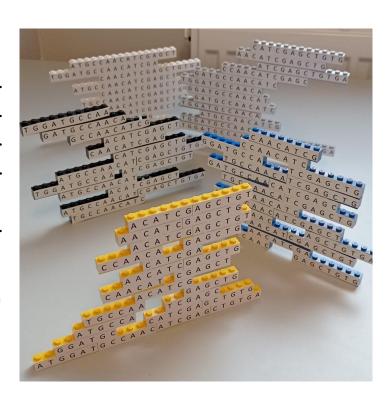
#### **Análisis de Secuencias**

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### **Análisis de Secuencias**

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ACGATATTA GTACACTCACGTCGTTCGGA
ACGATATTACACGCACACTCAAGTCGTTCGGAACCT
ACGATATTACACGTACACTCACGTCGTTCGGAA
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TACACGTACACTCAAGTCGTTCG
CACGTACACTCAAGTCGTTCTGAACCT
CACGTACACTCACGTCGTTCGGAACCT

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ACGATATTACACGTACACTCACGTCGTTCGGAA	$\rightarrow$	Calidad:	98/100
ATTACACGTACACTCACGTCGTTCGGA/CT		Calidad:	·
TACACGTACACTCAAGTCGTTCG ACCT	$\rightarrow$	Calidad:	89/100
CACGTACACTCAAGTCGTTCTGAACCT	$\rightarrow$	Calidad:	99/100
CACGTACACTCACGTCGTTCGGAACCT	$\rightarrow$	Calidad:	95/100

ACGATATTACACGTACACTC	:AA	FTCGT	$\rightarrow$	Calidad:	98/100
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ACGATATTACACGTACACTO	AC	TCGTTCGGA	$\rightarrow$	Calidad:	98/100
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TACACGTACACTC	AAG	TCGTTCGGAACCT	$\rightarrow$	Calidad:	89/100
CACGTACACTO	AA	TCGTTCTGAACCT	$\rightarrow$	Calidad:	99/100
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**ACGATATTACACGTACACTCAAGTCGGATCGGAACCT** → Referencia

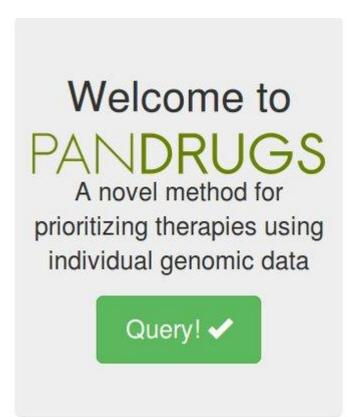
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#### ACGATATTACACGTACACTCAAGTCGATCGGAACCT

ACGATATTACACGTACACTCAAGTCGT	$\rightarrow$	Calidad:	98/100
TCGAGATTGCATGTACCCTCAAGCCGTCGG	$\rightarrow$	Calidad:	14/100
ACGATATTACACGTACACTCACGTCGT	$\rightarrow$	Calidad:	95/100
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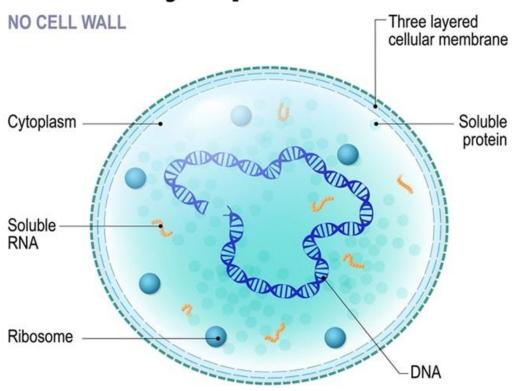
#### Medicina Personalizada

www.pandrugs.org

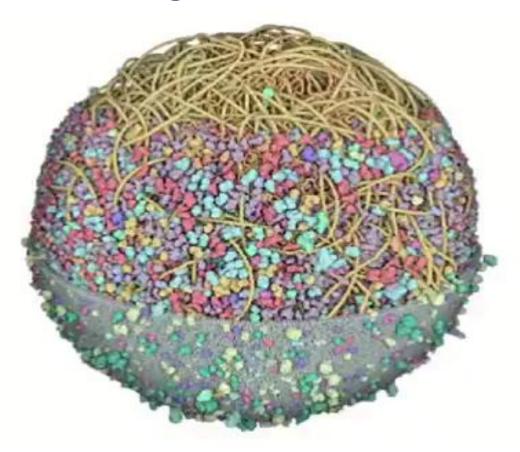


## Biología de sistemas

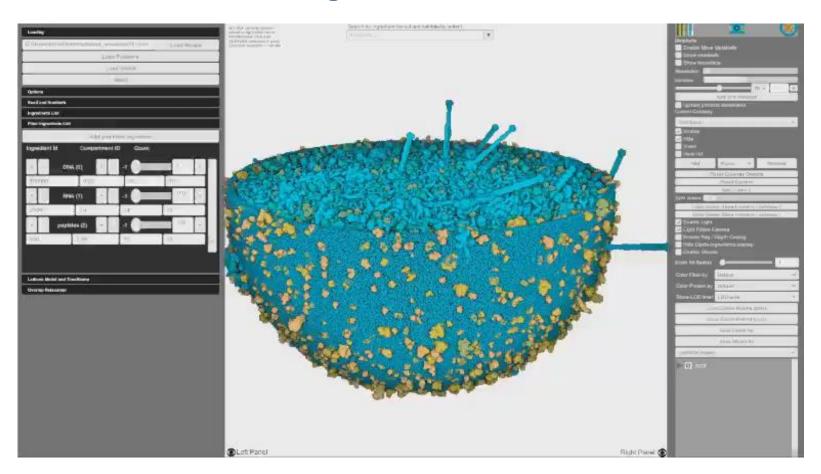
# Mycoplasma



# Biología de sistemas

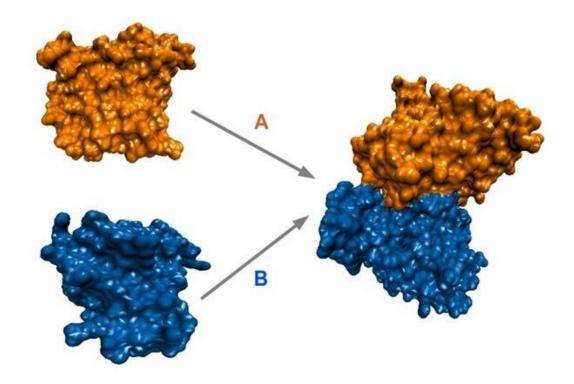


# Biología de sistemas



# Modelado de proteínas

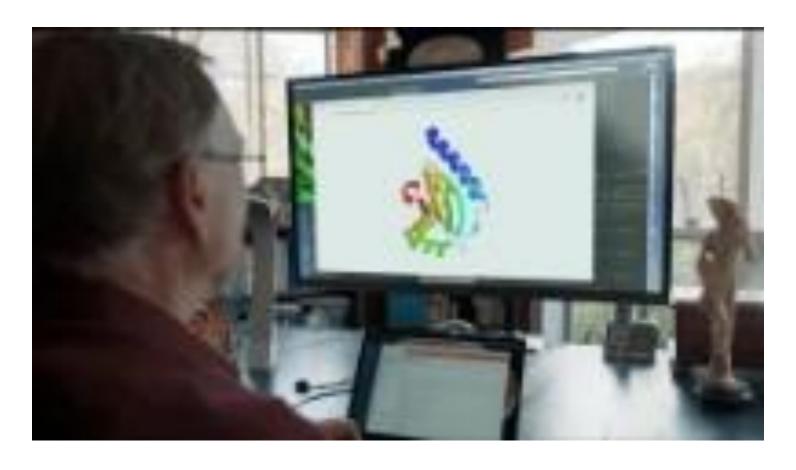
• Diseño de fármacos



### Plegado de proteínas



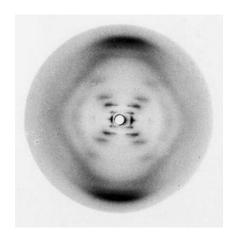
# Plegado de proteínas



### Más problemas: Rosalind







https://bit.ly/BIERosalind