

Computational Genomics

Máster en Bioinformática y Biología Computacional

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Príncipe Felipe Research Center

Goal: biomedical research

- **Basic research** in genes, targets, molecular and cellular processes, Nanomedicine and Computational Medicine
- **Translation into clinical practice:** personalized medicine, cancer, rare diseases, metabolic and functional impairment

<http://www.cipf.es/>



Who are we?

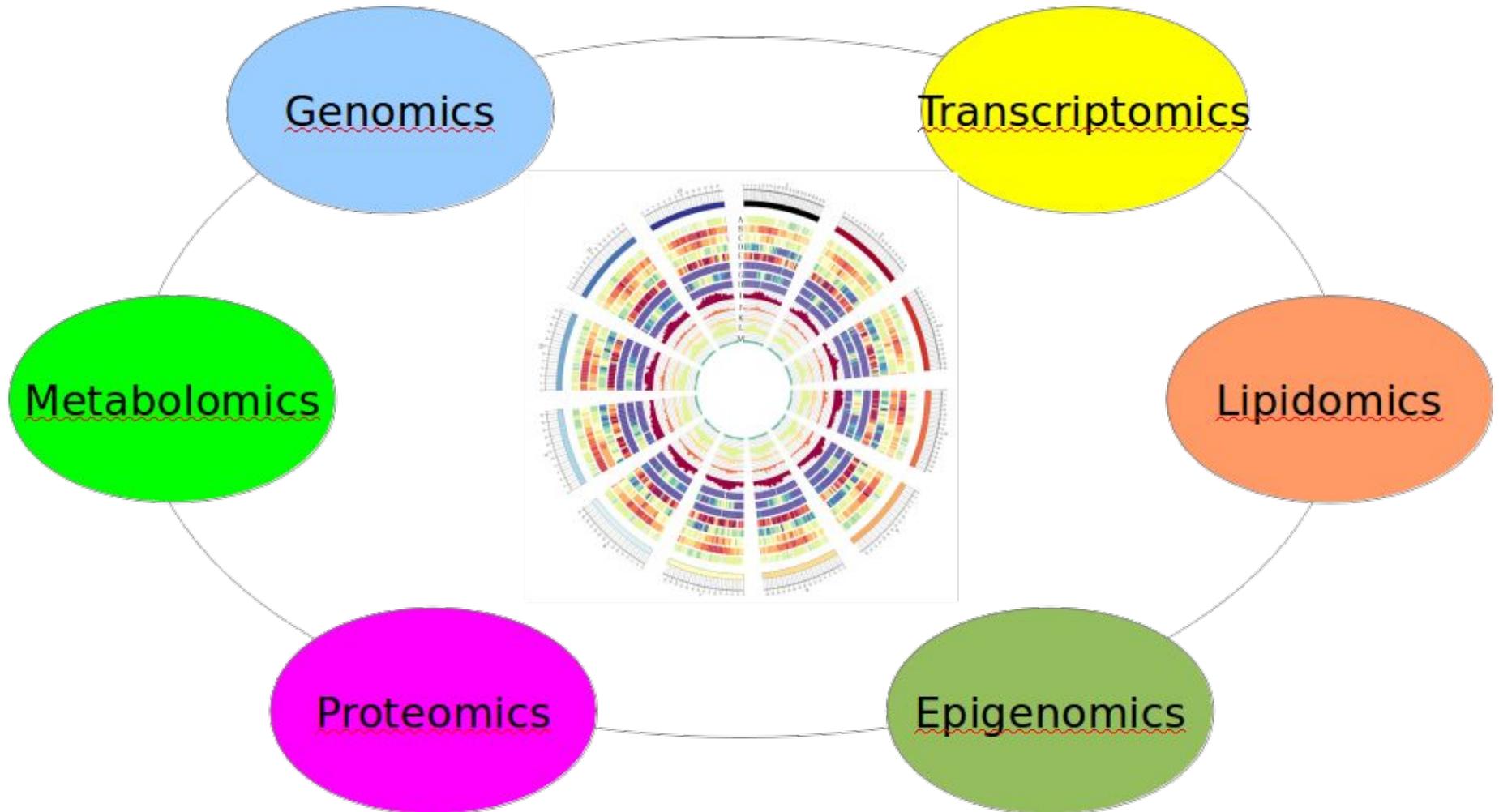
- The **Computational Genomics** Department, in Research Center Prince Felipe
- **Team:** multidisciplinary group of 14 researchers and technicians led by Joaquín Dopazo

<http://bioinfo.cipf.es/>

Who are we?

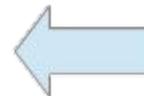
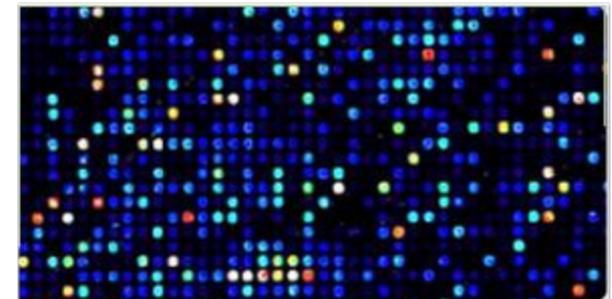
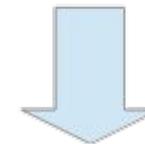
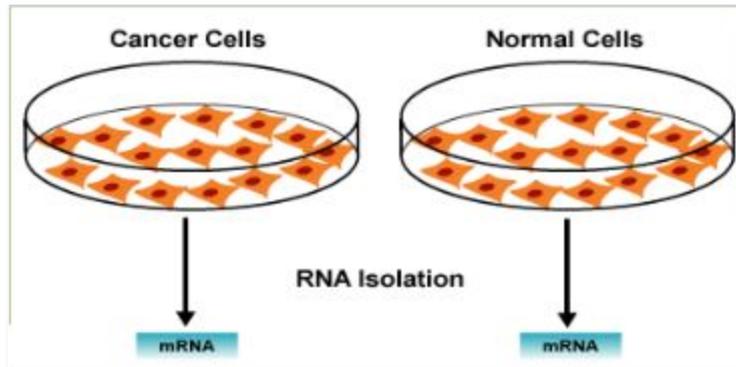


Computational Genomics



Computational Genomics

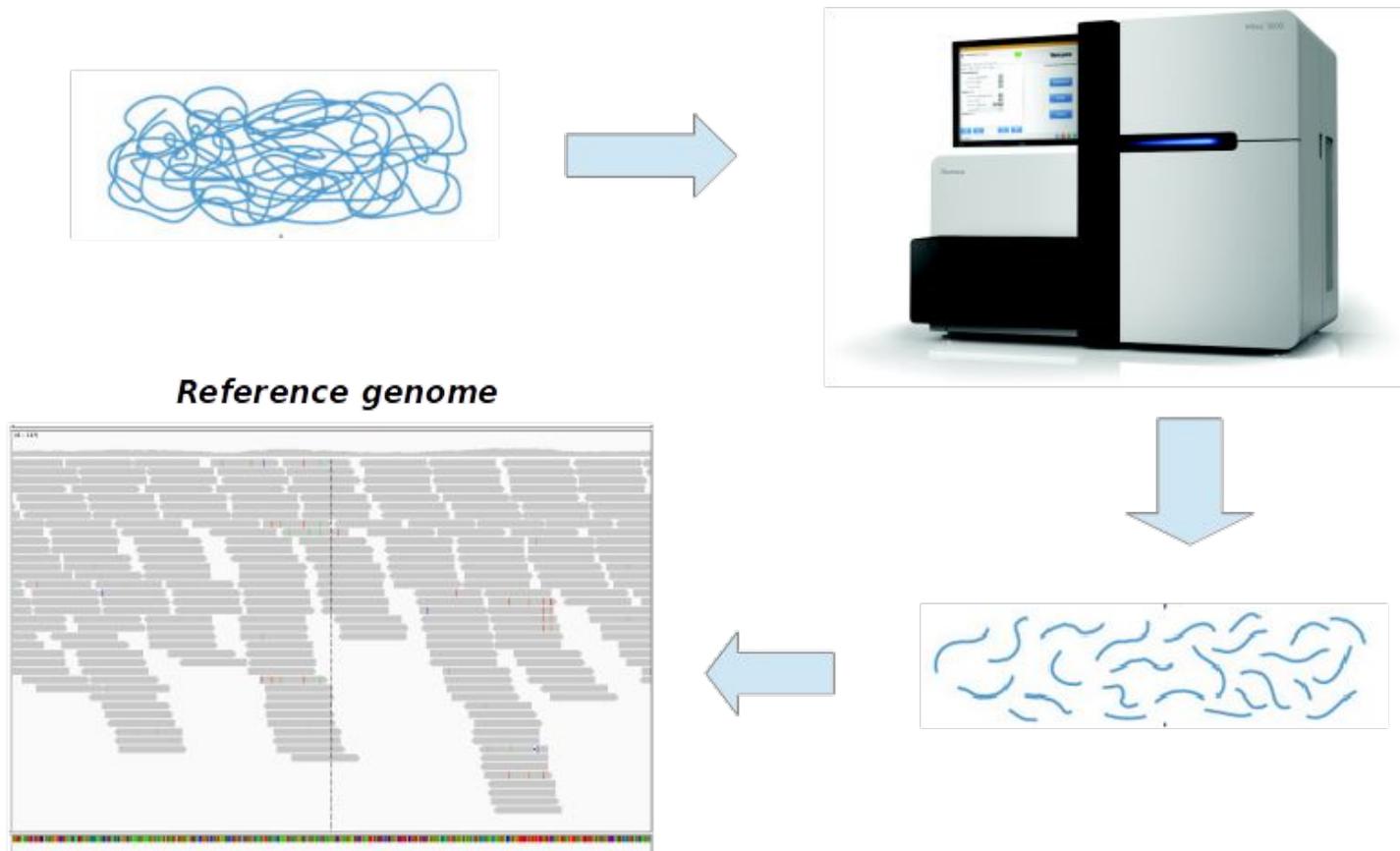
High throughput technologies: microarrays



UID	NAME	GWEIGHT	spo0	spo30	spo2	spo5
EWEIGHT			1	1	1	1
YAL003W	EFB1	1	0.23	-1.79	-1.29	-1.56
YAL004W		1	0.41	-0.38	-0.89	-1.06
YAL005C	SSA1	1	0.61	-0.07	-1.29	-1.29
YAL010C	MDM10	1	0.16	-0.15	-0.76	-1.25
YAL012W	CYS3	1	0.03	1.39	-0.84	-1.64
YAL015C	NTG1	1	-0.18	-0.18	-0.62	-1.32
YAL018C	YAL018C	1	-0.51	-0.62	-0.76	3.74
YAL025C	MAK16	1	-0.14	-3.32	-1.84	-1.12
YAL034C	FUN19	1	0.19	-0.03	-1.03	-1.29
YAL035W	FUN12	1	0.01	-1.47	-1.15	-0.69
YAL036C	FUN11	1	-0.15	-2.74	-1.79	-1.32
YAL038W	CDC19	1	-0.06	-1.89	-1.69	-2.32
YAL040C	CLN3	1	-0.17	-2.25	-1.69	-2.25
YAL054C	ACS1	1	0.51	2.6	1.9	1.7
YAL055W	YAL055W	1	-0.32	0.83	0.58	0.82

Computational Genomics

High throughput technologies: Next Generation Sequencing



Computational Genomics

Biological
knowledge

KEGG
pathways

Gene
Ontology

Regulatory
elements

MiRNA, CisRed
Transcription Factor
Binding Sites

Biocarta
pathways

InterPro
Motifs

Gene
Expression
in tissues

Bioentities from
literature

Clinical
knowledge

HUMSAVAR

ClinVar

HGMD

COSMIC

How do we work?


PRINCIPE FELIPE
CENTRO DE INVESTIGACION

Computational Genomics



snow

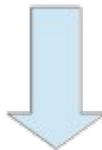
31
Image

TEAM



Network Miner

BierApp 



Proyectos PROMETEO
Generalitat Valenciana
nagen ...

23
Image

INB

er  **ciberer**
CENTRO DE INVESTIGACION BIOMEDICA EN RED
DE ENFERMEDADES RARAS



ciberer  BIER

BULL  STATegra

How do we work?

IT4Innovations#
národní01\$!@%#0
superpočítačové
centrum \$@0@\$0%\$



OMICS MASTER



Outline

1. Introduction to Babelomics
2. Functional Profiling: over-representation methods
3. Unsupervised Classification: Clustering
4. Supervised Classification: Prediction

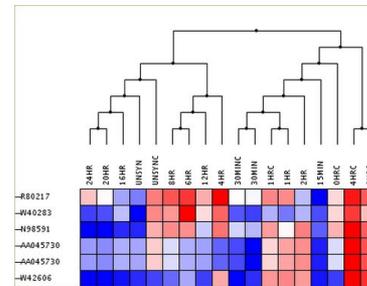
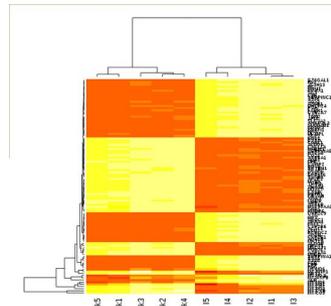
Outline

Design

Processing

- Differential expression
- Clustering
- Predictors

Functional profiling



Any questions?

