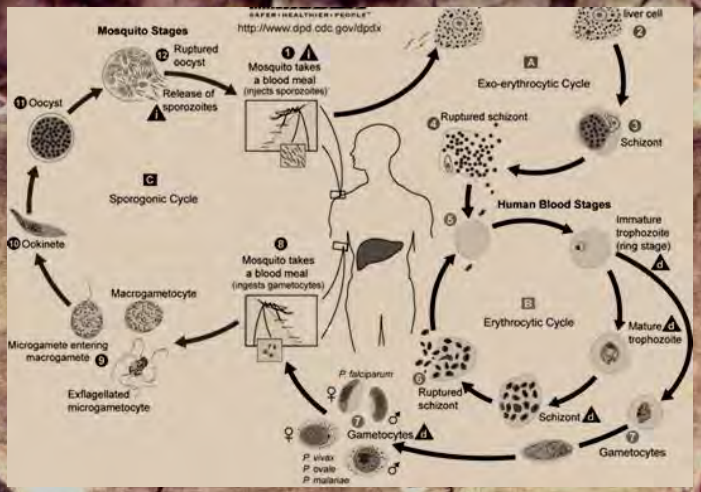
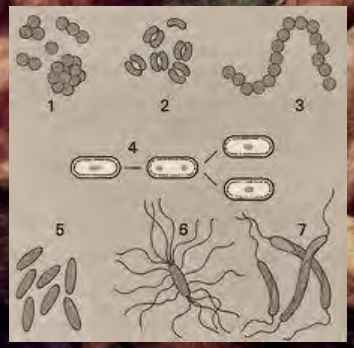
Microbe Inactivation

Bradford Powell Ph.D., PMP

Cernomics Solutions





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Women:
Can't live with them. Can't live without them.
D. Erasmus

Women:
Can't govern well without them.
B Powell
Congratulations to the largest class of new women in Congress.

Desiderius Erasmus *1466-1536*

MICROBES

Can't live with some of them.
Can't live without some others.

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The 15 leading causes of death in 2011 (U.S.)

★	1	Diseases of heart
★	2	Malignant neoplasms
★	3	Chronic lower respiratory diseases
	4	Cerebrovascular diseases
	5	Accidents (unintentional injuries)
★	6	Alzheimer's disease
★	7	Diabetes mellitus
★	8	Influenza and pneumonia
★	9	Nephritis, nephrotic syndrome and nephrosis
	10	Intentional self-harm (suicide)
★	11	Septicemia
★	12	Chronic liver disease and cirrhosis
★	13	Essential hypertension and hypertensive renal disease
★	14	Parkinson's disease
★	15	Pneumonitis due to solids and liquids

★ De Chiara G, et al. 2012. Infectious Agents and Neurodegeneration. *Mol Neurobiol.* Aug 17. [Epub ahead of print]

National Vital Statistics Reports, Vol. 61, No. 6. CDC, Oct 10, 2012

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The Top 10 Causes of Death (Worldwide 2008)

World	ths in millions	% of deaths
Ischaemic heart di		12.8%
Stroke and other cerebrovascular		
★ Lower respiratory infections		
Chronic obstructive pulmonary disease	3.28	
★ Diarrhoeal diseases	2.46	4.3%
★ HIV/AIDS	1.78	3.1%
Trachea, bronchus, lung cancers	1.39	2.4%
★ Tuberculosis	1.34	2.4%
Diabetes mellitus	1.26	2.2%
Road traffic accidents	1.21	2.1%

14 Million annual deaths Worldwide caused by infectious disease

WHO, Factsheet No 310, Updated June 2011

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1500 1600 1700 1800 1900 2000 2010

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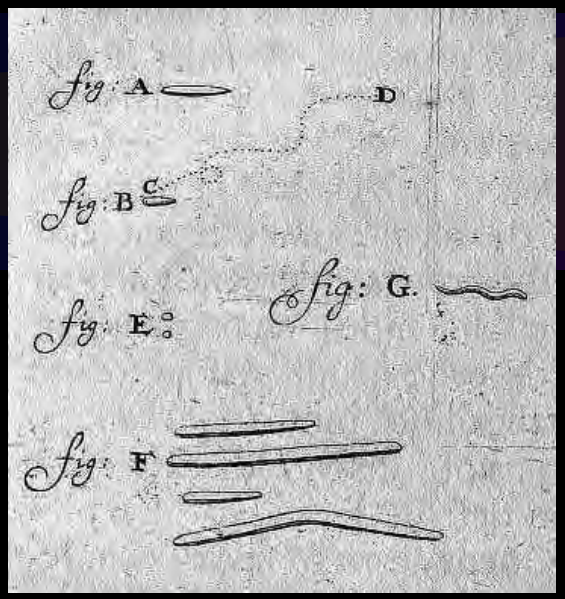

1500

2010

Antony van Leeuwenhoek *1632-1723*

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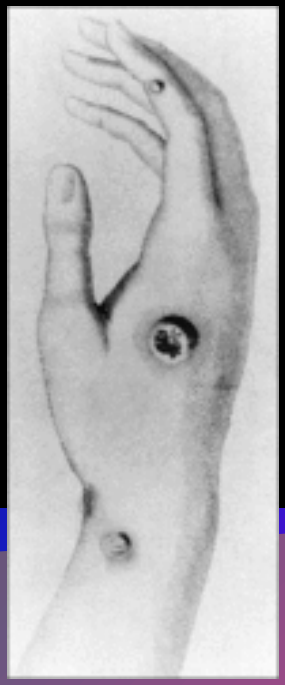
1600

Edward Jenner *1749 - 1823*

Lady Mary Wortley Montague



2010

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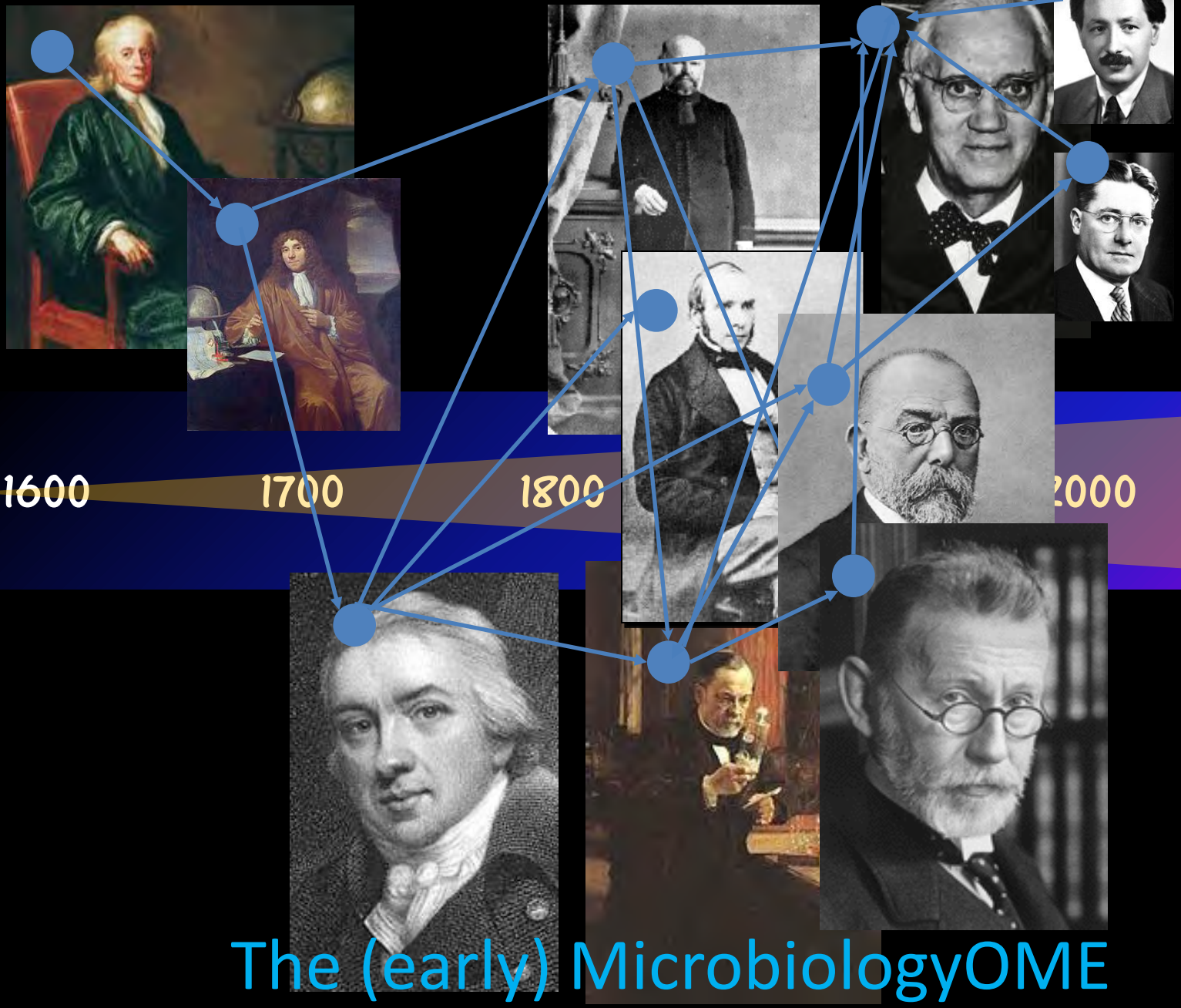

The (early) MicrobiologyOME

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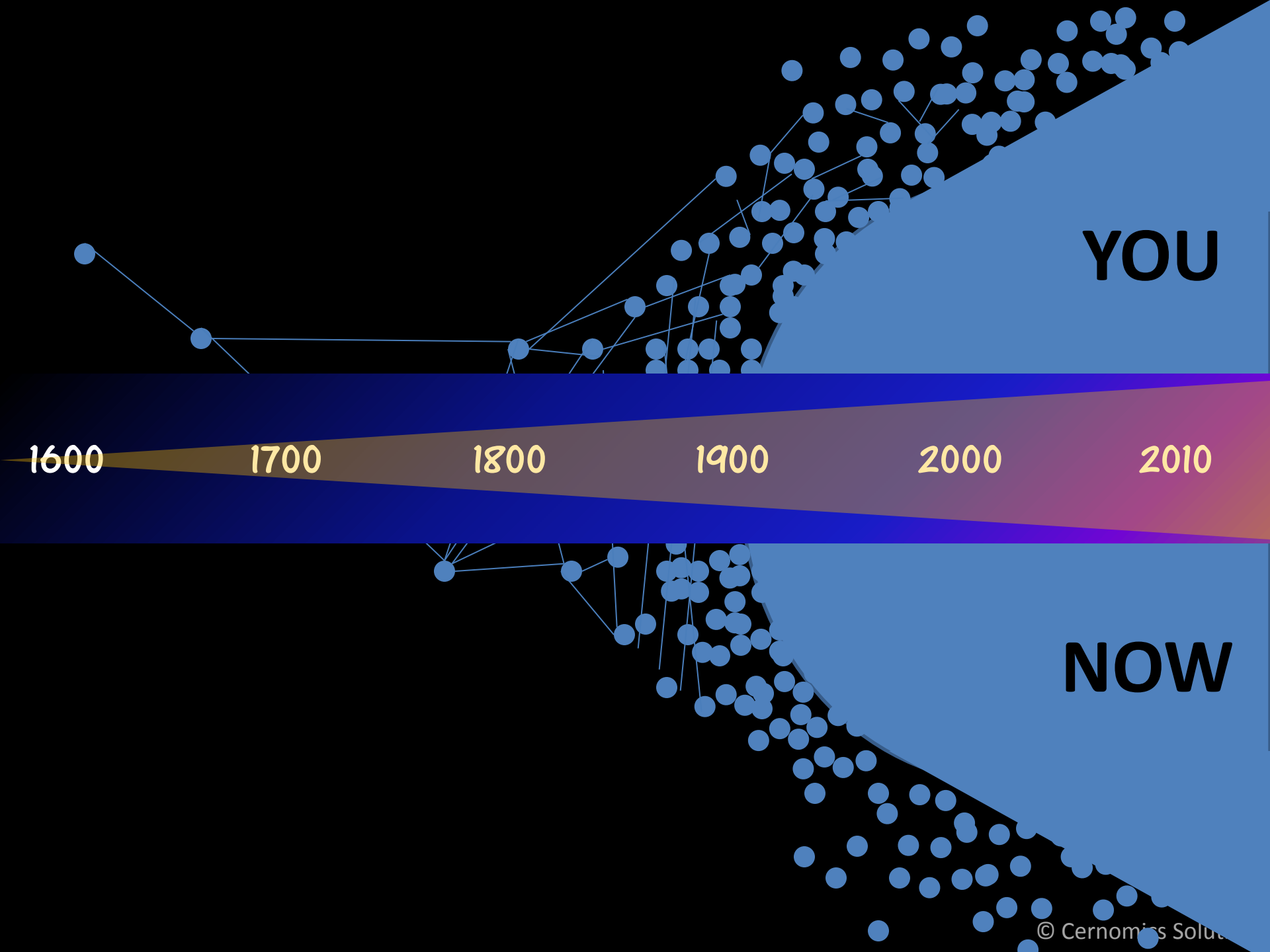

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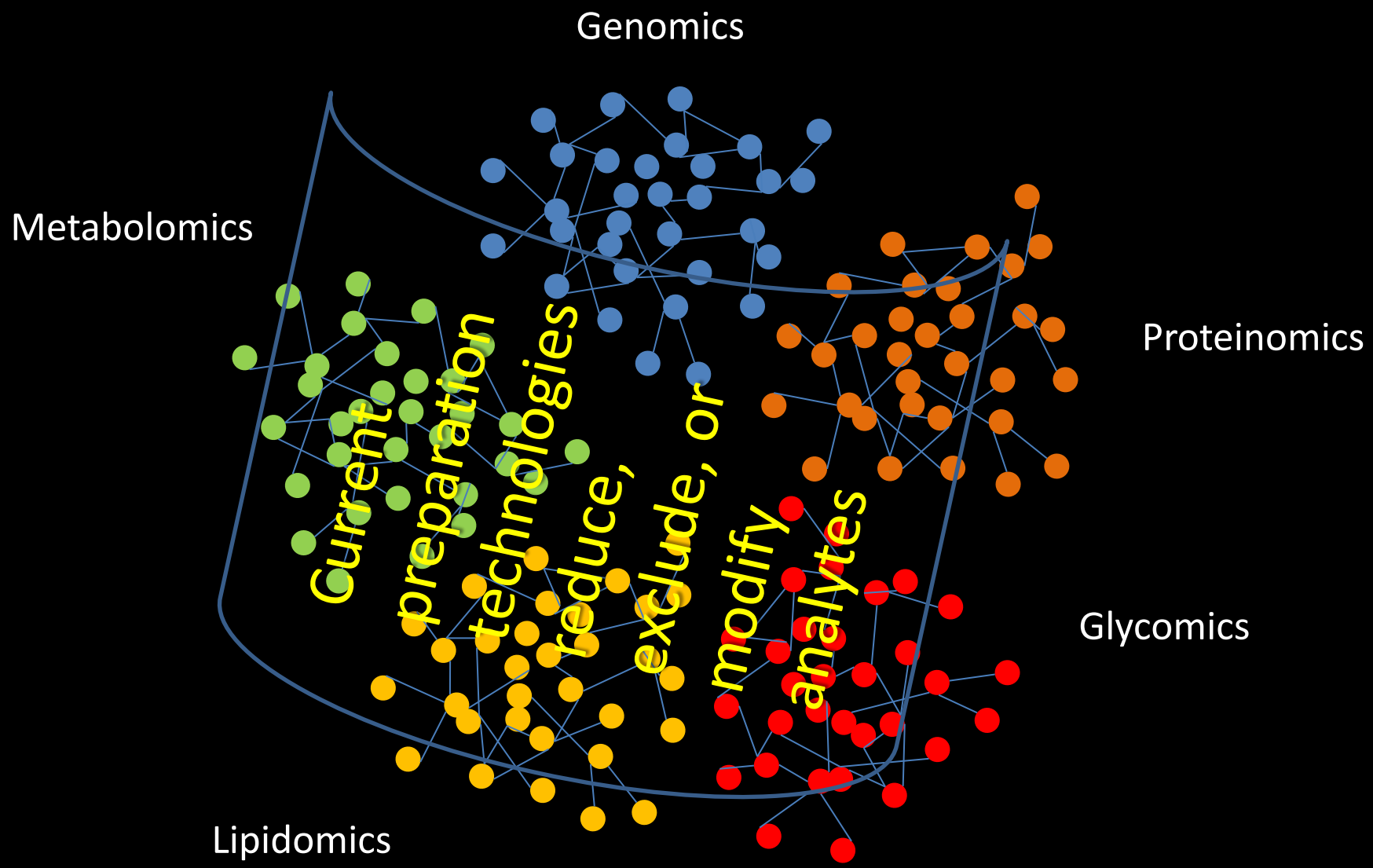
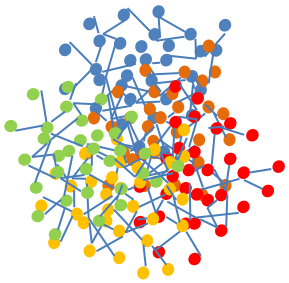
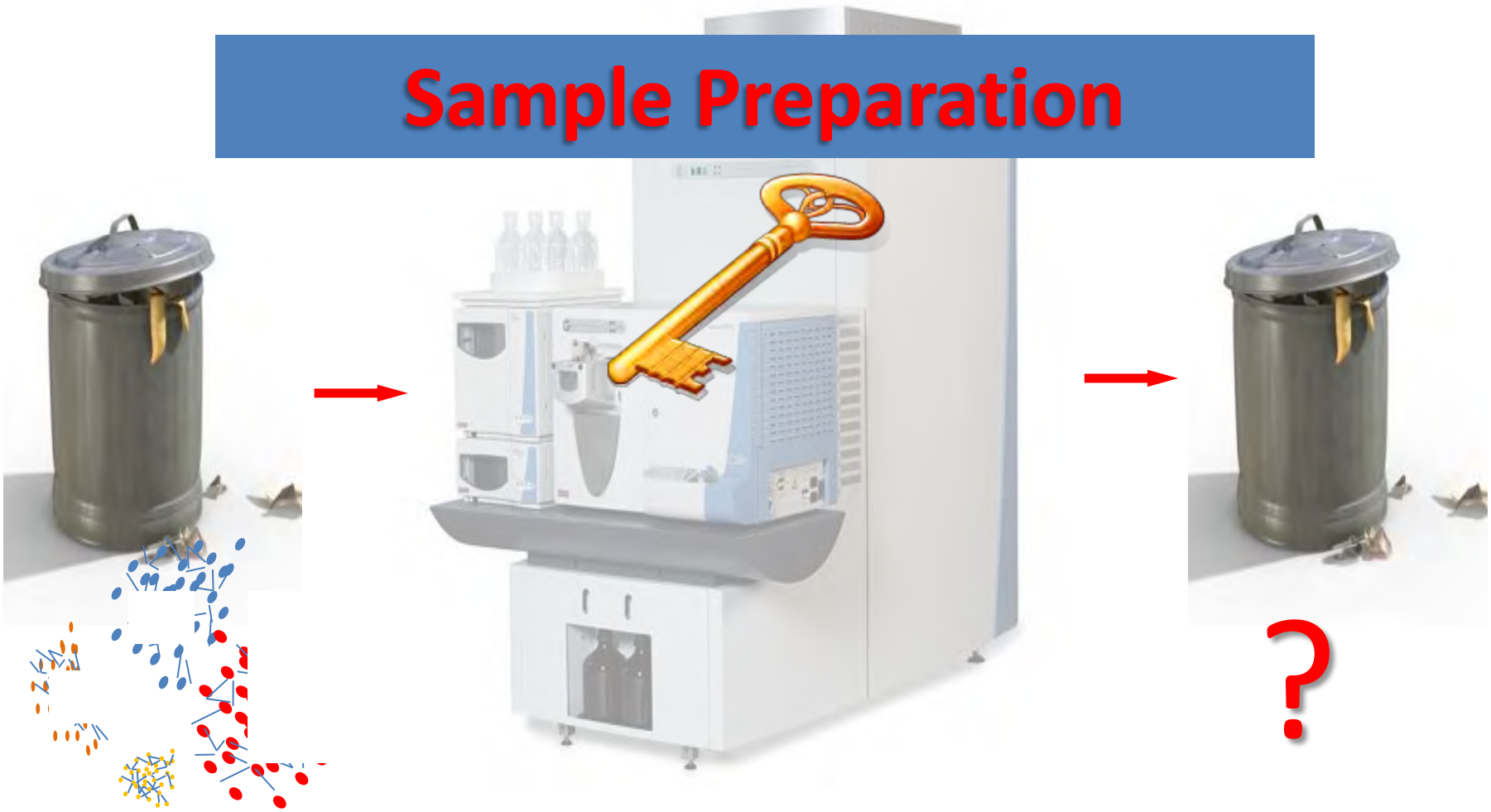
Systems Biology



Systems Biology Methodology



Sample Preparation



The Sample Preparation Paradigm

THE DREAM

- Safe & No handling
- No reagents or consumables
- No sample preparation
- Any molecular target
- Any Microbe / Matrix

FIRST LOVE

- Pure *E. coli* lab strain
- Common reagents & kits
- Easy preparation and QC

REAL WORLD

- Infectious and/or dangerous MUST BE INACTIVATED
- Precious little sample with matrix
- Special procedures and reagents
- Typically single molecular target

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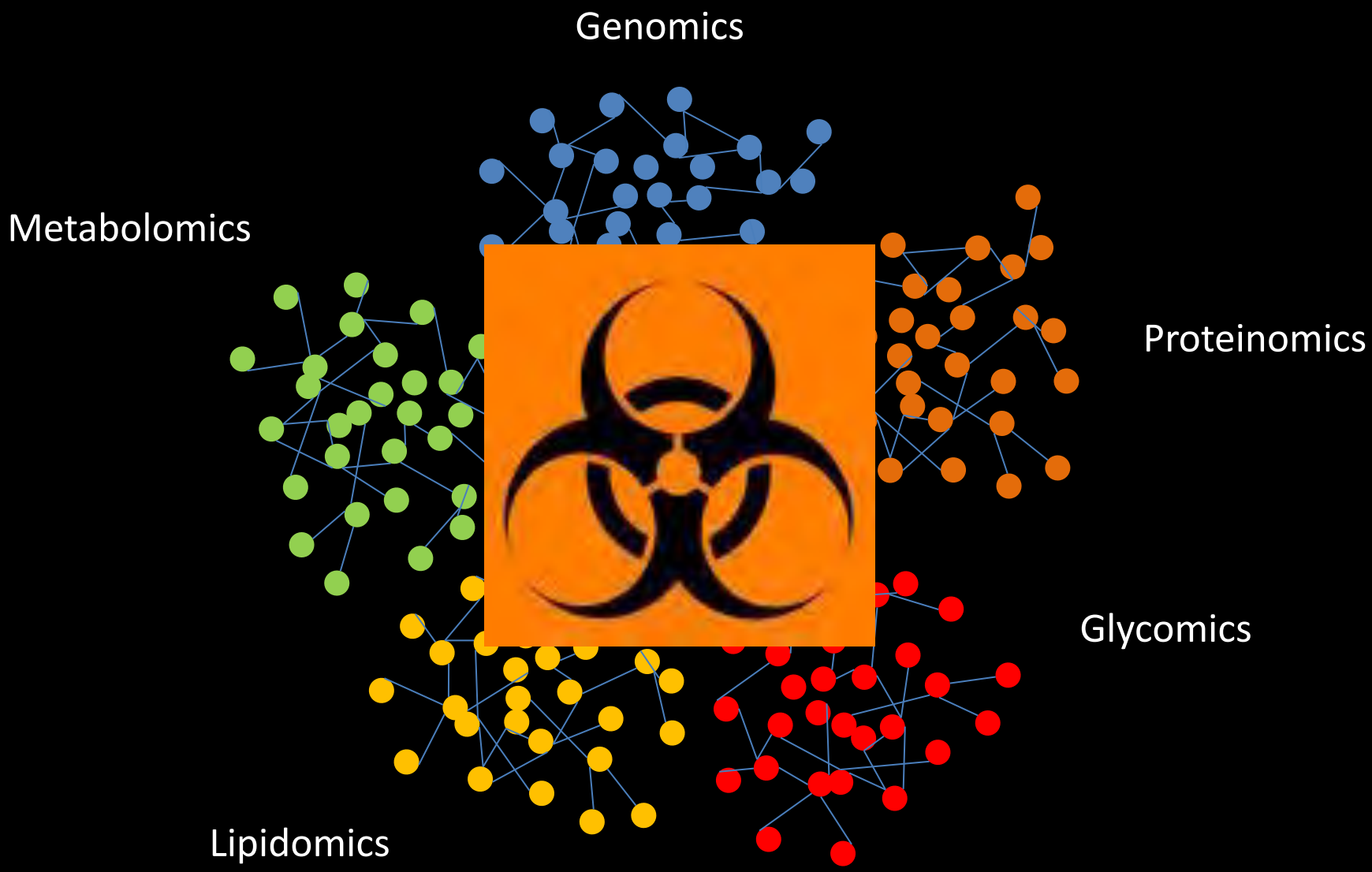
How To Inactivate Dangerous Microbes AND Perform Systems Biology?



Pressure Cycling Technology

Thank you