

CEA's spin-off (Nucleic Acid Laboratory)
Launched September 2013
Located on CEA's campus



Functional DNA Repair Enzyme Signature

Application domains : Oncology, toxicology, cosmetology

Tests in vitro

Kits for research

Kits for diagnostic

Service

DNA Repair Enzyme Signature as a radiotherapy sensitivity biomarker

DNA Repair : key cellular protection mechanisms

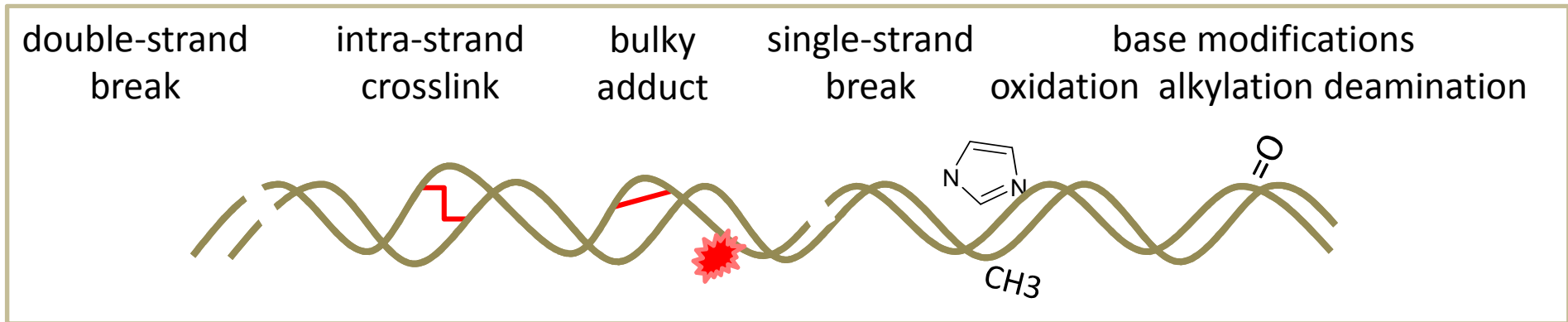
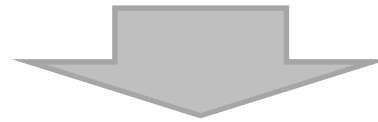
**Ionizing
Radiation**

**Ultra-violet
Radiation**

**Environmental
pollutants**

**Reactive Oxygen
Species**

Cisplatin



DNA Repair Mechanisms

NHEJ
20/06/2014

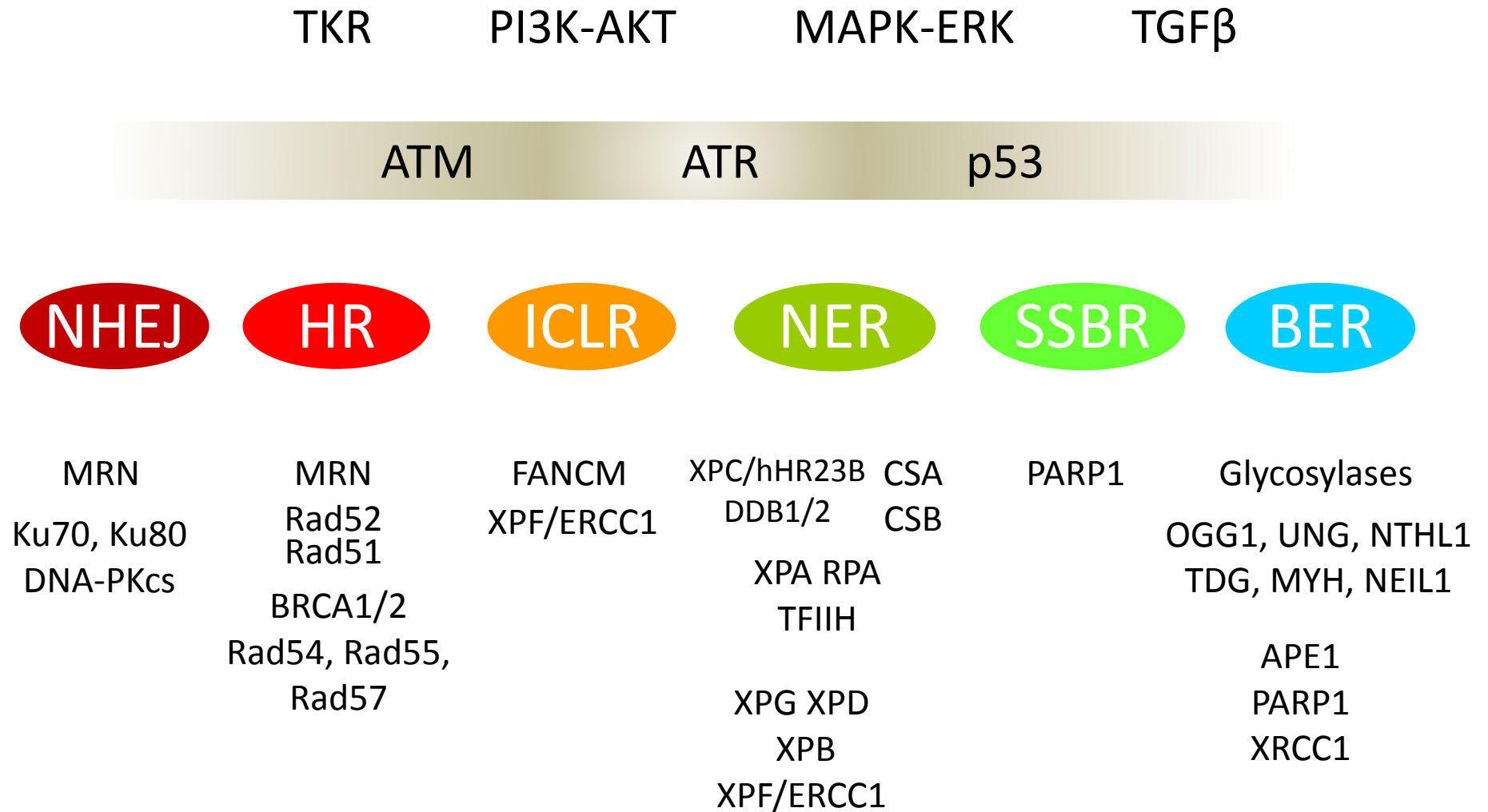
HR

ICLR

NER

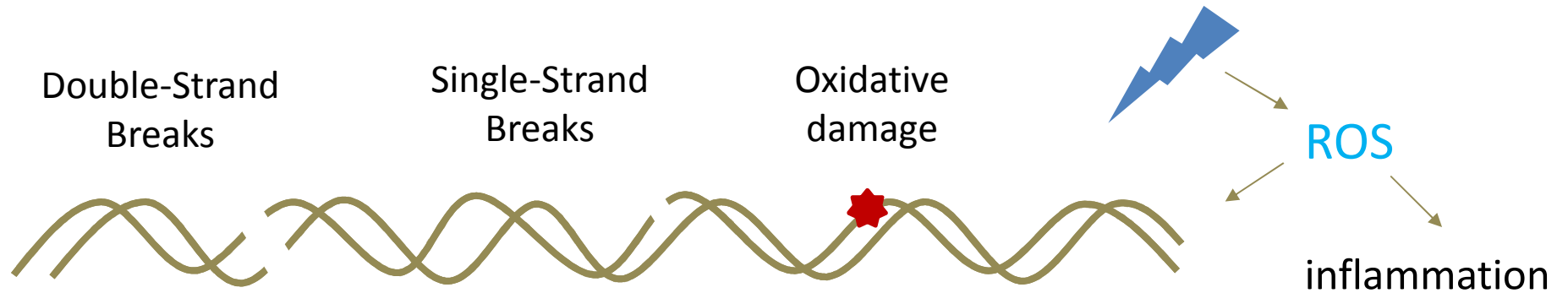
SSBR

BER



crosstalk - interaction 

DNA Repair : central role in Radiotherapy Hypersensitivity and Resistance



ATM		ATR		p53	
NHEJ	HR	ICLR	SSBR	BER	
ATM	ATM	FANCD1 (BRCA1)	PARP1	PARP1	
MRN	MRN	BRCA2		Glycosylases	
Ku70, 80	BRCA1	RAD51		APE1	
DNA-PKcs	BRCA2	RPA		XRCC1	
XRCC4	RAD51			PNK	
Lig4	RAD54			Pol β	

DNA Repair is complex

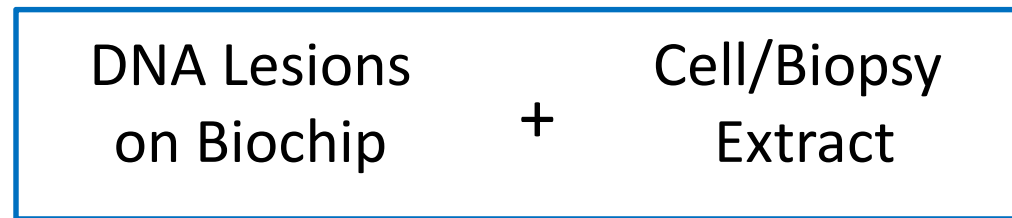
Single parameter analysis cannot account for this complexity



A more relevant and effective concept

LXRRepair DNA Repair Enzyme Signature

Functional analysis of DNA Repair Enzyme Activities on Biochip



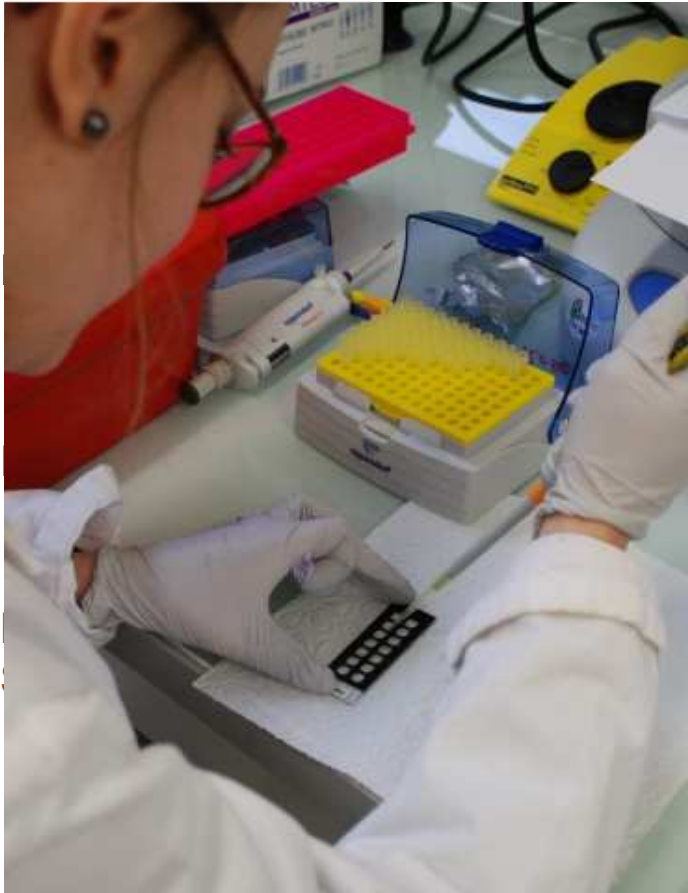
DNA Repair Reactions

ICLR

NER

BER

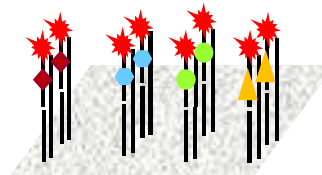
Multiplexed
Quantitative



Cell/Tissue Extract

DNA Lesions

- **Glyco-SPOT**

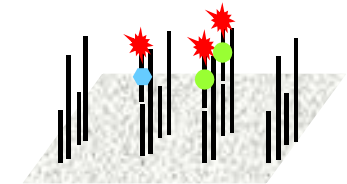


Excision

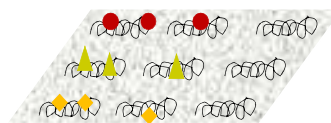


Fluorescence measurement

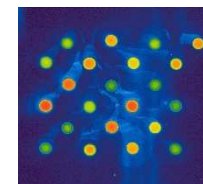
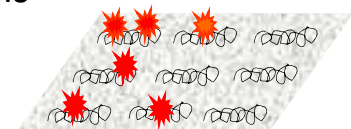
BER



- **ExSy-SPOT**



Excision/Synthesis



SPOT TECHNOLOGY

- Measurement of function
- Quantitative comparison between different DNA Repair pathways
- Biomarker of pathway activation

PROTEIN AND NUCLEIC ACID DETECTION

- No access to function
- No insights into interactions, regulations

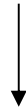
More informative → High value biomarker identification

Proof-of-Concept

DRES of patients receiving radiotherapy

15 patients, all cancer types, 2 Gy doses over 2 months

Blood samples (CPT tubes, 7 mL): Day 0, 1, 8 and 60



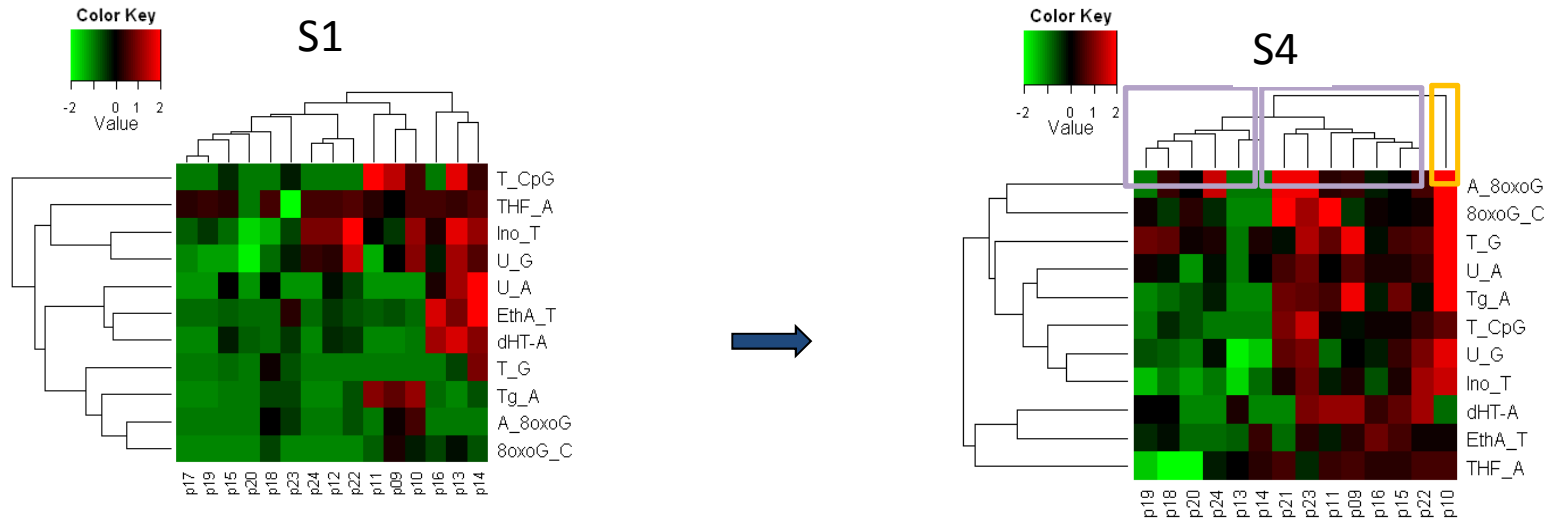
PBMCs, Nuclear Extracts, Protein content



Glyco-SPOT



Proof-of-Concept



8oxoG_C (hOGG1):

D2 - D3 > D1

A_8oxoG (MUTYH):

D3 - D4 > D1

Tg_A (NTH, NEIL1):

D3 > D1

Adaptive Response vs Acute Response ?

- Patient stratification

CDx development

Basal DRES

Response to Drug

Hypersensitivity to Radiotherapy

- Drug Mechanisms of Action

LXRepair

Kits

Service

www.lxrepair.com

DNA Repair Enzyme Signature associated with Response to Chemo- and Radio-therapy in Head and Neck Cancer

ChemRad

Pr Claire RODRIGUEZ-LAFRASSE - EMR3738 Lyon1 - HCL

(Pr P Ceruse, N Magne, F Chapuis, C Righini)

Prospective study - 120 patients

Predictive biomarker of tumor resistance and patient hypersensitivity

- Tumor
- PBMCs

CT + RT



Hôpitaux de Lyon



THANK YOU for your ATTENTION !

ENJOY LUNCH TIME



www.lxrepair.com