

Exposome: un nuevo concepto que cambiará la medicina laboral

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Fundación MAPFRE

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EMERGING SCIENCE
FOR ENVIRONMENTAL
HEALTH DECISIONS

**Emerging Technologies for Measuring
Individual Exposomes**

DECEMBER 8-9, 2011 ■ THURSDAY, 8:30-5:00, FRIDAY, 8:30-NOON*
HOUSE OF SWEDEN EVENT CENTER, 2900 K STREET, NW, WASHINGTON, DC

THIS WORKSHOP WILL BE WEBCAST.

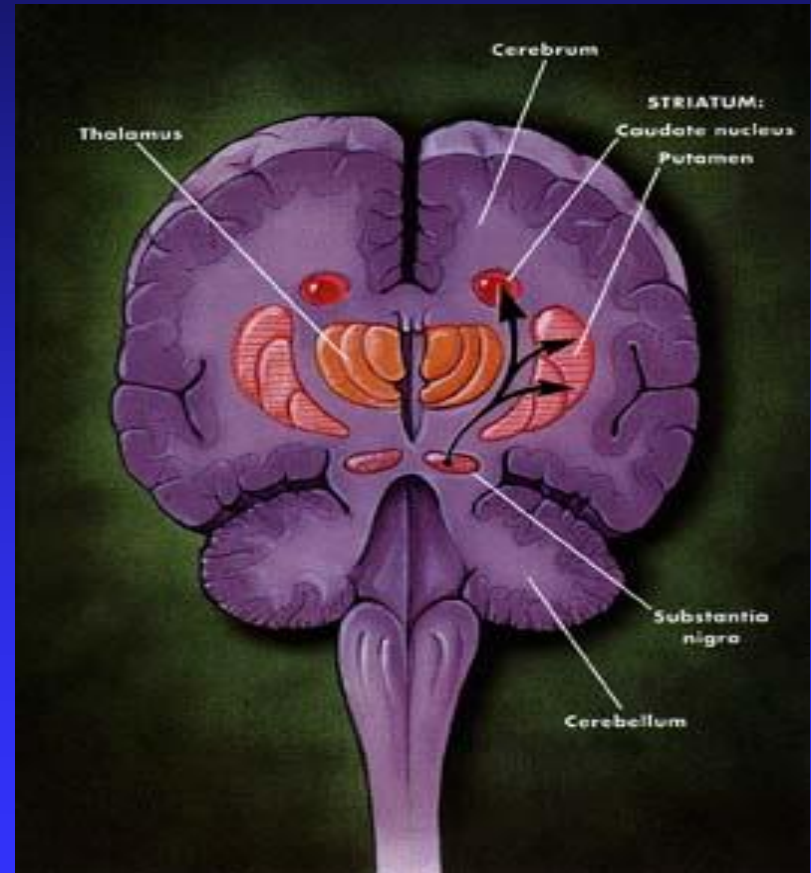
Welcome and workshop objectives

S.M. Rappaport
University of California, Berkeley





Francisco de Zurbarán (San Hugo en el refectorio de los Cartujos, 1655)



**4.252.490 varones fallecidos entre
1985-1999 en los Estados Unidos**

Muertes por manganeso (985.2)

“El caso de la misteriosa confusión del manganeso: una moraleja de los peligros de los riesgos externos”

Toxicidad por manganeso (985.2)

Muertes por arma de fuego y explosiones (982.5)

The case of the mysterious manganese mayhem: a cautionary tale of the perils of external hazards. *M. J. Stampfer*. Journal of occupational and environmental hygiene. Volume 7, issue 7, July 2010, page 43. Channing Laboratory, Harvard Medical School, Boston, Massachusetts, USA.

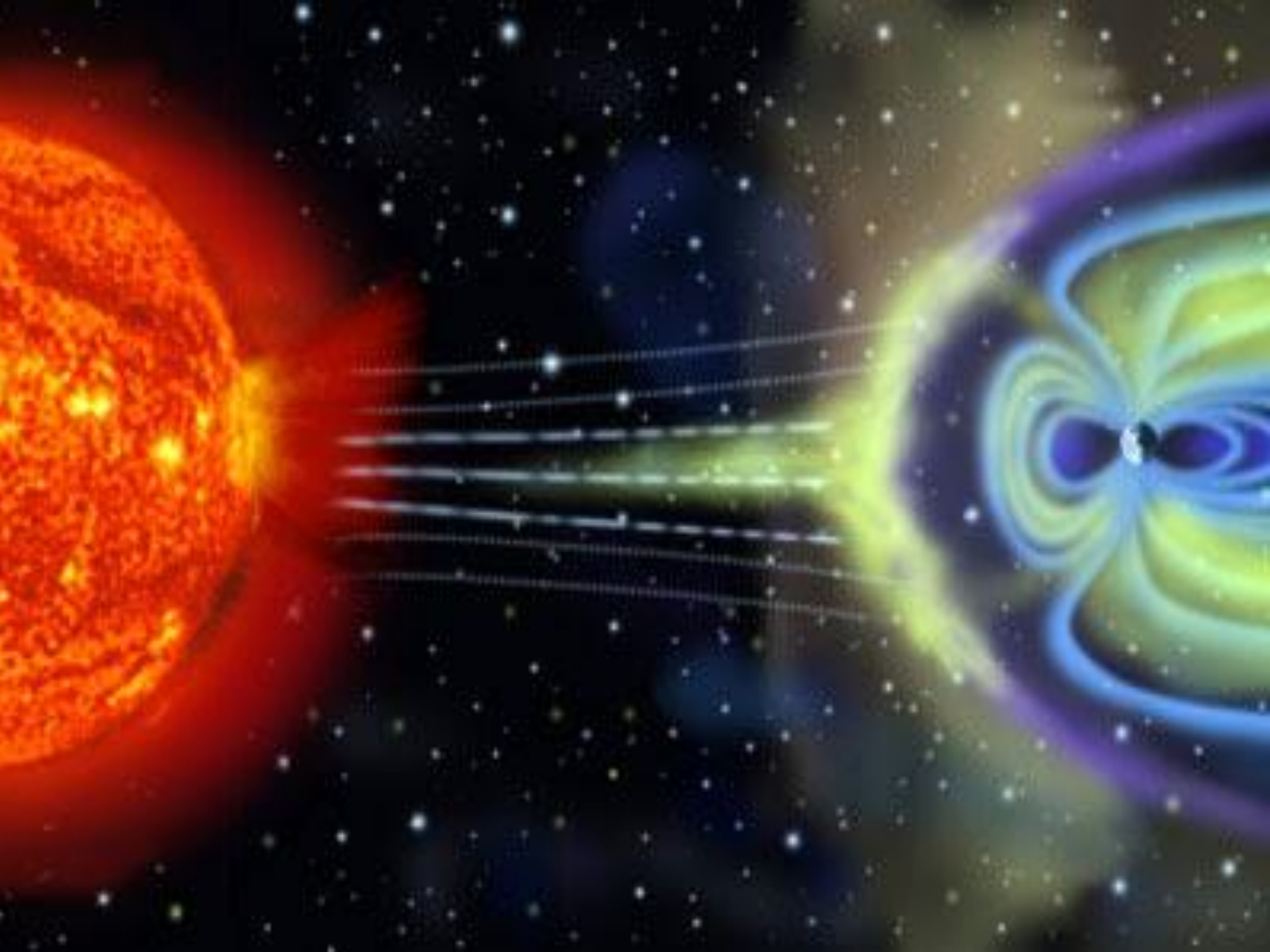
1301 McKinney, Suite 3500
Houston, TX 77010
Telefono: (713) 957-4747 Fax: (713) 651-1775

**IF YOU BELIEVE YOU MAY
HAVE BEEN EXPOSED TO
WELDING ROD FUMES,
PLEASE COMPLETE THIS
FORM**



RESULTADOS TÓXICOS/METABOLITOS (2011)

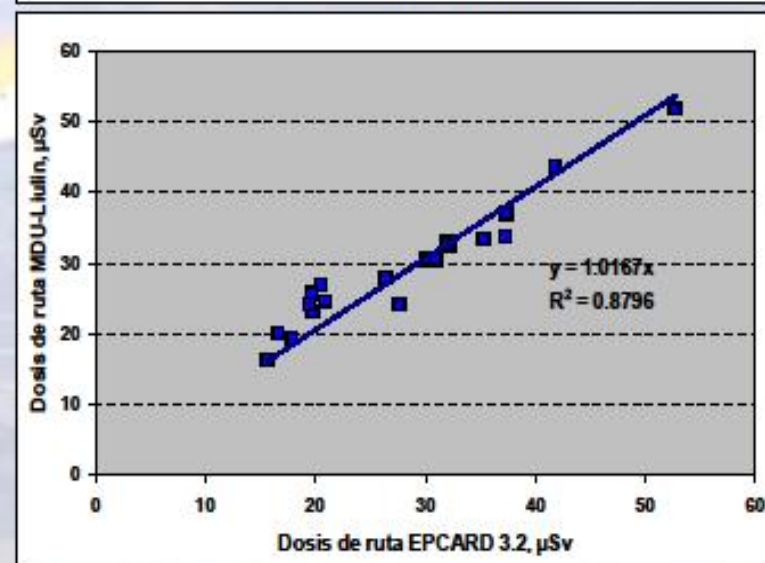
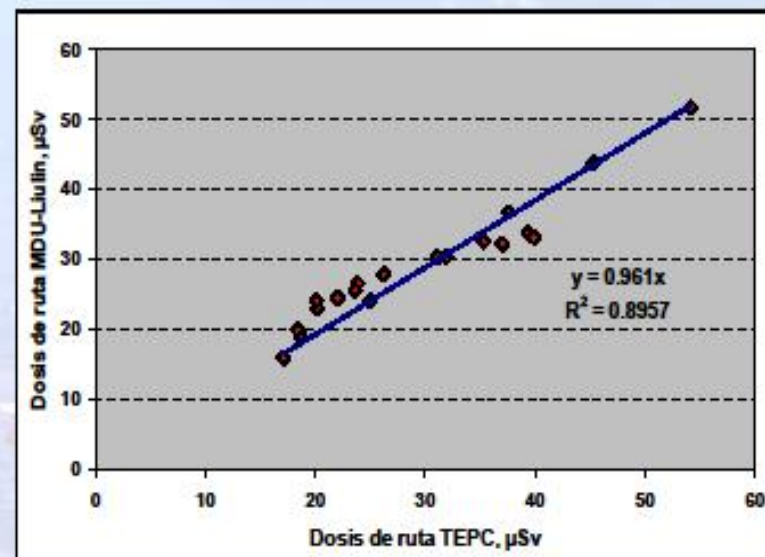
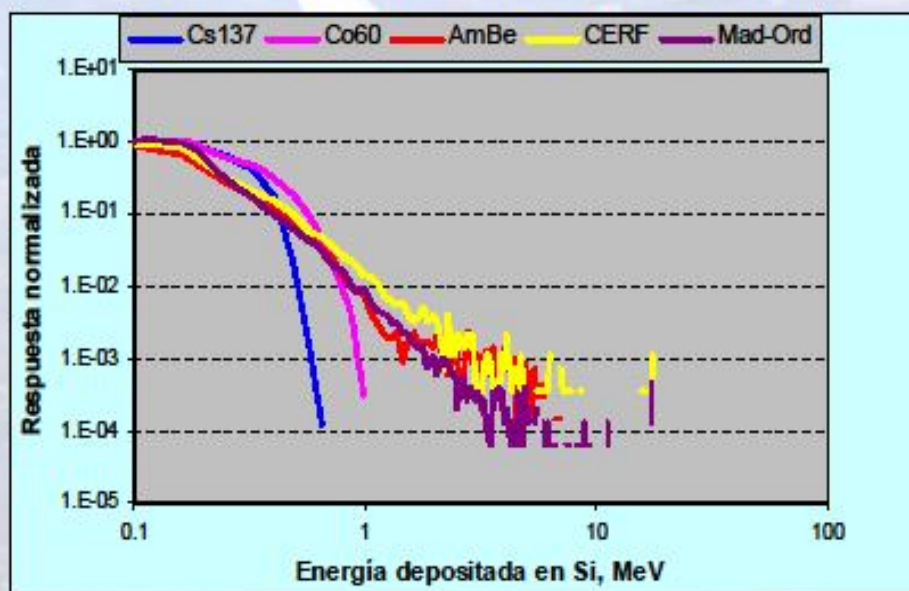
MANGANESO	(n:747/ 0.4%)
CROMO	(n:1863/0.0%)
FLÚOR	(n:269/0.0%)
PLOMO	(n:163 /0.0%)
NÍQUEL	(n:214 /0.0%)
BENCENO	(n:569/0.0%)
TOLUENO	(n:849/0.2%)
XILENO	(n:920 /0.4%)



Fuentes naturales de radiaciones ionizantes



El MDU-Liulin-6Sp es un espectrómetro de transferencia lineal de energía (LET) de dimensiones exteriores 100x100x45 mm³ y con un peso aproximado de 550 g, Sus resultados están en buen acuerdo con los datos obtenidos con TEPC y con los resultados calculados con EPCARD 3.2



Región operación	Nº vuelos	Horas de vuelo	Altitud Km	Dosis efectiva anual (mSv) TEPC
Norteamérica	28	244	10.3	3.29
América Central	29	108	10.4	2.16
Sudamérica	39	359	9.8	1.69
África	8	43	10.4	1.68
Europa	52	120	10.2	2.40
España insular	44	38	8.8	0.91
Islas Canarias	12	31	10.2	1.57
TOTAL	212	943	9.9	1.97

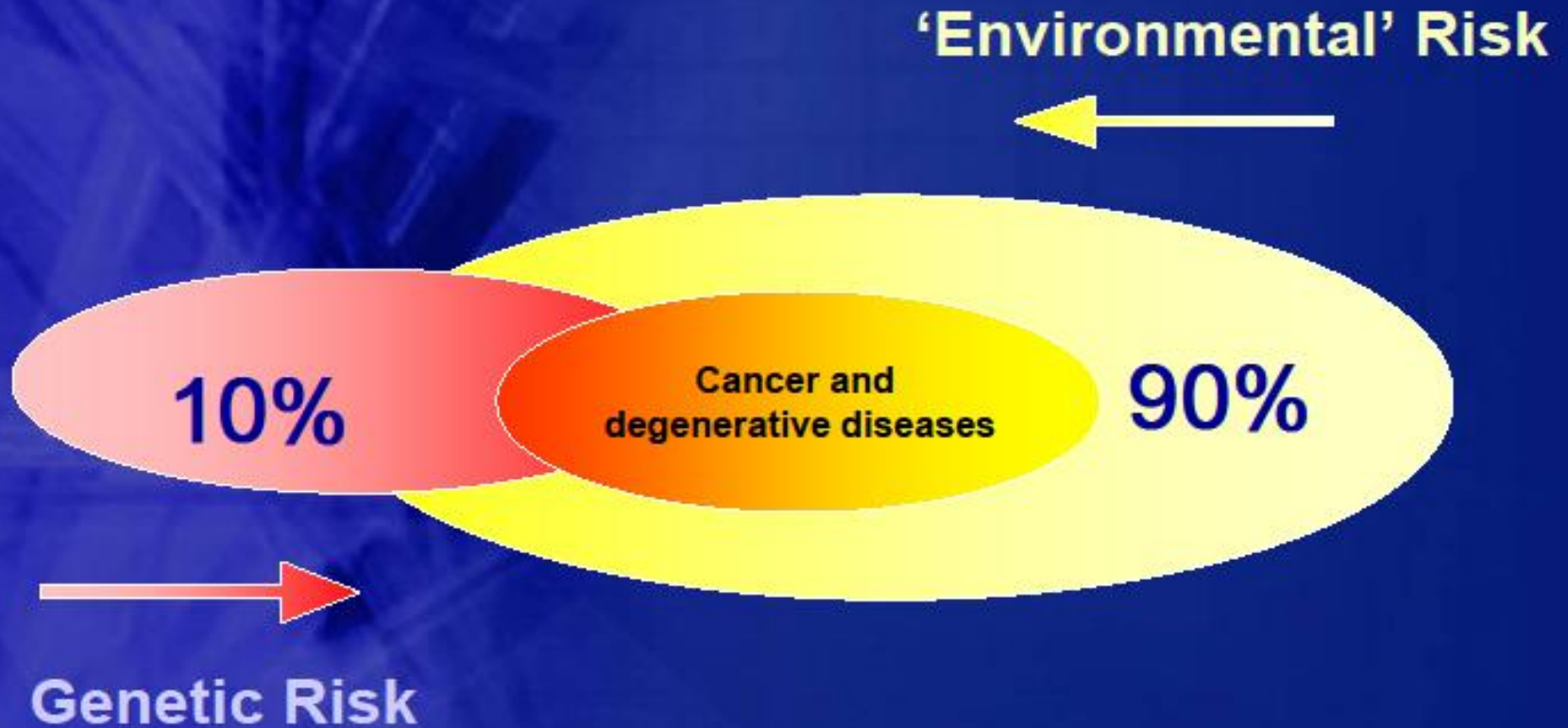
RADIACIÓN NO IONIZANTE ULTRAVIOLETA





"Definitely work-related."

Putting the E into GxE



M. T. Smith and S.M. Rappaport, "Building Exposure Biology Centers to Put the E into GxE Interaction Studies". Editorial in *Environ Health Perspect*, 117(8): A334-A335 (2009).

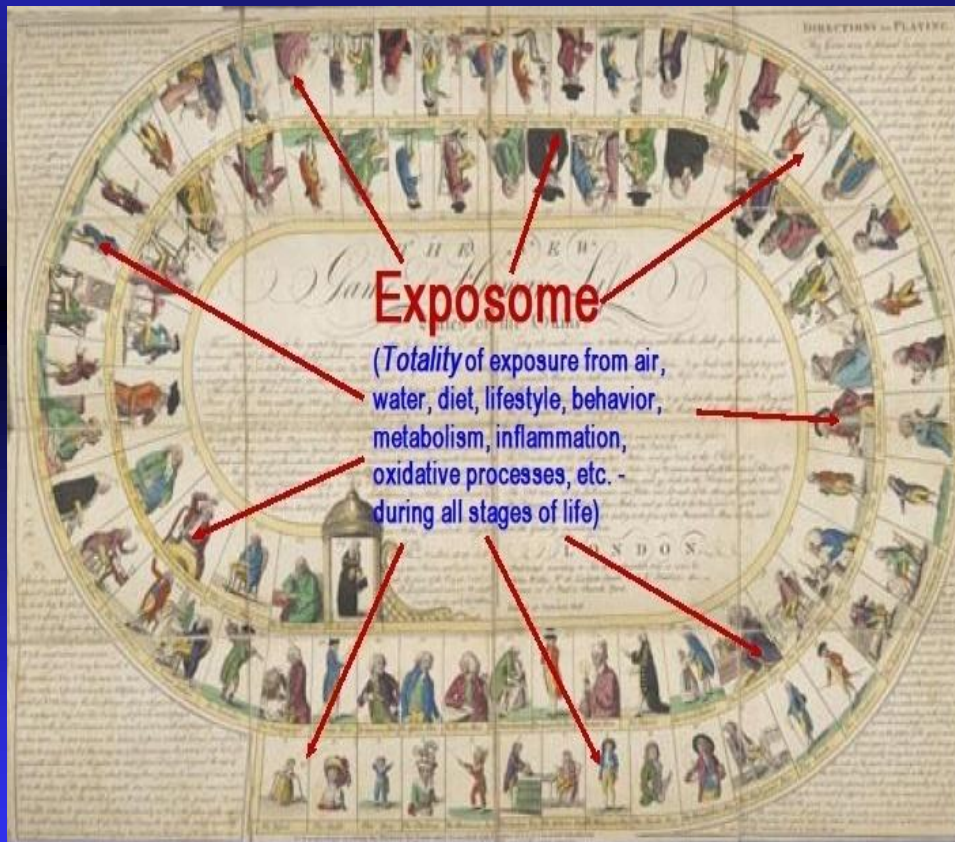
1. Broad definition of “environment”

Why cancer is mainly “environmental”

Annual incidence of cancer (per million) in migrants from Japan to Hawaii, in the Japanese and in Hawaiian Caucasians

	Migrants	Japanese	Hawaii Caucasians
Colon	371	78	368
Stomach	397	1,331	217

EXPOSOME



“Exposome” representa la totalidad de las exposiciones (internas y externas) que sufre una persona desde el mismo momento de la concepción, durante toda su vida.

Christopher Wild

RADIATION



STRESS



LIFE-STYLE



INFECTIONS



DRUGS



DIET



POLLUTION

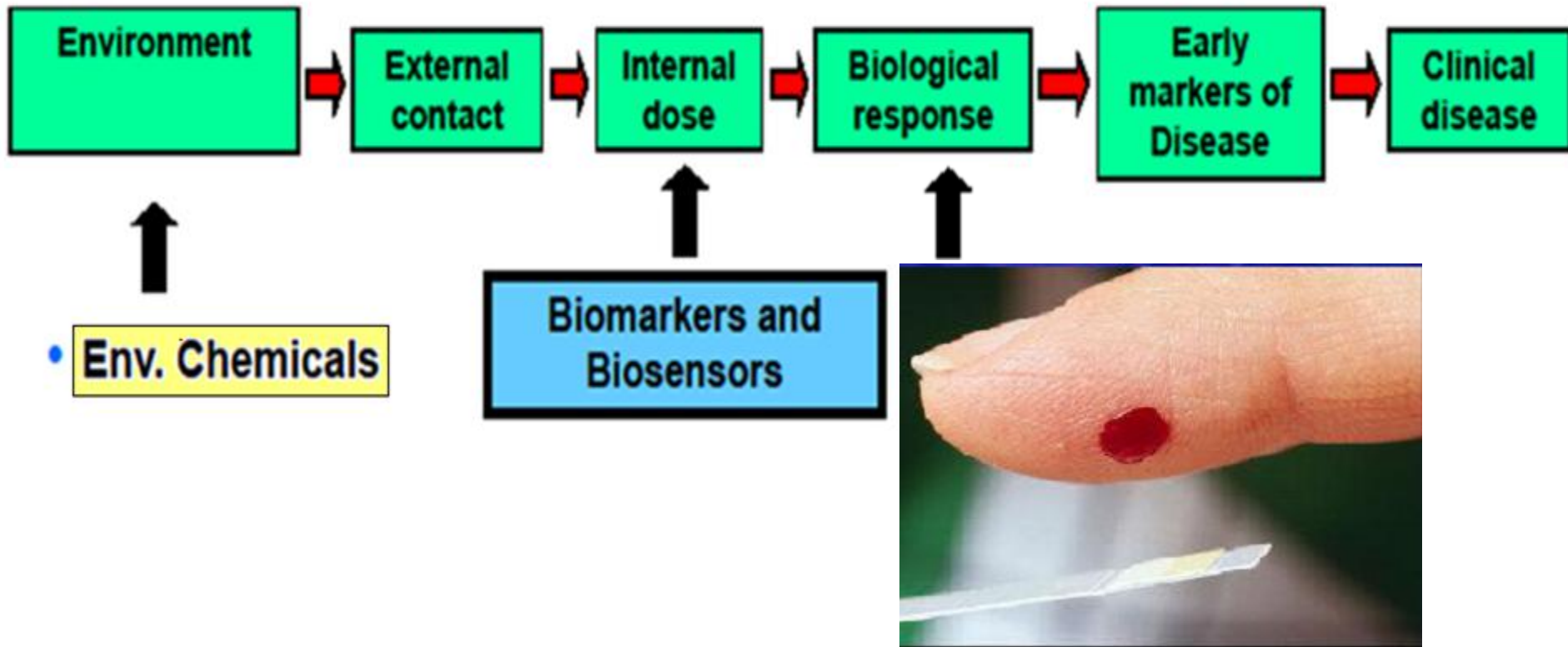


**Internal
chemical
environment**

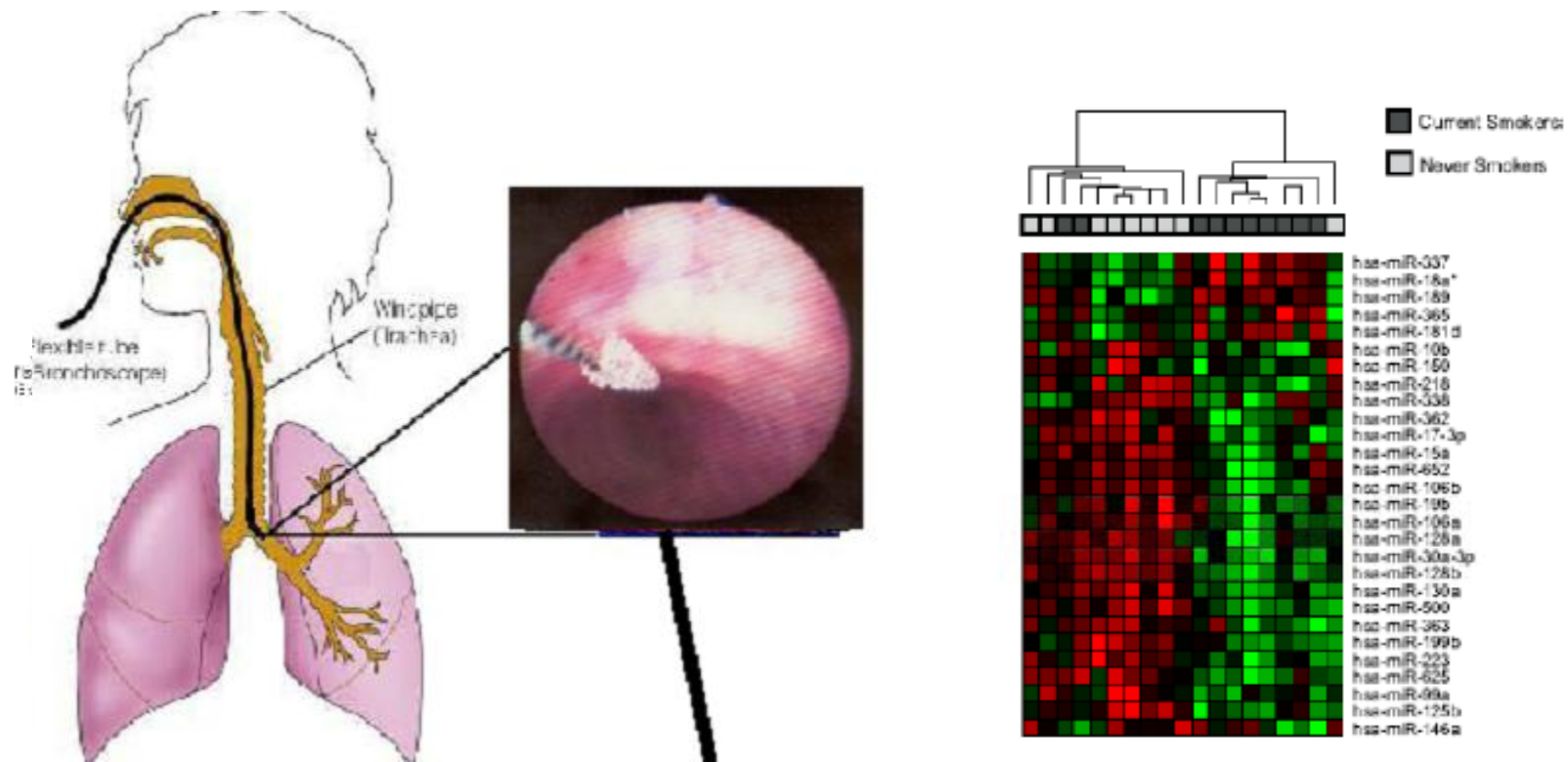
- Xenobiotics
- Inflammation
- Preexisting disease
- Lipid peroxidation
- Oxidative stress
- Gut flora

*The exposome
includes all
chemicals in the
internal chemical
environment*

Biology Response Indicators Program



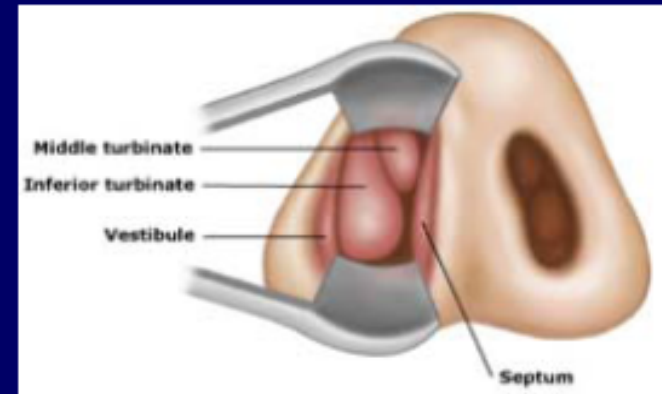
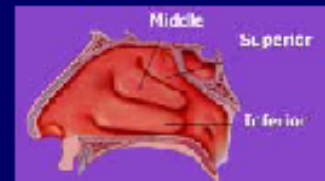
Impact of smoking on bronchial airway microRNA expression

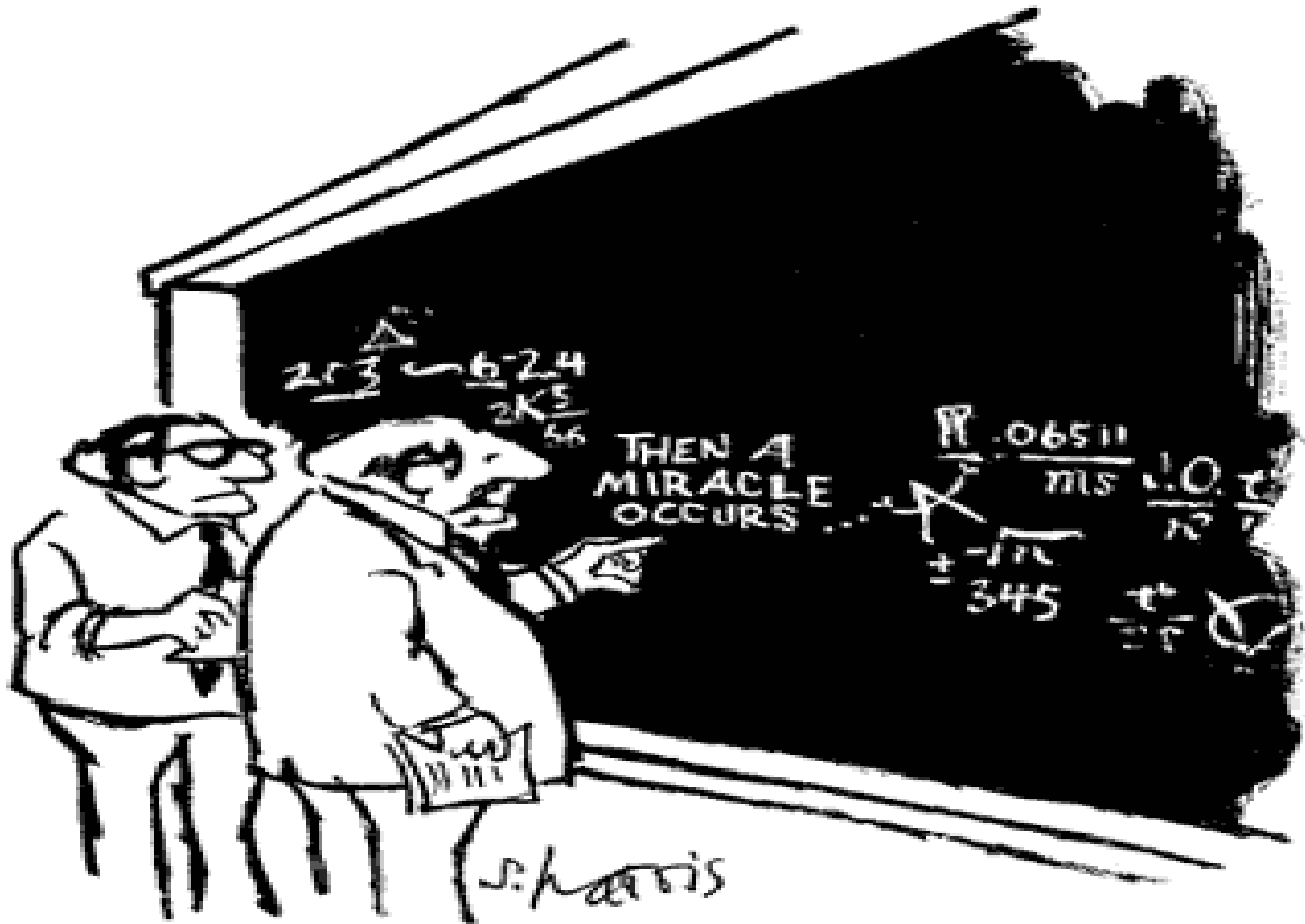


MicroRNA regulate the gene-expression response to smoking

Technique for Obtaining RNA from Nasal Mucosal Brushings

- 1% Lidocaine topically to inferior turbinate
- Cytosoft[®] brushings from “interior” of inferior turbinate
- Immerse in RNA later





"I think you should be more explicit here in step two."

A Major Technology Gulf Exists Between Discovery Proteomics and Routine Diagnostic Platforms: Virtuoso vs Pushbutton Analysis



Discovery Proteomics: LC-MS/MS		Routine Clinical Analyzer: Immunoassay
50-700	# proteins	1-20
\$1,000	\$ per analysis	\$2-100
25-50%	CV	3-5%
4-52 wks	time required	~15 min
2-50	# samples	100
Mix of auto & manual steps	workflow	All inside 1 box

“El futuro ya está aquí; lo que sucede es que no está adecuadamente distribuido”

William Gibson