

Toxicology Update

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Pesticides

Very special chemicals!

Preserve safe uses!

You make a difference—
know your stuff!

We live in a chemical world!

More than 32,000,000 known

- Origin

Natural and Synthetic

- Class

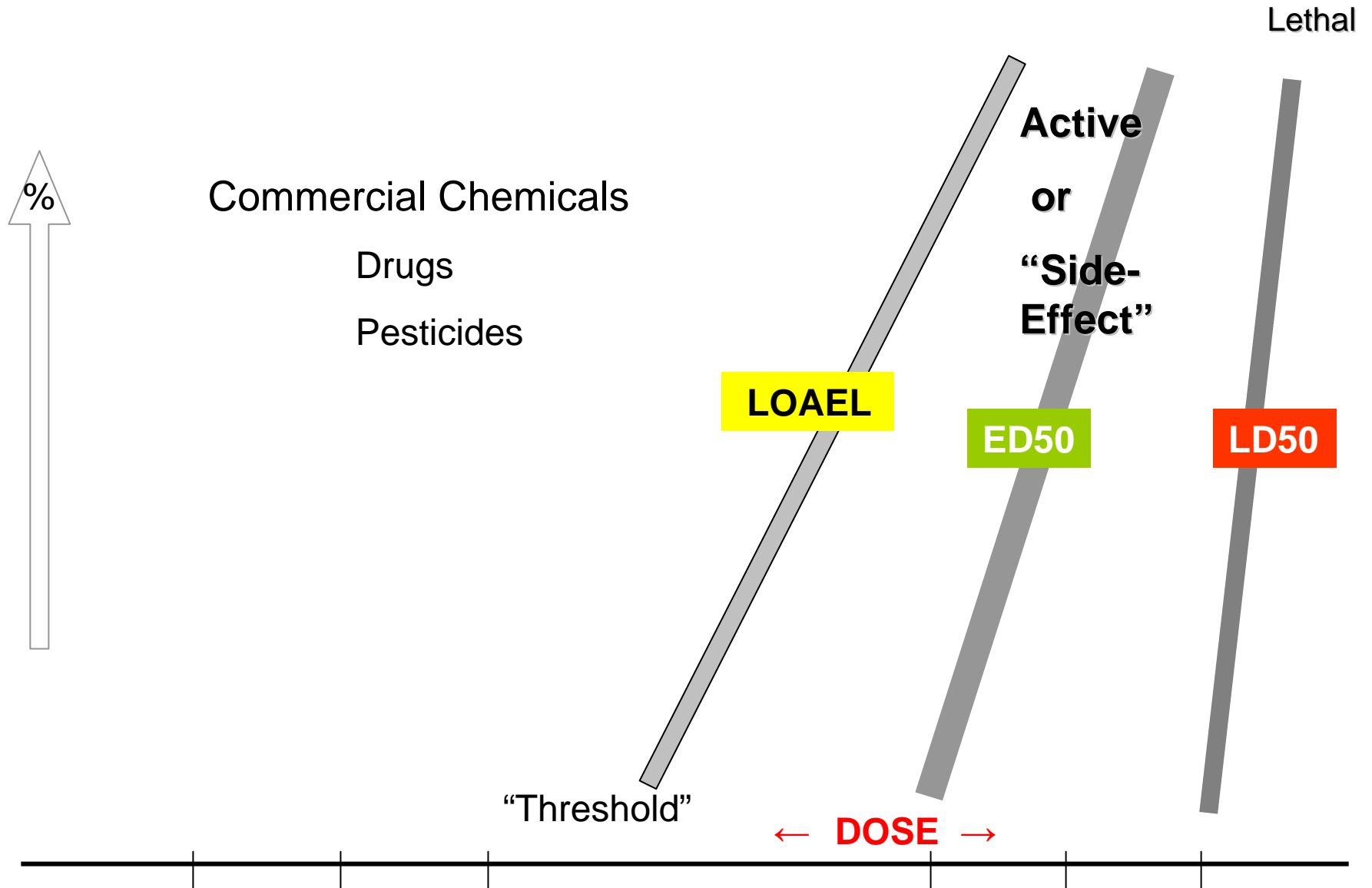
Organic and Inorganic

- Use

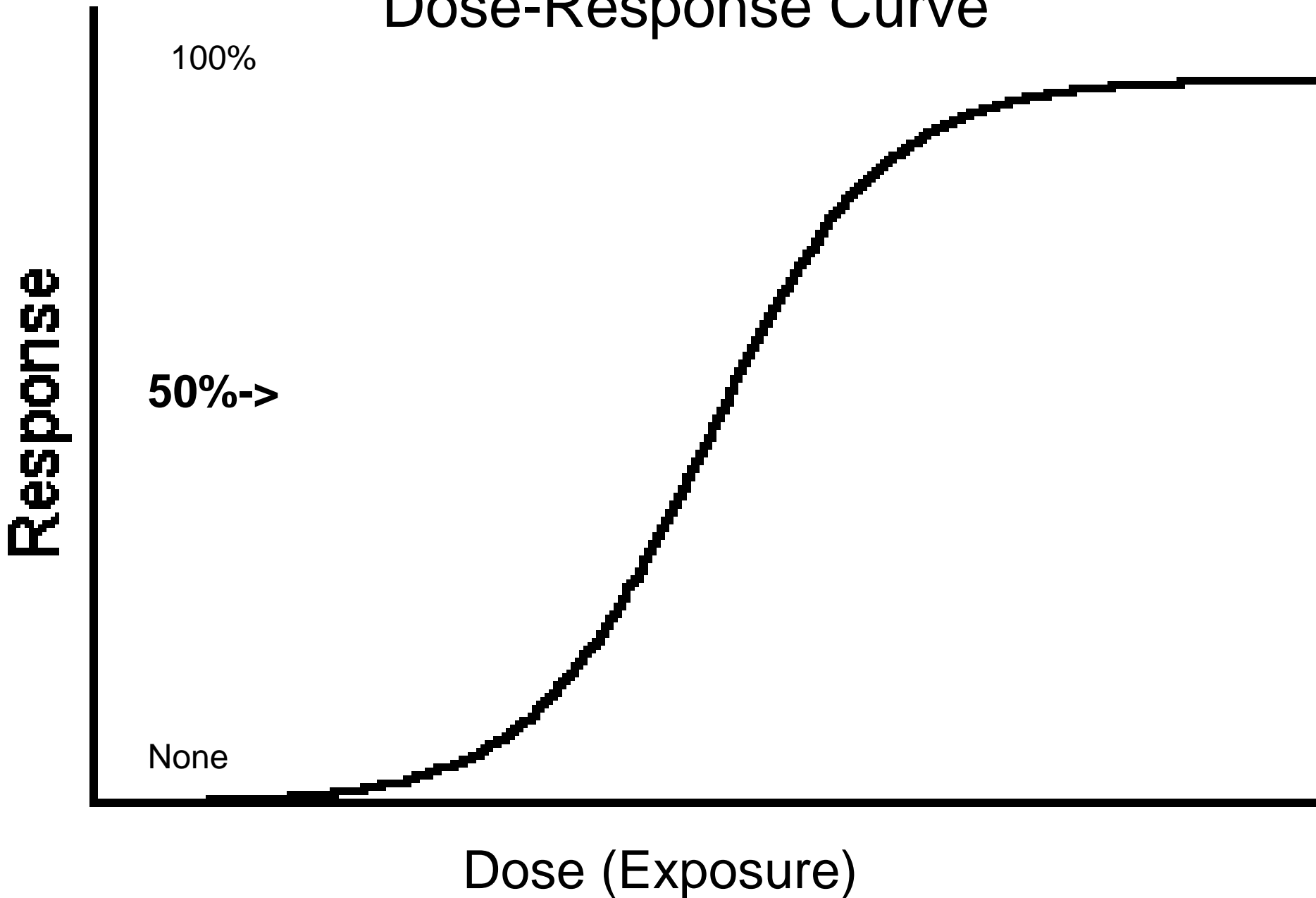
Process •• ***Commercial Products*** •• Pollutants

Foods • Drugs • Cosmetics • Pesticides

Safety Evaluation: Exposure-Response Relationships



“Dose-Response Curve”



Chemotherapy: Drug Safety

“...for seven years of misfortune,
I had one moment of good luck!”



Paul Ehrlich 1854-1915

1909 “606” Salvarsan

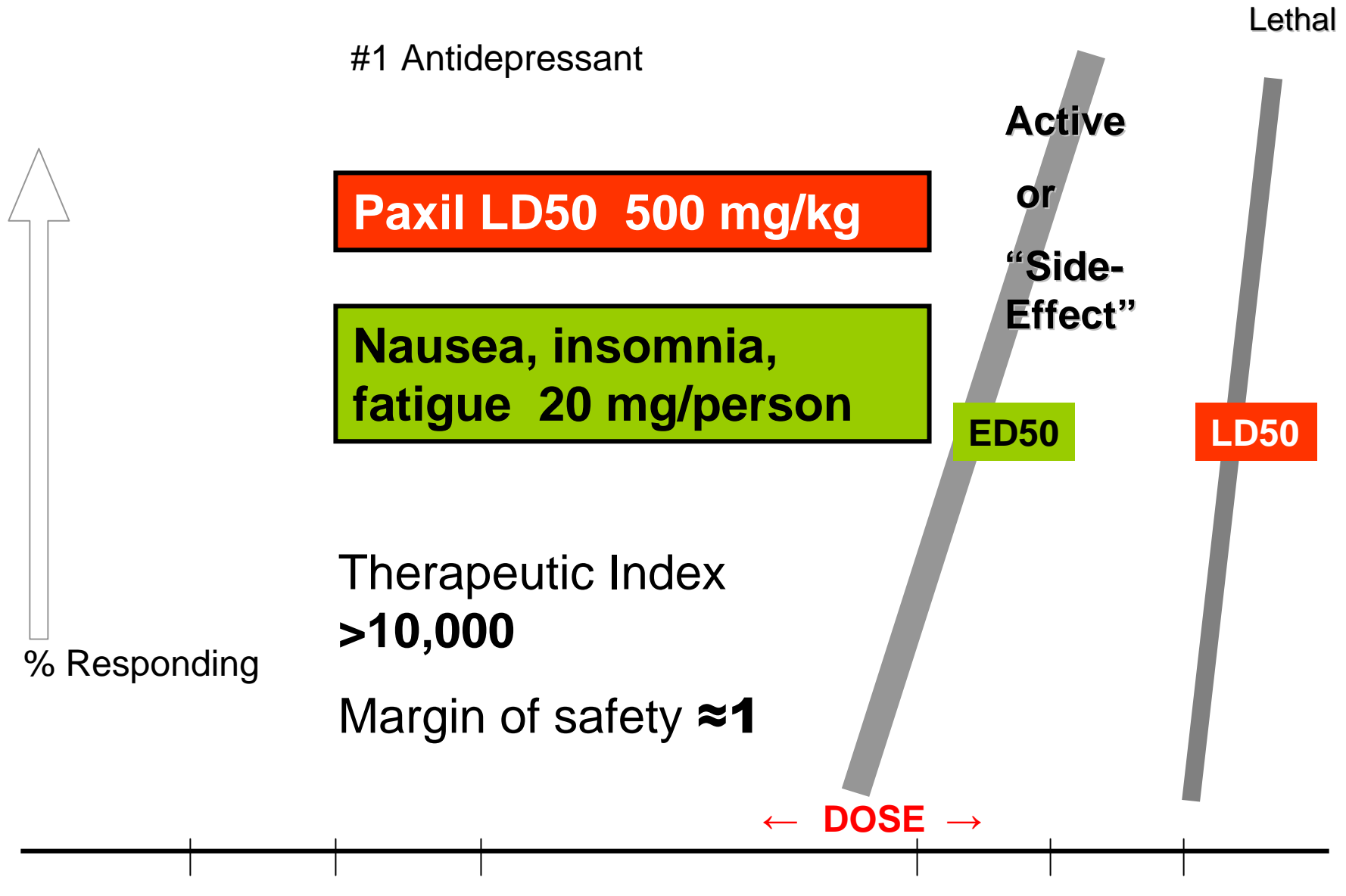
A Magic Bullet

An arsenic drug used
to treat syphilis prior
to use of penicillin

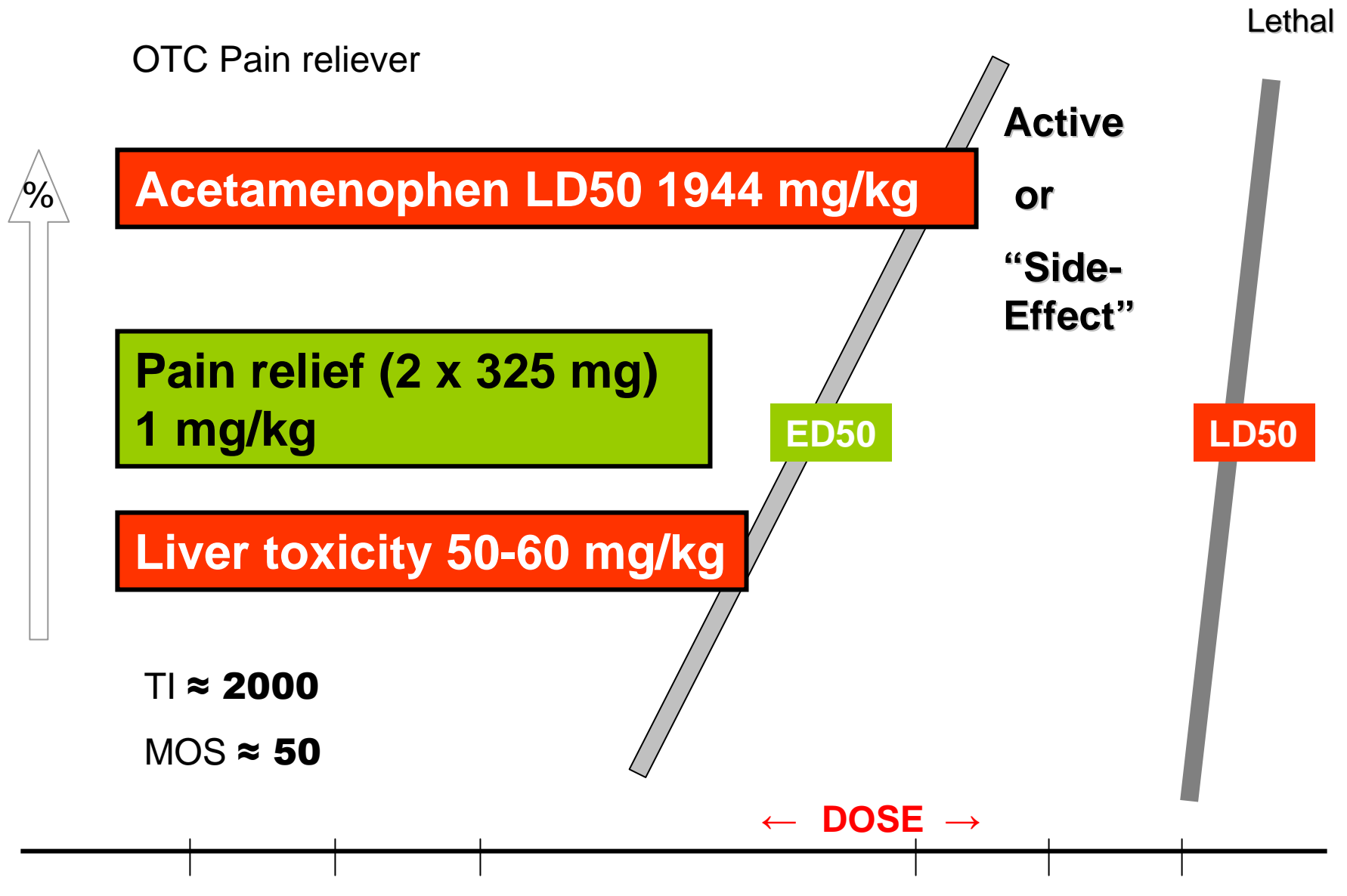
Therapeutic Index

Lethal dose/Effective dose

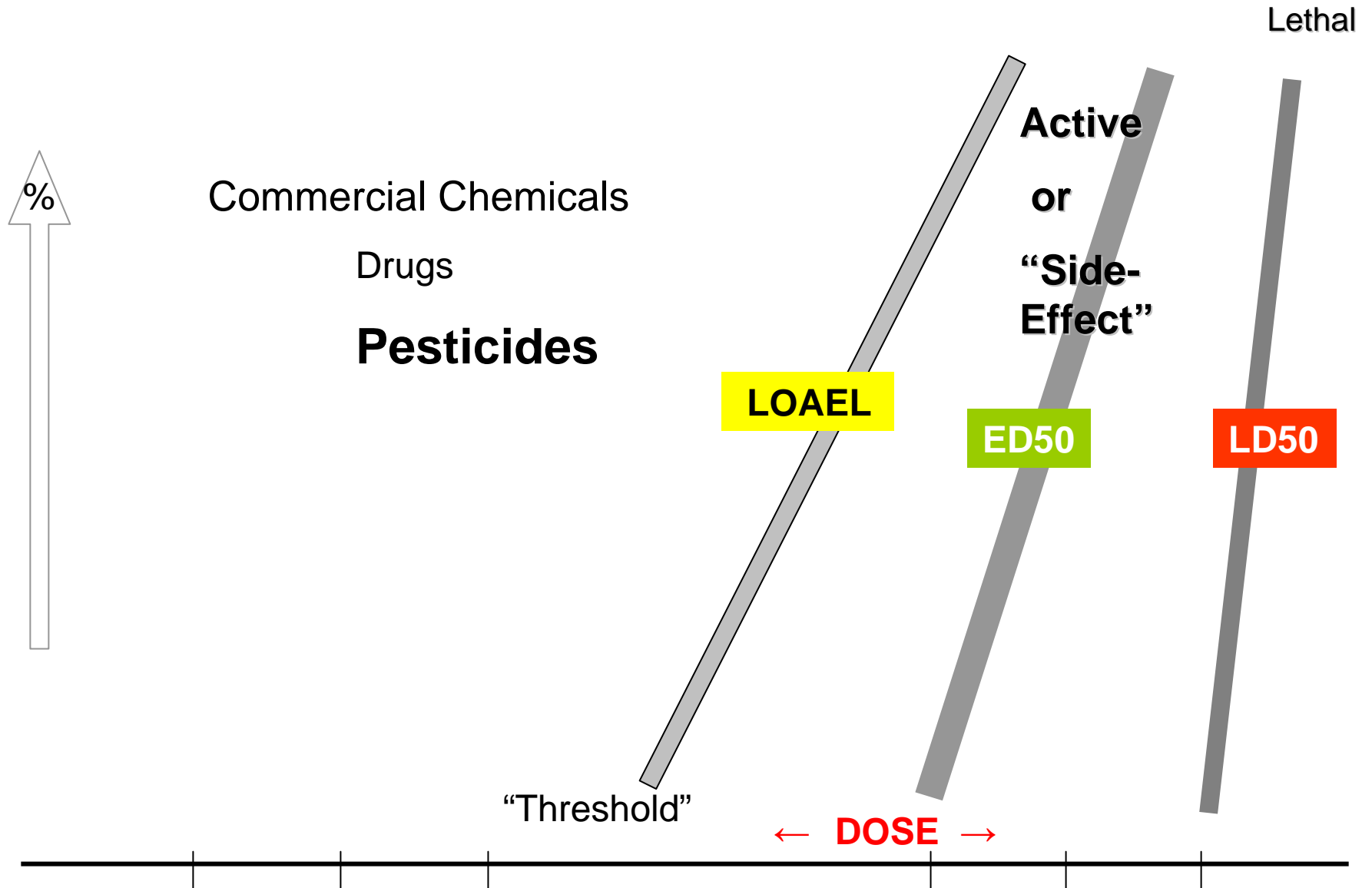
Safety Evaluation: Exposure-Response Relationships



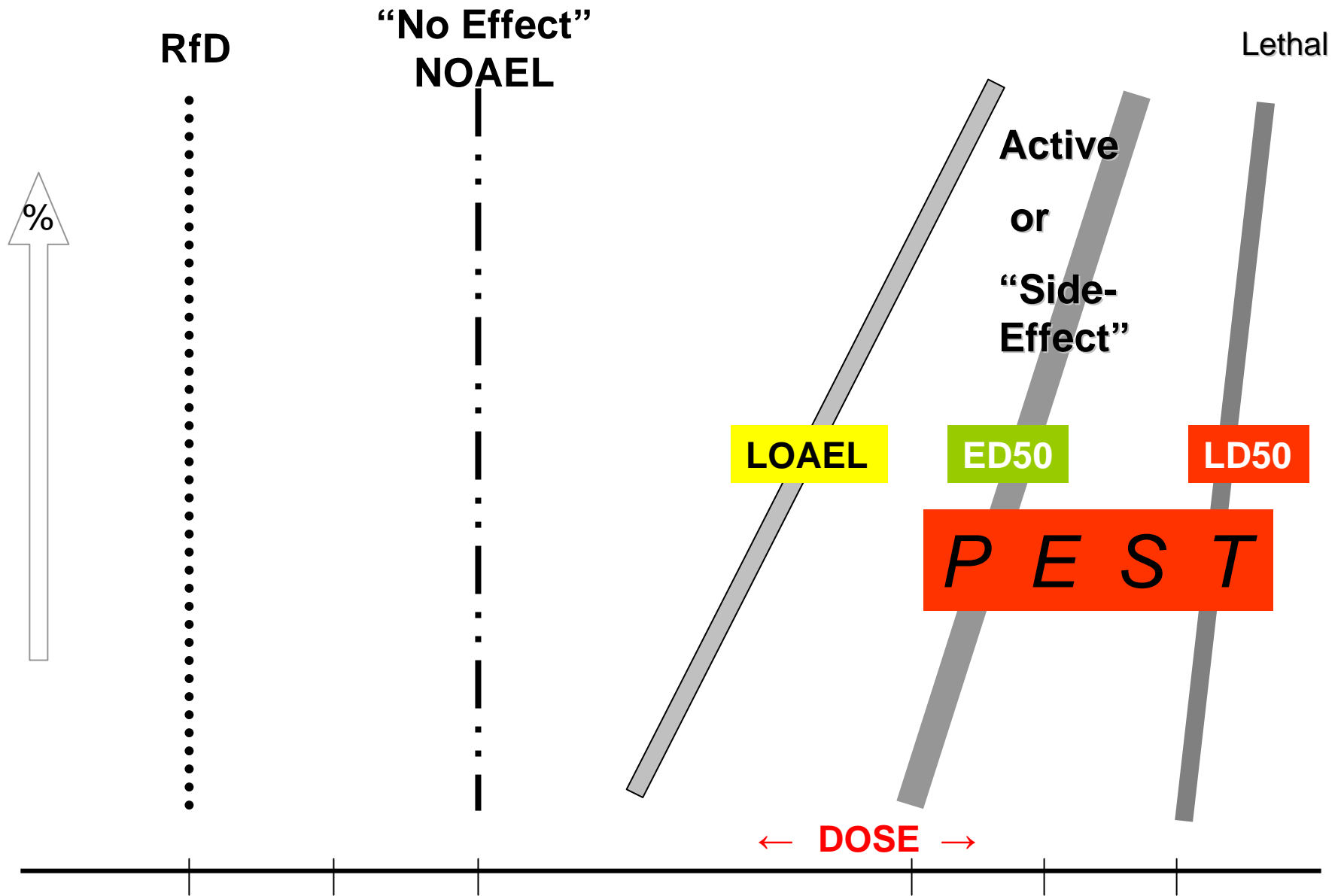
Safety Evaluation: Exposure-Response Relationships



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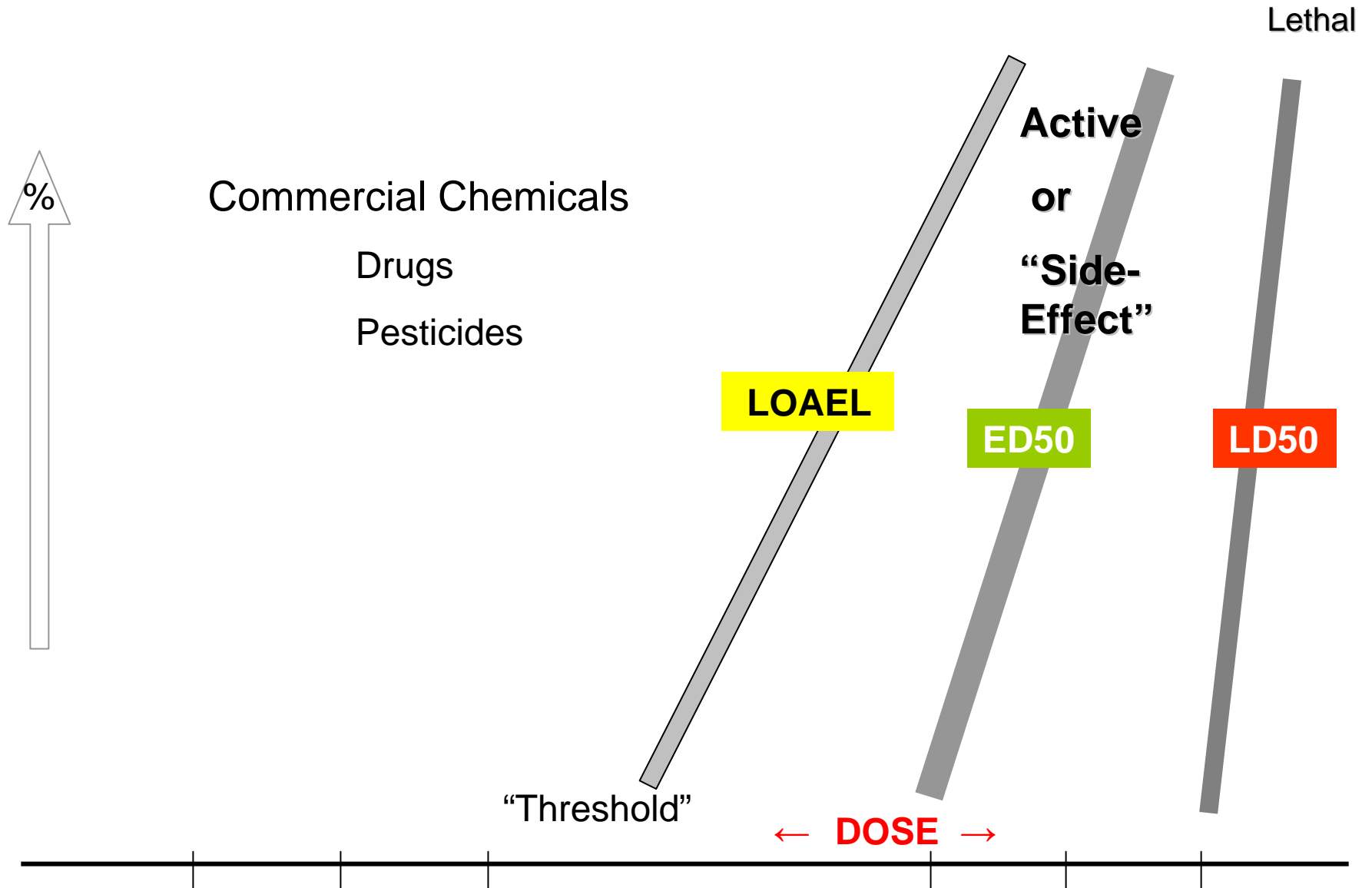
Productc	Formulation	Active Ingredient.	Rat oral LD50 (mg/kg bw)	Human product equivalents of LD50
Termidor	0.06%	fipronil	97	16 L
Talstar	0.06%	bifenthrin	54 (f)	9 L
Gourmet	1%	borate	2500	25 kg
Vitis	0.001%	imidacloprid	450	4,500 L

LD50s aren't about risk—safety evaluation is about exposure and use!

Active Ingredient.	Rat, oral LD50 (mg/kg bw)	Low Observed Adverse Effect Level (mg/kg-d)	No Observed Adverse Effect Level (mg/kg-d)	Reference Dose Includes "Uncertainty Factors" (chronic)
fipronil	97	7	2.5	0.025 neuro
bifenthrin	54 (f)	2	1	0.015 neuro
boron	2500-5000	5 chronic	2.5 boron	Dietary background
imidacloprid	450	55	5.5	0.057

Margin of exposure = NOAEL / 100 or more

Safety Evaluation: Exposure-Response Relationships



Accidental Pesticide Exposures

- Rare (catastrophic)
- Short term (seconds, min, hrs, days)
- Response: toxicity
 - Death (LD50)
 - Target organ (ED50)
- Regulation
 - Restricted Materials & Engineering Controls
 - Personal Protective Equipment

Leading Causes of Death

U. S. A., 2004

All causes	2,443,000
Heart disease	697,000
Cancer	557,000
Stroke	163,000
Chronic lung disease	125,000
Unintentional injuries	107,000
Diabetes	73,000
Flu	66,000

Accidental U. S. Deaths, National Safety Council, 2005-2006

Deaths, 2004	Total	Rate/million
All unintentional injuries	111,000	378
Motor vehicle accidents	46,200	157
Falls	20,200	69
Poisoning	13,300	45
Choking	4,900	17
Fires and smoke	3,900	13
Drowning	3,800	13
Suffocation	1,300	4
Heat or cold	1,200	4
All others	16,200	55

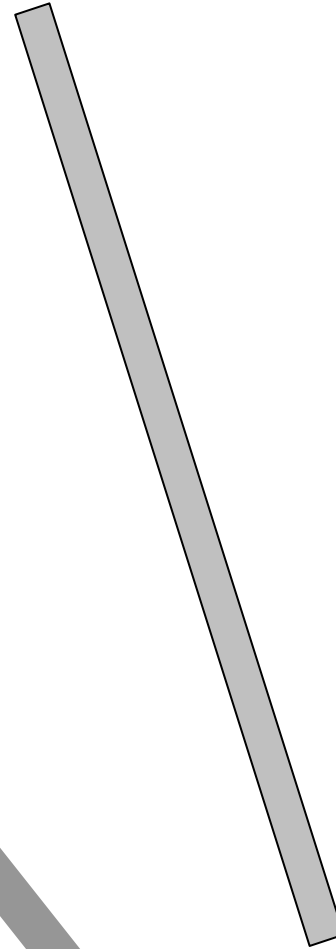
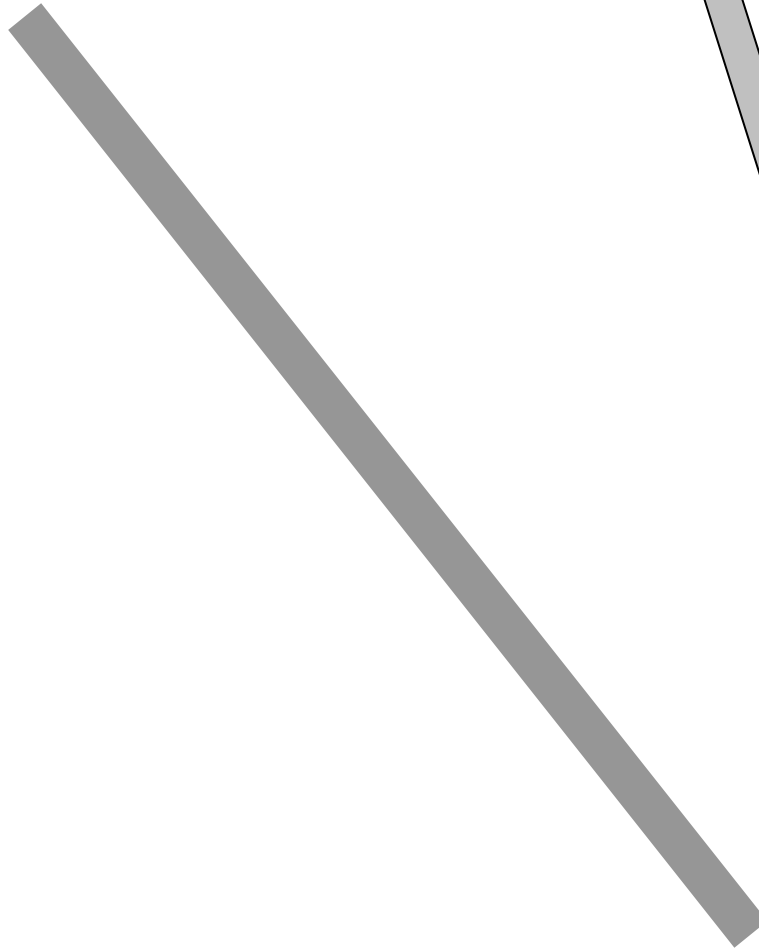
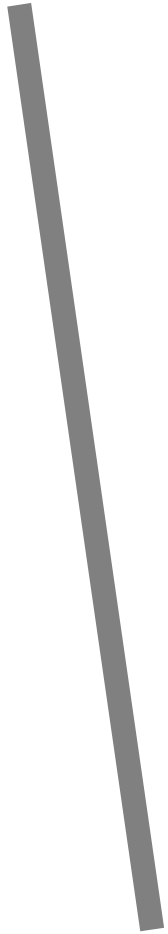
All U. S. Deaths Due to Injury

Year	Death x 1000		
	2002	2001	2000
Transportation	107	102	98
Non-transportation	58	54	51
Venomous animals and plants	0.076	0.061	0.080
Poisoning	18	14	13
Pesticide (0.007; 2002)			
Suicide	32	31	29
Undetermined intent (poisoning)	3	3	3
Medicine and surgery	3	3	3

What about everyday exposures and safety evaluation?

Normal

Occupational



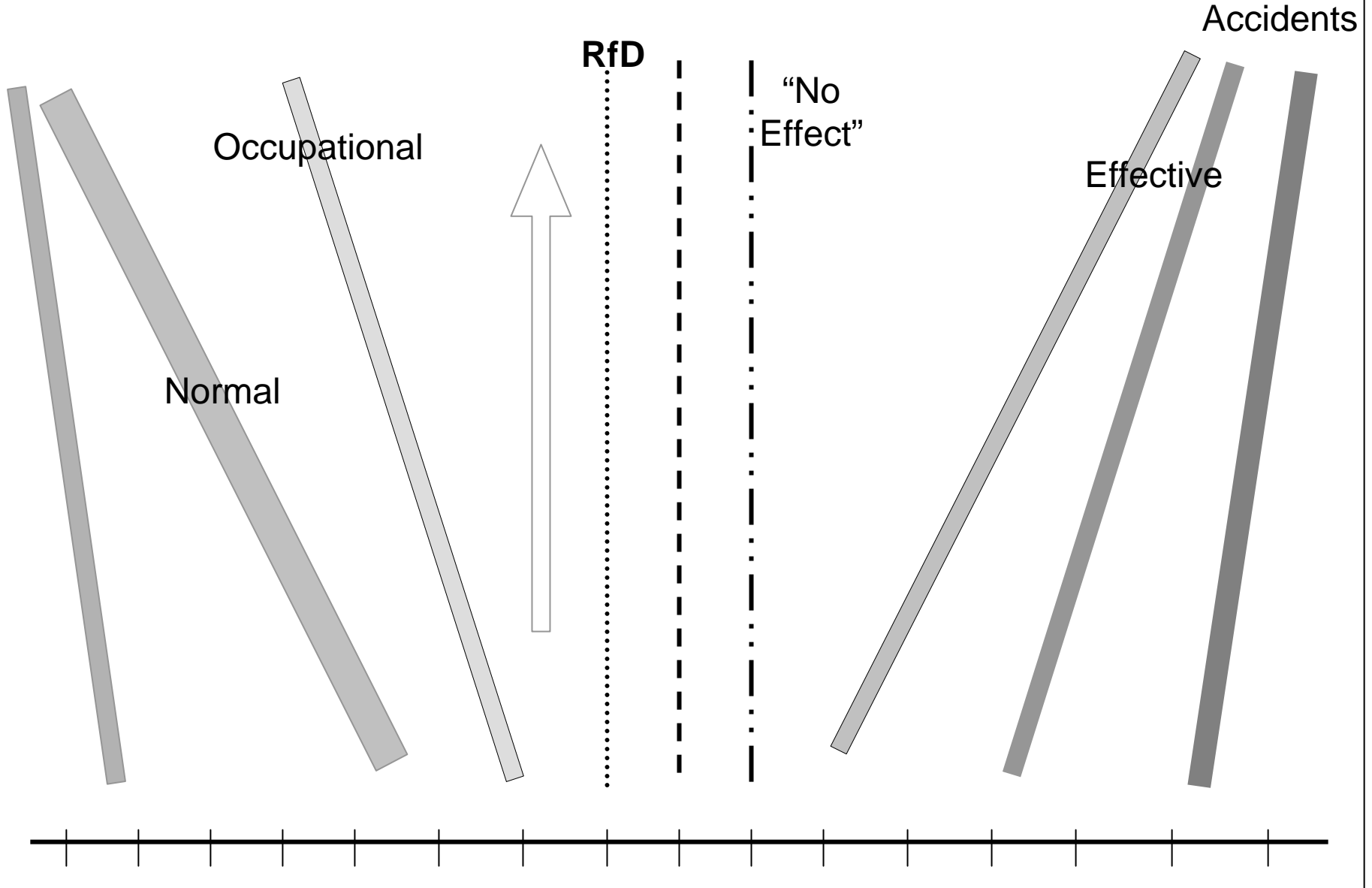
← DOSE →



Unintended Pesticide Exposures

- Common (*residues* from use)
 - Agricultural “Integrated Pest Management”
 - Residential “Pest Control”
- Short term (min, hr, d, wks to yrs)
- Responses: No Observed Adverse Effects
- Regulations minimize continuing, low level *pesticide* contacts

Yes, Exposure goes with use!



What is your concern?

Check 'em out!

Letterhead

One issue—keep it simple!

First person, singular

"I...."

NOTICE OF PROPOSED REGULATORY ACTION

“What the new regulatory action will do!”

SUBMITTAL OF COMMENTS

Written comments:

<dpr08003@cdpr.ca.gov

facsimile transmission: 916-324-1452

FORM OF COMMENTS

Public hearing if any interested person submits a written request to DPR no later than 15 days prior to the close of the written comment period.

EFFECT ON SMALL BUSINESS

“DPR has determined that the proposed regulatory action does affect small businesses.”

AGENCY CONTACT

Send written comments to:

Regulations Coordinator

Office of Legislation and Regulations

Department of Pesticide Regulation

1001 I Street, P. O. Box 4015

Sacramento, CA 95812-4015

916-445-3991

Keep a copy!

Note: If unavailable, questions may be directed to the following person

For example,

Environmental Program Manager

Worker Health and Safety Branch

916-445-4163

Notice of Proposed Action, the Initial Statement of Reasons, and the proposed text of the regulation are also available on DPR's Internet Home Page

<http://www.cdpr.ca.gov>

Accessing “Writing a Letter”

<http://faculty.ucr.edu/~krieger/>

click [PCEP View](#)