



TOXICOLOGY AND DRUG IMPAIRED DRIVING

Regional Toxicology Liaisons

Kristen Burke

Sabra Jones

Chris Heartsill

Amy Miles

OVERVIEW

Forensic Toxicology

Categories of drugs

Basic Pharmacology terminology

Toxicology testing considerations

Interpretation of the toxicology testing results

Drug Recognition Evaluation and drug categories

The effects of drugs

Oral Fluid roadside screening benefit

FORENSIC TOXICOLOGY

Analyzing bodily fluids for the presence of drugs and alcohol for legal purposes

Drug – Any substance when taken into the human body impairs the ability to operate a motor vehicle safely



CNS Depressants



Alcohol



Inhalants



Dissociative Anesthetic



Cannabinoids



CNS Stimulants



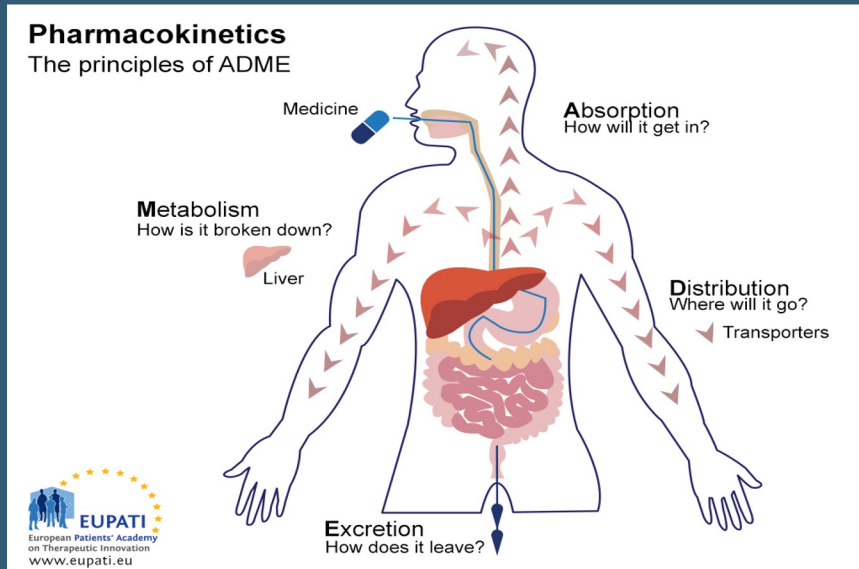
Hallucinogens



Narcotic Analgesics

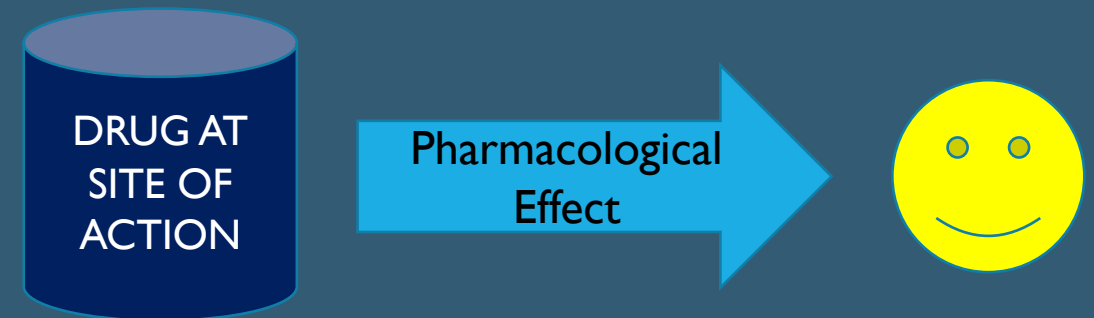
What is Pharmacokinetics?

What the body does to the drug.
Is the process by which a *drug* is *moved* through the human body.

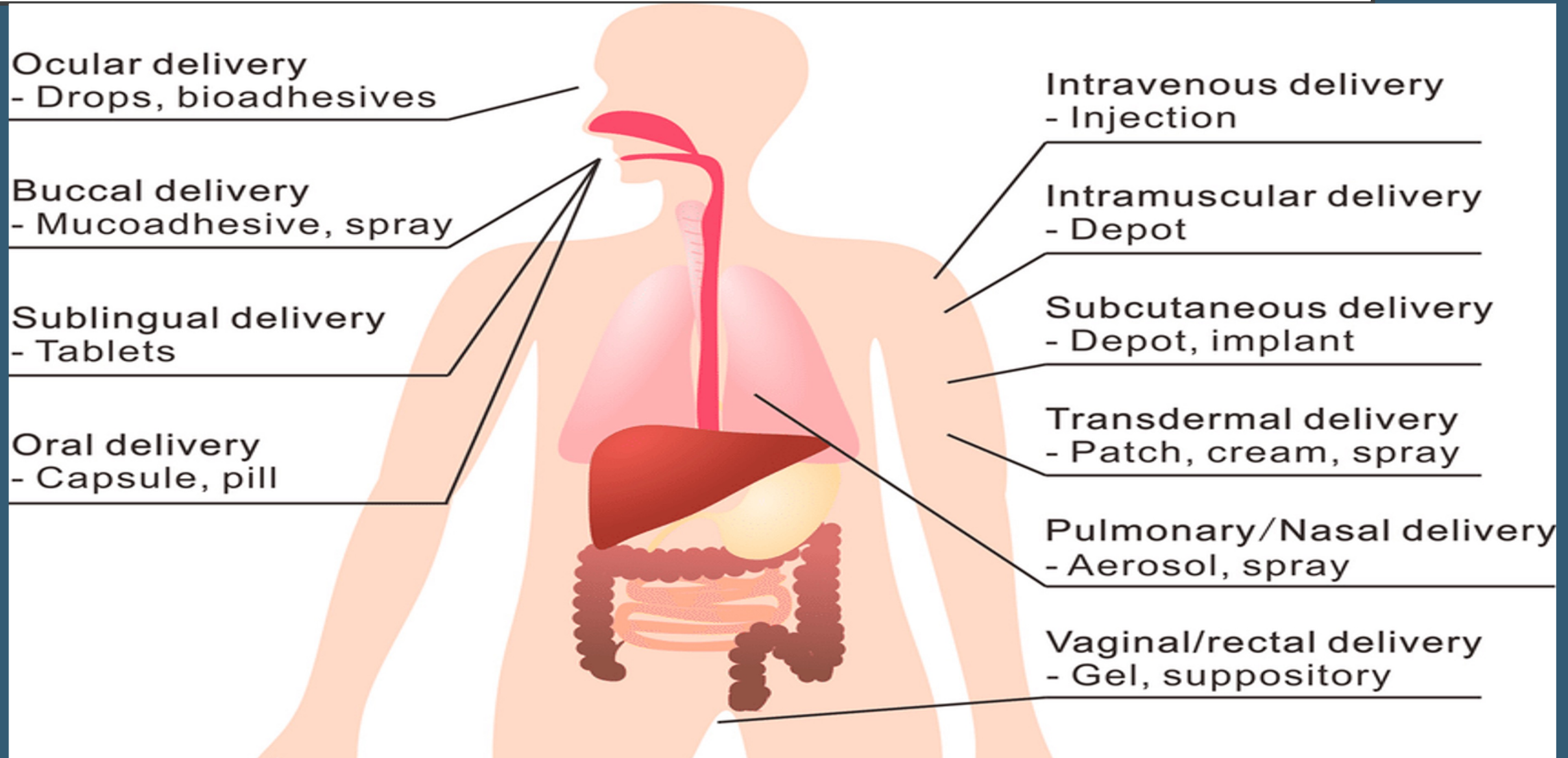


What is Pharmacodynamics?

What drug does to the body,
involves receptor binding,
post-receptor effects, and
chemical interactions.



ROUTE OF ADMINISTRATION



Toxicology Testing Considerations

- Laboratory detection capabilities
 - What was identified
 - Concentration?
 - Matrices (Whole blood, urine, oral fluid)



Drug Impairment

Recognizing the Signs

INTERPRETING TOXICOLOGY RESULTS/EFFECTS

Interpretation Factors:

- Drug use history
- Type of ingestion
- Potential effects of drug
- Drug-Drug Interaction
- Quantitative Values (dose relationship)

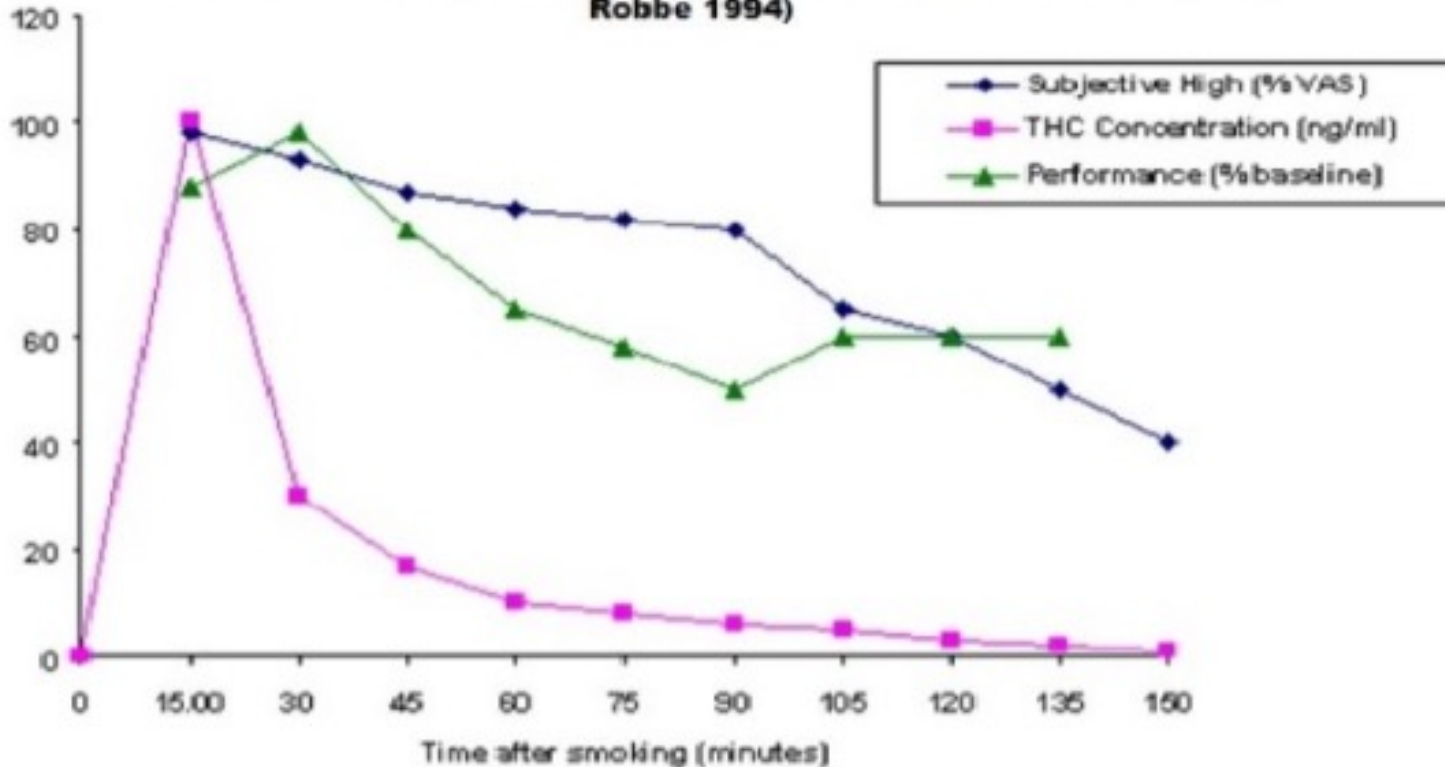
INTERPRETING TOXICOLOGY RESULTS

Unlike 0.08% for alcohol, per-se limits for drugs do not universally represent the impact of the drugs on individuals at particular level.

	Alcohol	Drugs
Predict impairment based on blood level	Yes	No
Per se law	0.08%	No
Predict dose based on blood level	Yes	No
Back extrapolation	Yes	No

Concentration \neq Effects

Time Course of Standardized THC Concentration in Plasma, Performance Deficit and Subjective High after Smoking Marijuana
(Adapted from Berghaus et al. 1998, Sticht and Käferstein 1998 and Robbe 1994)



- Peak blood levels \neq Peak effects
- Why scientists don't recommend per se THC levels

INTERPRETING TOXICOLOGY RESULTS

Toxicologists cannot interpret impairment based on a laboratory report alone

- Information considered to evaluate impairment
 - Driving facts/scenario
 - Officer observations of driving behavior
 - Officer observations at roadside
 - DRE evaluation information
 - Drug(s) present in testing

Without observations of impairment from an officer or DRE

- It is not likely to make an appropriate determination of impairment

OBSERVED EFFECTS-DRUG RECOGNITION EVALUATIONS

Drug Symptom Matrix

	CNS Depressant	Inhalants	PCP	Cannabis	CNS Stimulants	Hallucinogens	Narcotic Analgesics
HGN	Present	Present	Present	None	None	None	None
VERTICAL NYSTAGMUS	Present* (High Dose)	Present* (High Dose)	Present	None	None	None	None
LACK of CONVERGENCE	Present	Present	Present	Present	None	None	None
PUPIL SIZE	Normal (1)	Normal (4)	Normal	Dilated (6)	Dilated	Dilated	Constricted
REACTION to LIGHT	Slow	Slow	Normal	Normal	Slow	Normal (3)	Little to none visible
PULSE RATE	Down (2)	Up	Up	Up	Up	Up	Down
BLOOD PRESSURE	Down	Up/Down (5)	Up	Up	Up	Up	Down
BODY TEMPERATURE	Normal	Up/Down/ Normal	Up	Normal	Up	Up	Down

Impairment can be present in the absence of obvious or observable signs.
Why...how?

- **Time and distance**
- **Reaction time**
- **Performance perception**
- **Spatial perception**
- **Decision making (Judgement)**
- **Senses****

Can still be unsafe to operate a motor vehicle when no observable physical signs may be present. Can occur with low levels of drug in the system.

COGNITIVE IMPAIRMENT

How Impairing Drugs Affect Driving

- Motor Coordination Judgment (risk taking)
- Reaction time Tracking
- Divided attention Perception

WHY ORAL FLUID FOR ROADSIDE SCREENING?

BLOOD

Considered the “gold standard” for assessing driving under the influence of drugs (DUID) cases

Time for Collection

Average time is 1.5–2 hours to collect a sample after a stop

Drug concentrations will be declining as medical personnel/warrant are acquired

THC (active component of marijuana) decreases rapidly in the blood

ORAL FLUID

Rapid, non-invasive, observed collection

Can be taken proximate to the traffic stop

No medical personnel required for collection

Parent drug detection shows recent intake

- Data from roadside studies
 - THC and methamphetamine account for the majority of positives in the survey, along with poly drug use. This data is consistent with cases (blood).

THANK YOU FOR LISTENING.

QUESTIONS?



REFERENCES

- <https://abuse-drug.com/wp-content/uploads/2016/03/Medical-ketamine-photo.jpg>
- <https://www.addictionresource.net/wp-content/uploads/2019/12/hallucinogenic-drugs.jpg>
- <https://www.opioidtreatment.net/wp-content/uploads/2018/07/heroin-and-oxycodone.jpg>
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- <https://www.centers.com/wp-content/uploads/inhalants1.png>