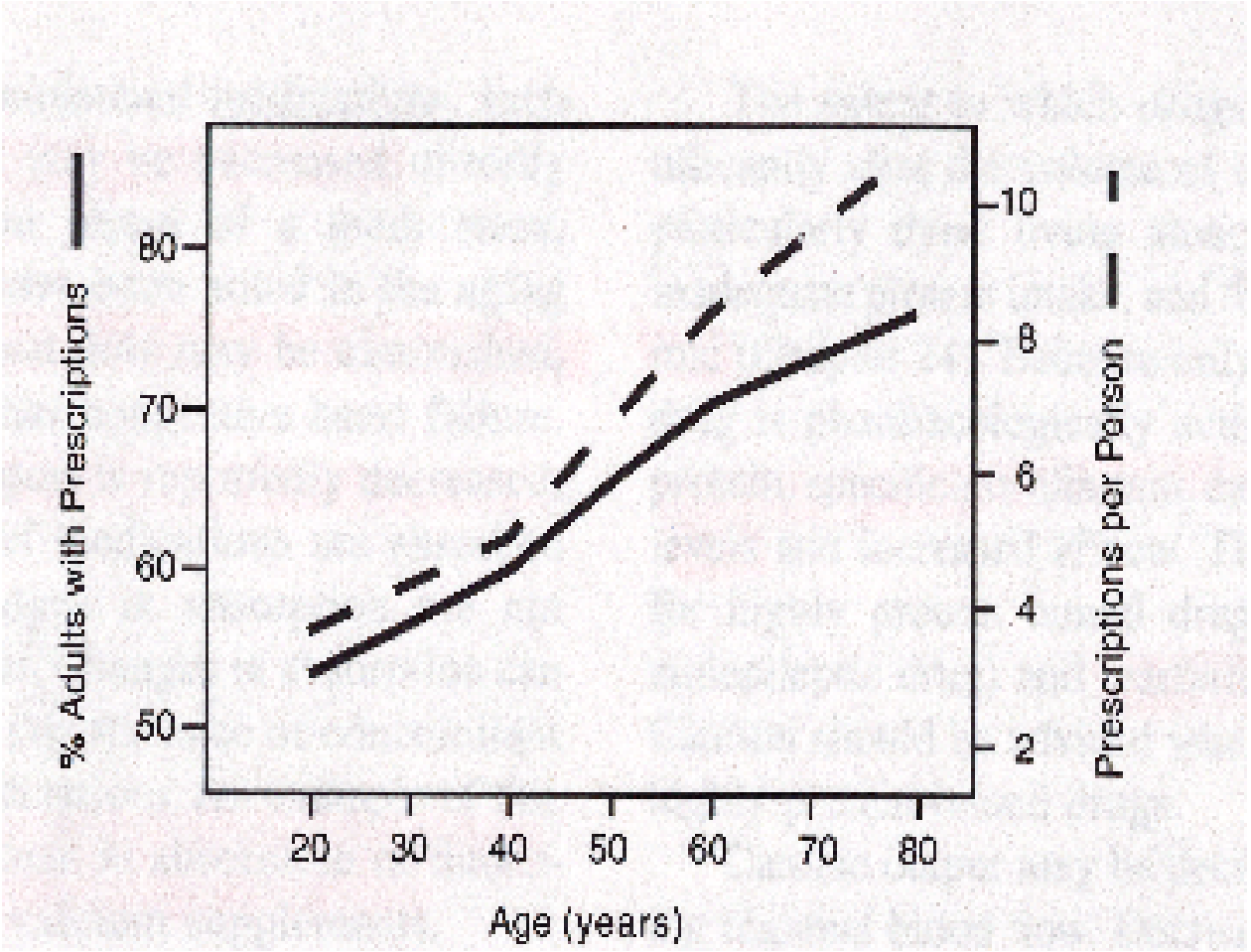
Pharmacotherapy in the Elderly

DRUGS USED IN THE GERIATRICS

VANDANA PANDA

The percentage of population with prescriptions, and the number of medications per individual, increase with age.



Age-related changes which affect pharmacokinetics

- **decreased lean body mass (**It is normally defined to be the **body** weight minus the **body** fat)
  - affects drug distribution
- **decreased levels of serum albumin**
  - affects drug distribution
- **decreased liver function**
  - affects drug metabolism/biotransformation
- **decreased renal function**

  affects drug elimination

Drug absorption changes in the elderly

gastrointestinal system (rarely significant clinically)

- acid production generally unchanged
- multiple prescriptions increase the probability of drug-drug interaction which may alter absorption
- Splanchnic blood flow decreases (with little effect on drug absorption)

  The splanchnic circulation includes the blood flow through the stomach, small intestine, large intestine, pancreas, spleen, and liver

Drug distribution changes in the elderly

fluid and tissue compartments

- decrease in total body water
- increase in fat compartment
- decrease in muscle mass

plasma drug-binding proteins (rarely significant clinically)

- decrease in serum albumin levels
- no change in □-acid glycoprotein levels

Drug metabolism changes in the elderly

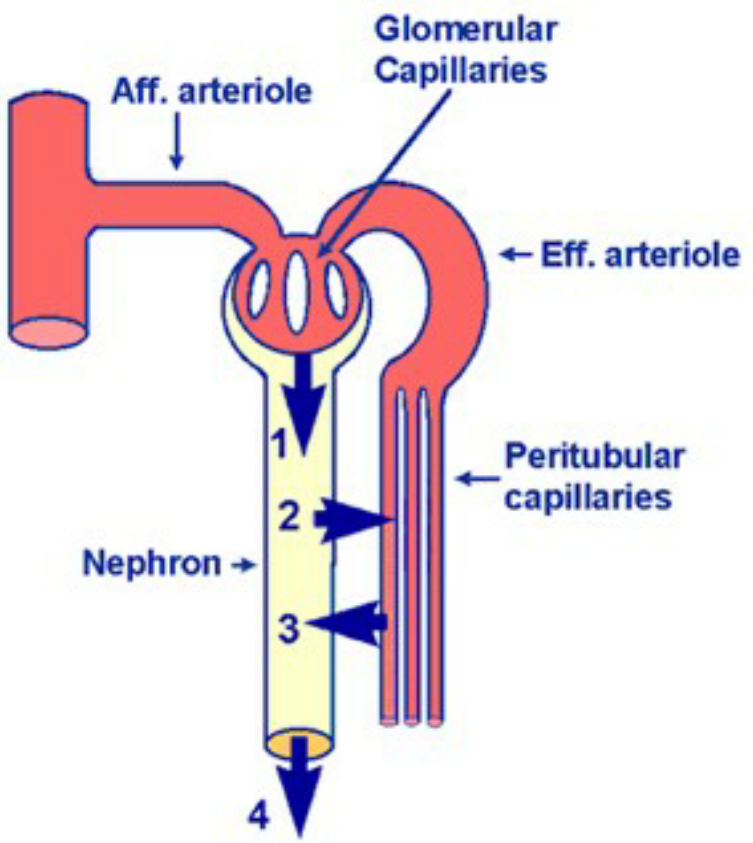
liver

- decrease in hepatic blood flow often associated with decreased First Pass Effect
- The **first-pass effect** (also known as **first-pass metabolism** or presystemic **metabolism**) is a phenomenon of drug **metabolism** whereby the concentration of a drug is greatly reduced before it reaches the systemic circulation
- Phase I metabolism decreased
- Phase II metabolism generally preserved

Drug elimination changes in the elderly

decrease in renal functions

- decreased blood flow to the kidneys
- decreased glomerular filtration
- decreased tubular secretion
- decline in creatinine clearance



Physiological changes in elderly patients affecting pharmcodynamics

target organ changes

- decreased desirable effects of pharmacotherapy
- increased adverse effects

homeostasis changes

- decreased capacity to respond to physiological challenges and the adverse side effects of drug therapy (*eg.,* orthostatic hypotension)

Adverse Drug Reactions

The elderly are 2–3 times more at risk for adverse drug reactions due to:

- reduced stature
- reduced renal and hepatic functions
- cumulative insults to the body (*eg.*, disease, diet, drug abuse)
- higher number and potency of medications
- altered pharmacokinetics
- noncompliance

Common problems of drug administration in the elderly

- **reduced homeostasis**
  - decreased renal and hepatic functions
  - increased target organ sensitivity
- **polypharmacy**
  - increased chance of adverse drug reactions
- **lack of available data**
  - fewer clinical trials on elderly populations
- **non-compliance**

Considerations for pharmacotherapy in the elderly

- Is drug therapy required?
- choice of appropriate drug and preparation
- dosage regimen to accommodate changes in physiology
- detailed monitoring and periodic re-evaluation of drug therapy
- clear and simple instructions

Summary

- changes in the physiology of the elderly alter responses to drug therapy
- pharmacokinetic changes affect the effective concentration of drug in the body
- pharmacodynamic changes alter the body's response to the drug therapy
- adverse drug reactions are more common in the elderly and can be avoided with better primary care