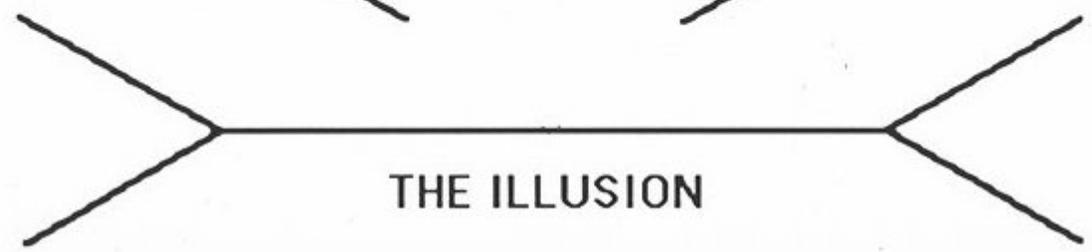
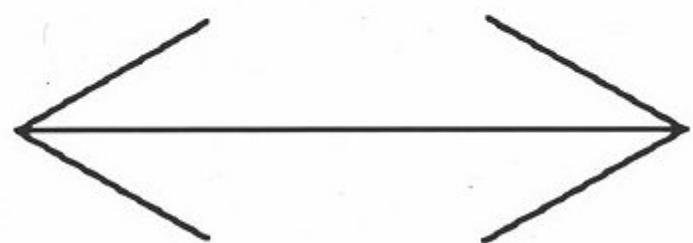


Optical Illusions!

**And their relationship to science,
biology, and pharmacokinetics today**



THE EYEBALL FIXES



THE ILLUSION

Eyes go to bends in lines

- Acute angle – look inside
- Obtuse angle – look further inside
- End of a line – look just inside the end
- The common illusion – look inside when arrows turn in, but outside when arrows turn out. Proprioceptive information from eyeball fixes is used to estimate the length of the line.

True or an Illusion?

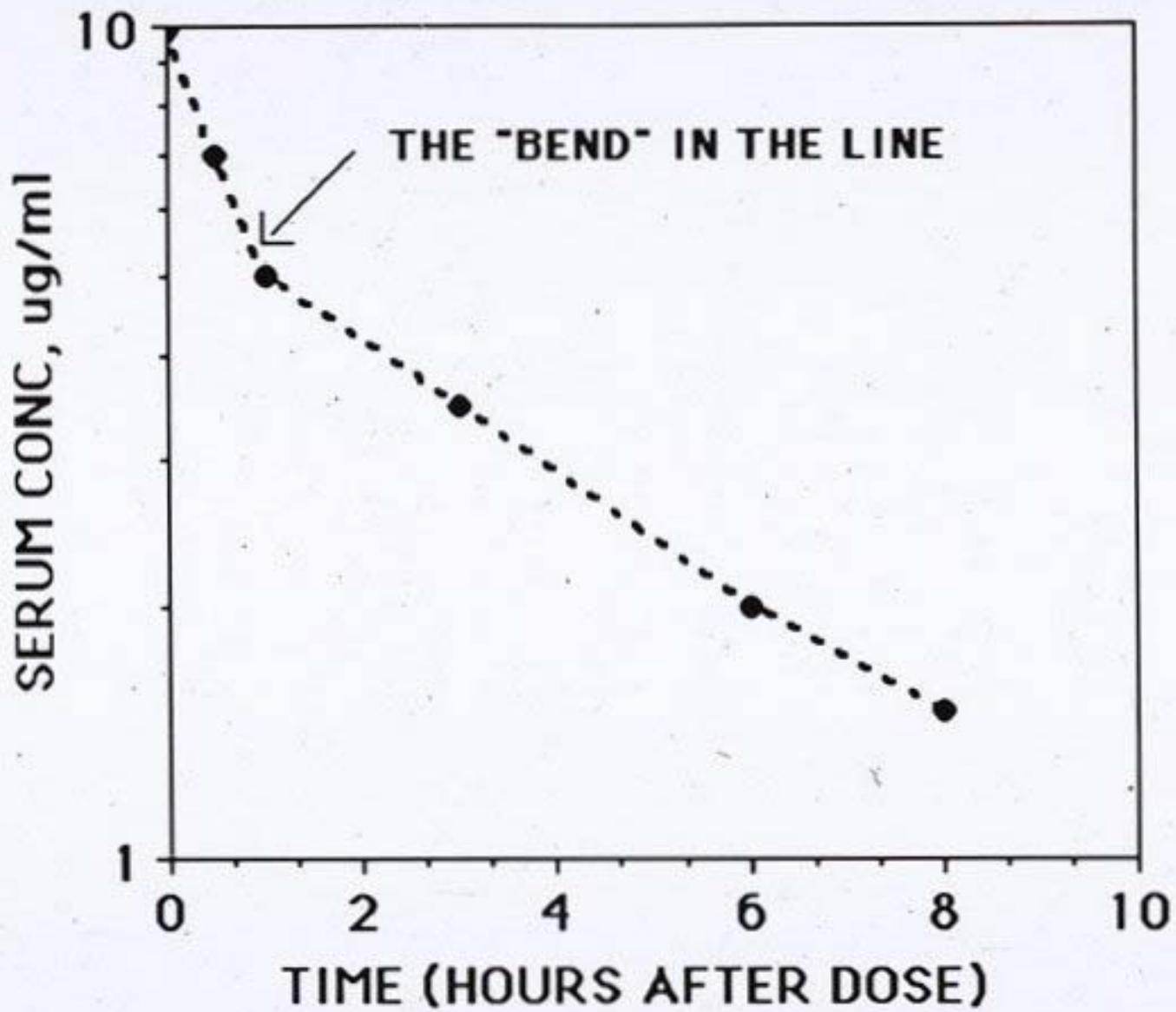
- You have to wait for a steady state before starting TDM.
- You have to wait for distribution to be complete after a dose before getting a serum sample.
- Assay CV% is a good measure of precision.
- You have to lose about 2/3 – 3/4 of your renal function before serum creatinine begins to rise significantly.
- The therapeutic range begins when the incidence of therapeutic effects becomes significant.
- The toxic range begins when the incidence of toxic effects becomes significant.
- The cutoff between therapeutic and toxic serum digoxin concentrations is 2.0 ng/ml.

You have to wait for a steady state before starting TDM.

- **Comes from linear regression on logs of levels.**
- **Not needed any more.**
- **NLLSq and Bayesian fitting are free of this restriction.**

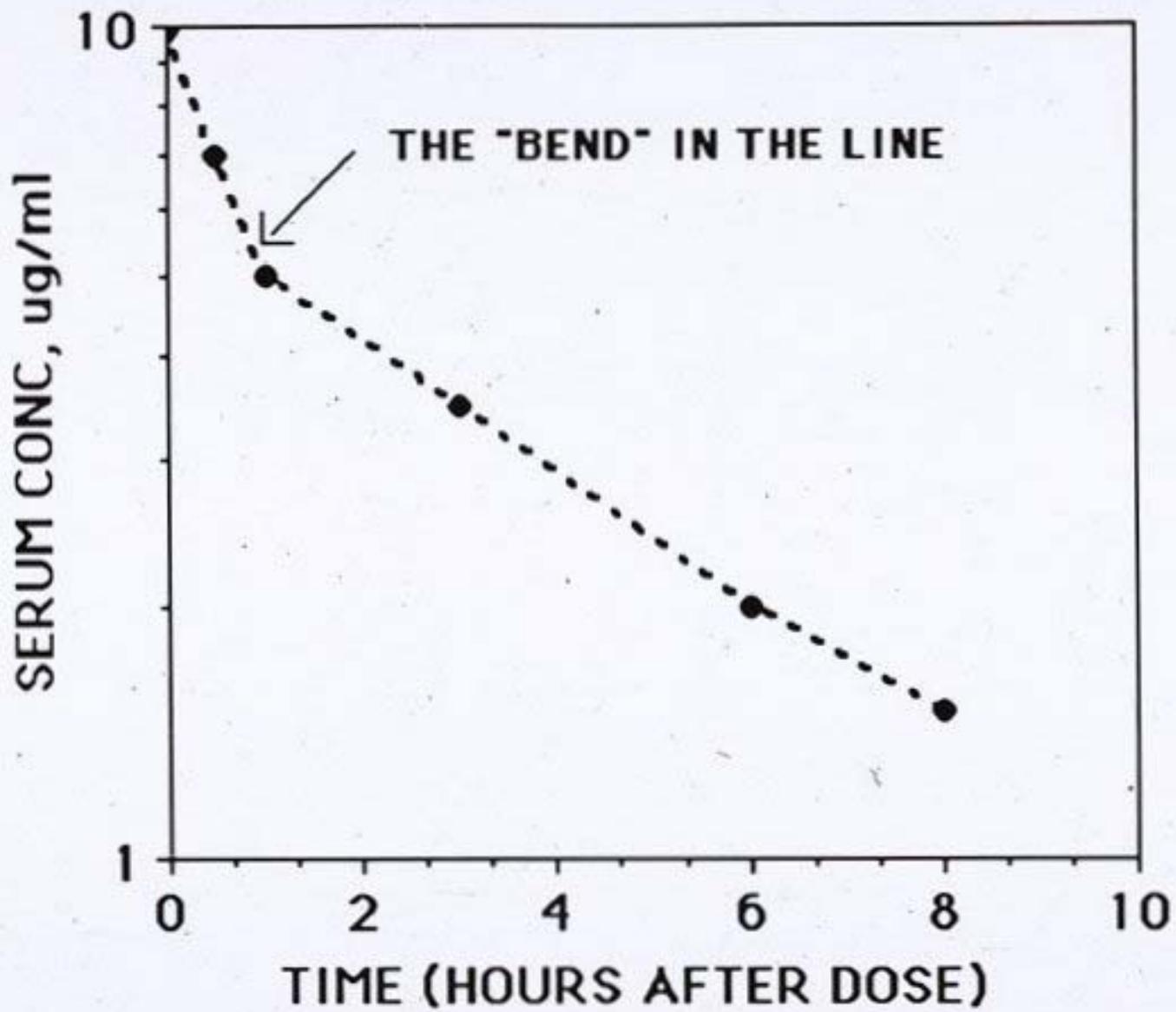
You must wait for complete distribution after a dose before getting a sample.

- **Again, comes from linear regression on logs of levels.**
- **Not needed any more.**
- **NLLSq and Bayesian fitting are free of this restriction.**



**The best times to get samples
are at the “peak” and the trough**

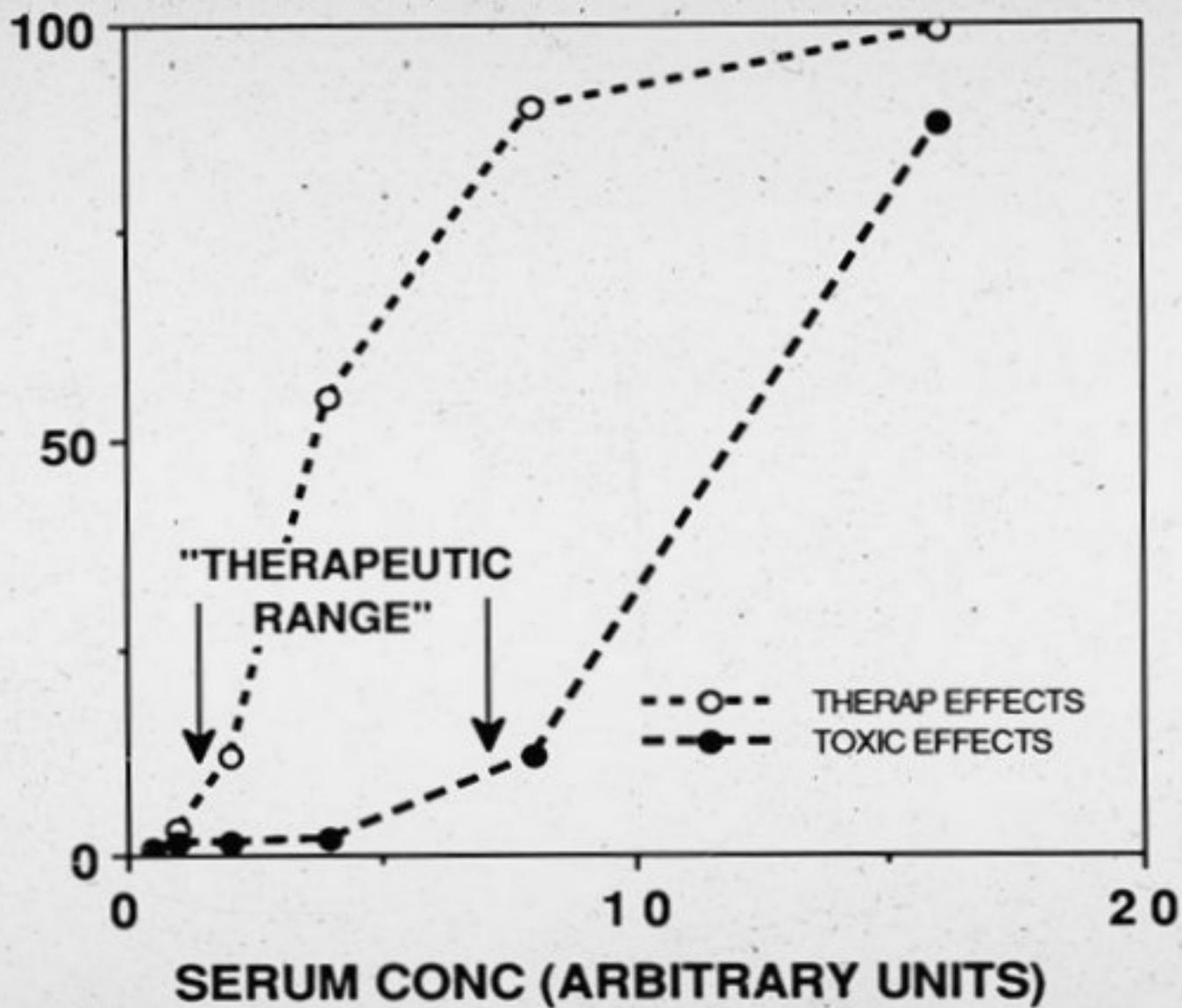
- Again, look at the illusory figure, and we will talk about this more



A constant assay CV% is a good measure of assay precision.

- SD or variance is a much better index.
- See section of assay errors.

PERCENT RESPONSE, OR
EXPECTATION OF EFFECT



You have to lose about 2/3 – 3/4 of your renal function before serum creatinine begins to rise significantly.

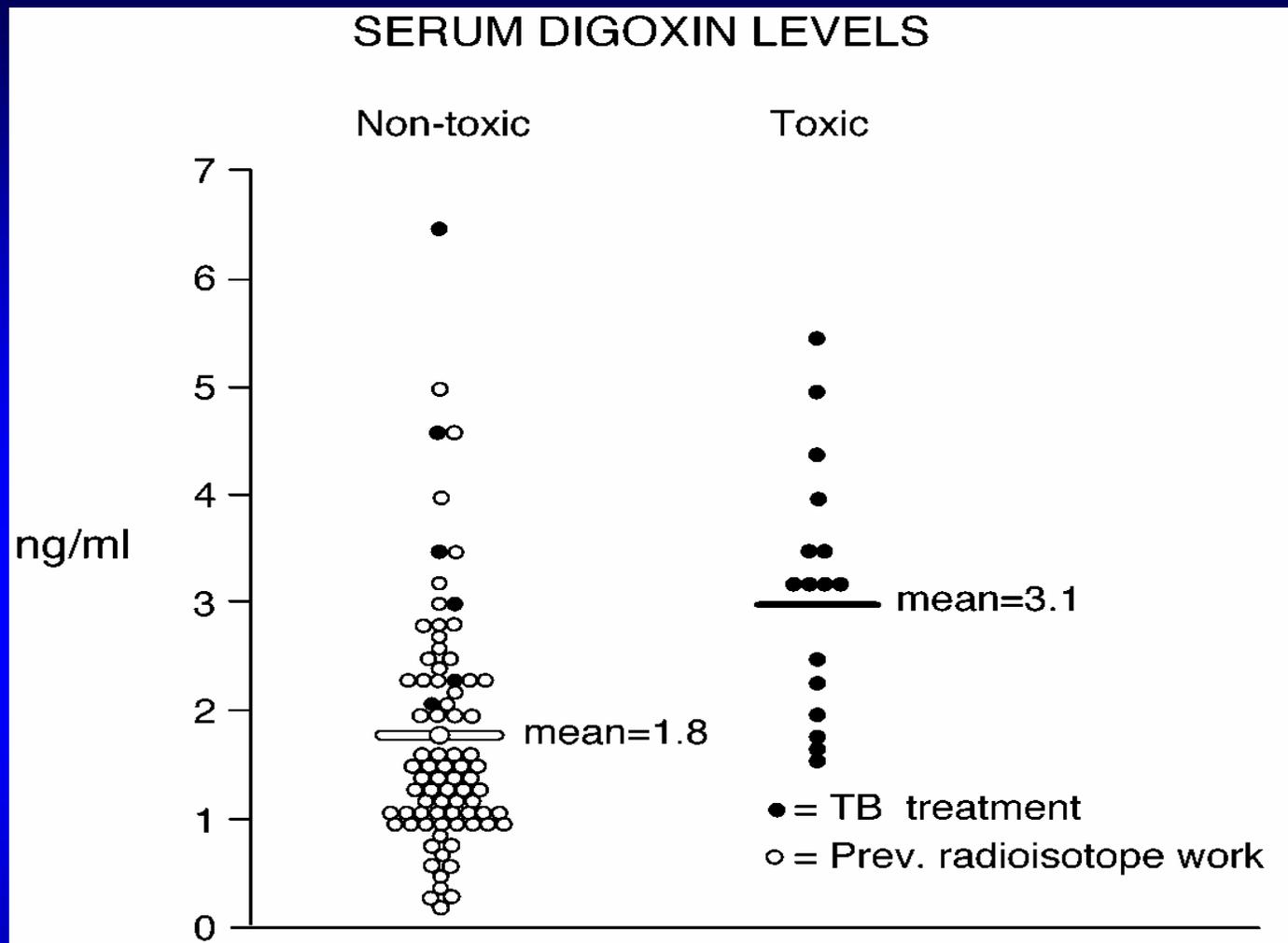
- Hyperbolic relationship between serum creatinine and CCr.
- See where the bend in the line is.

The therapeutic/toxic range begins when the incidence of therapeutic/toxic effects becomes significant.

- **See the visual illusion**

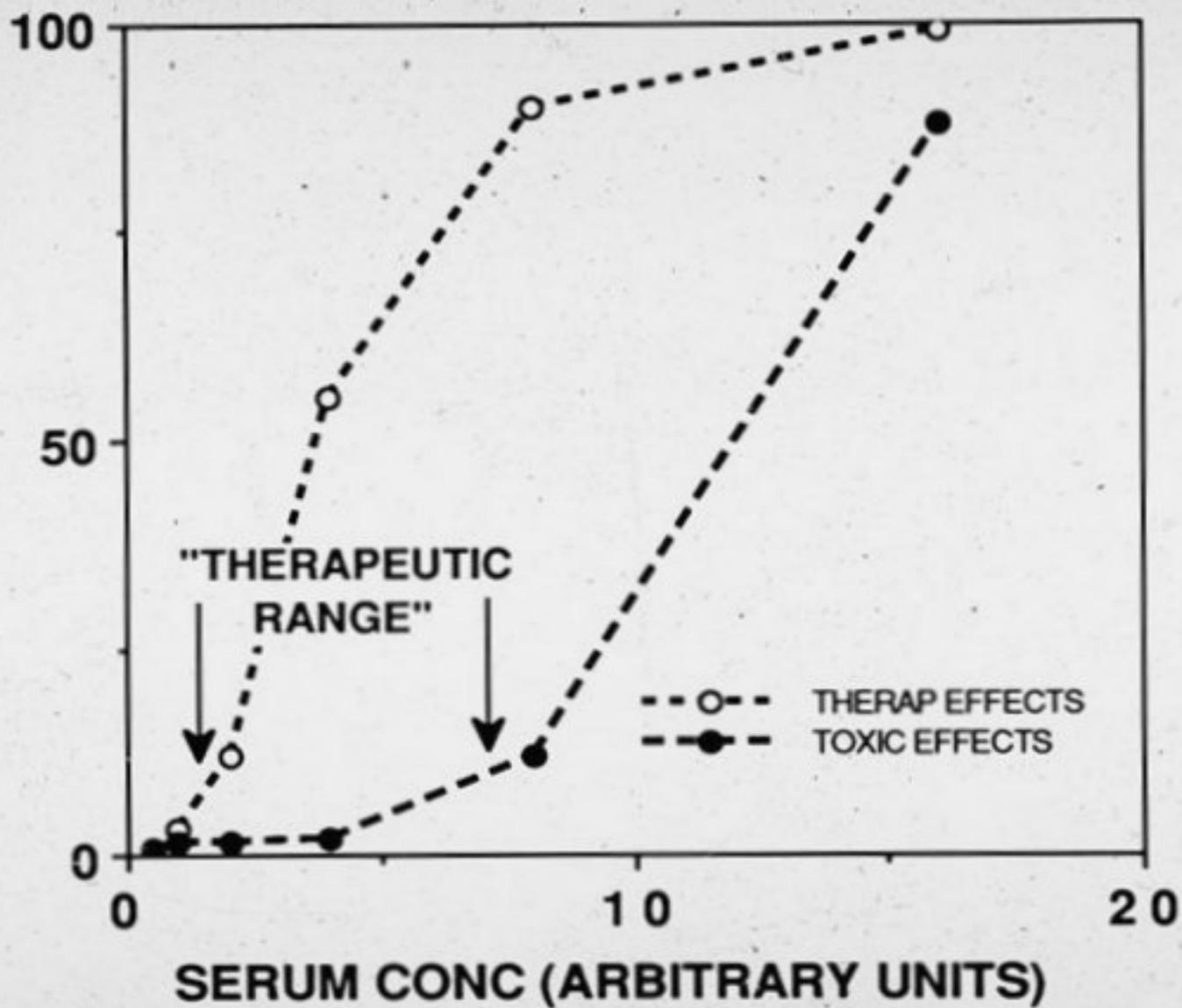
The cutoff between therapeutic and toxic serum digoxin concentrations is 2.0 ng/ml.

- **Look at the figure**



Serum digoxin concentrations in nontoxic and toxic patients found by Doherty [1]. Note great overlap between therapeutic and toxic concentrations, and the fact that approximately half the patients with serum levels of 3.0 ng/ml or more were NOT toxic. Also note that the incidence of toxicity is very low for levels up to 1.0 ng/ml, moderate (though significant) for levels of 1.0 to 2.0, more above 2.0, but still only about 50% for levels of 3.0 ng/ml or greater.

PERCENT RESPONSE, OR
EXPECTATION OF EFFECT



Conclusions

- **Don't be fooled by what you see!**
- **Think about what is behind what you see.**