

The blood matrix:

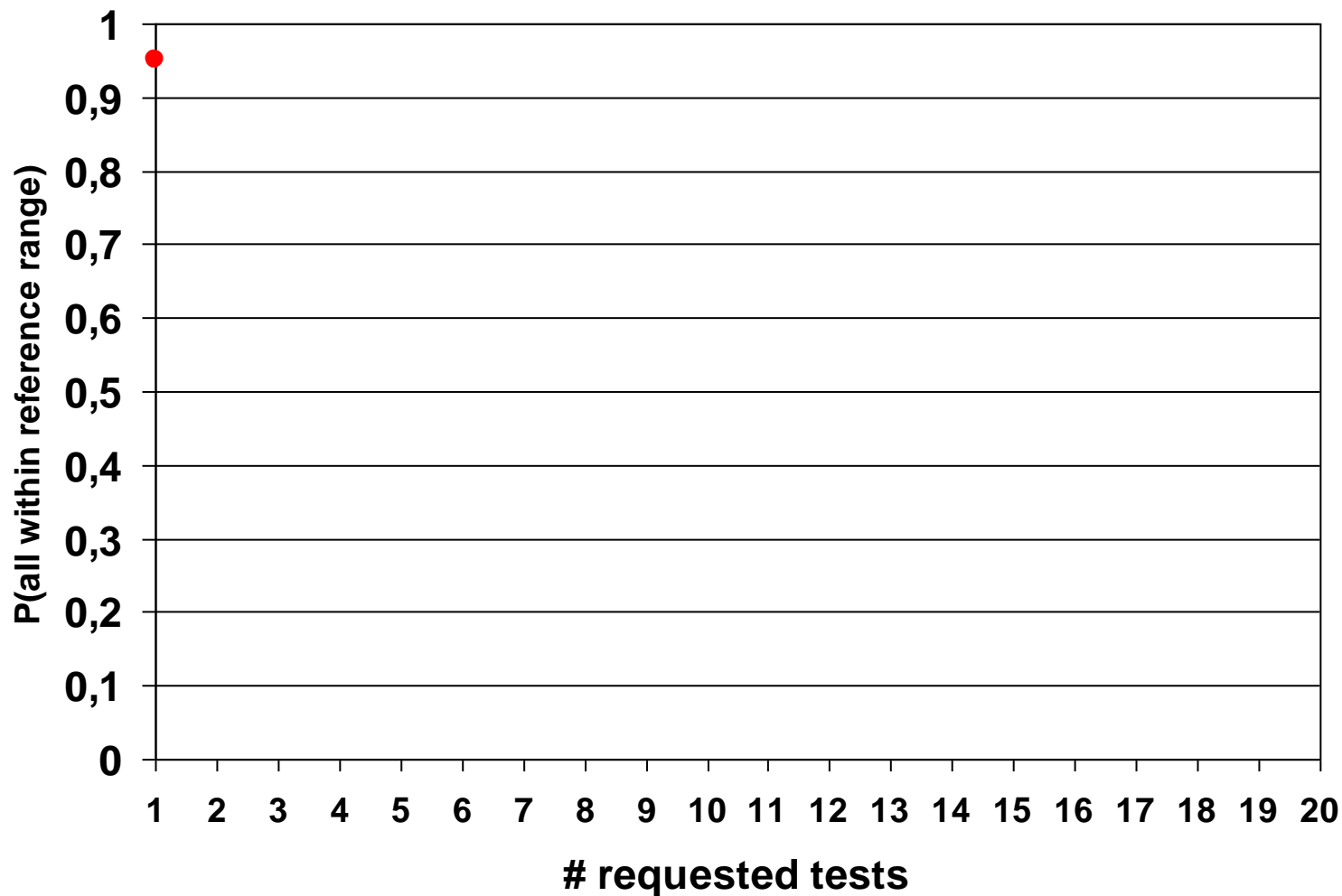
A dynamic mirror

**Albert Wolthuis
Leeuwarden
The Netherlands**

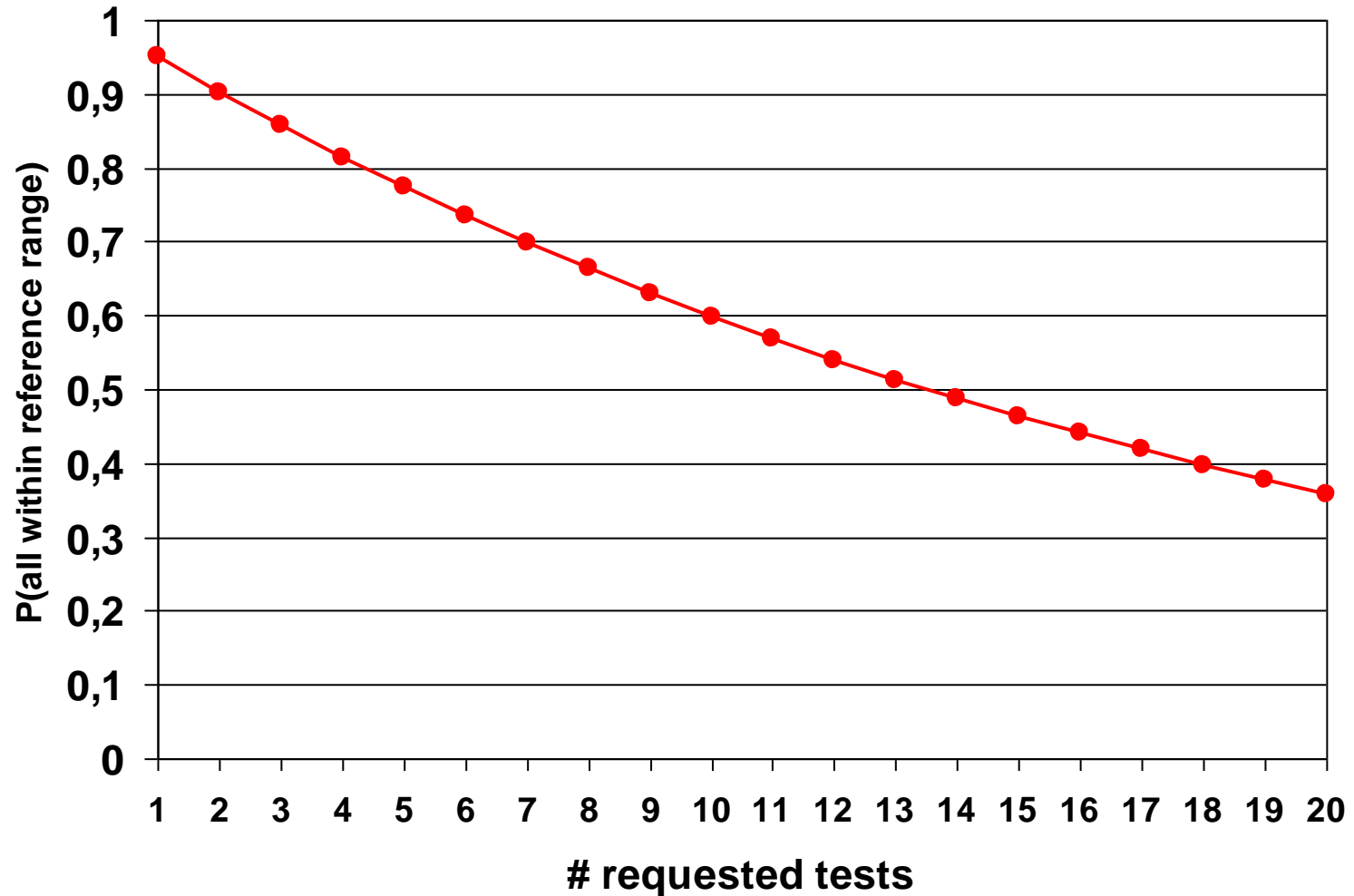




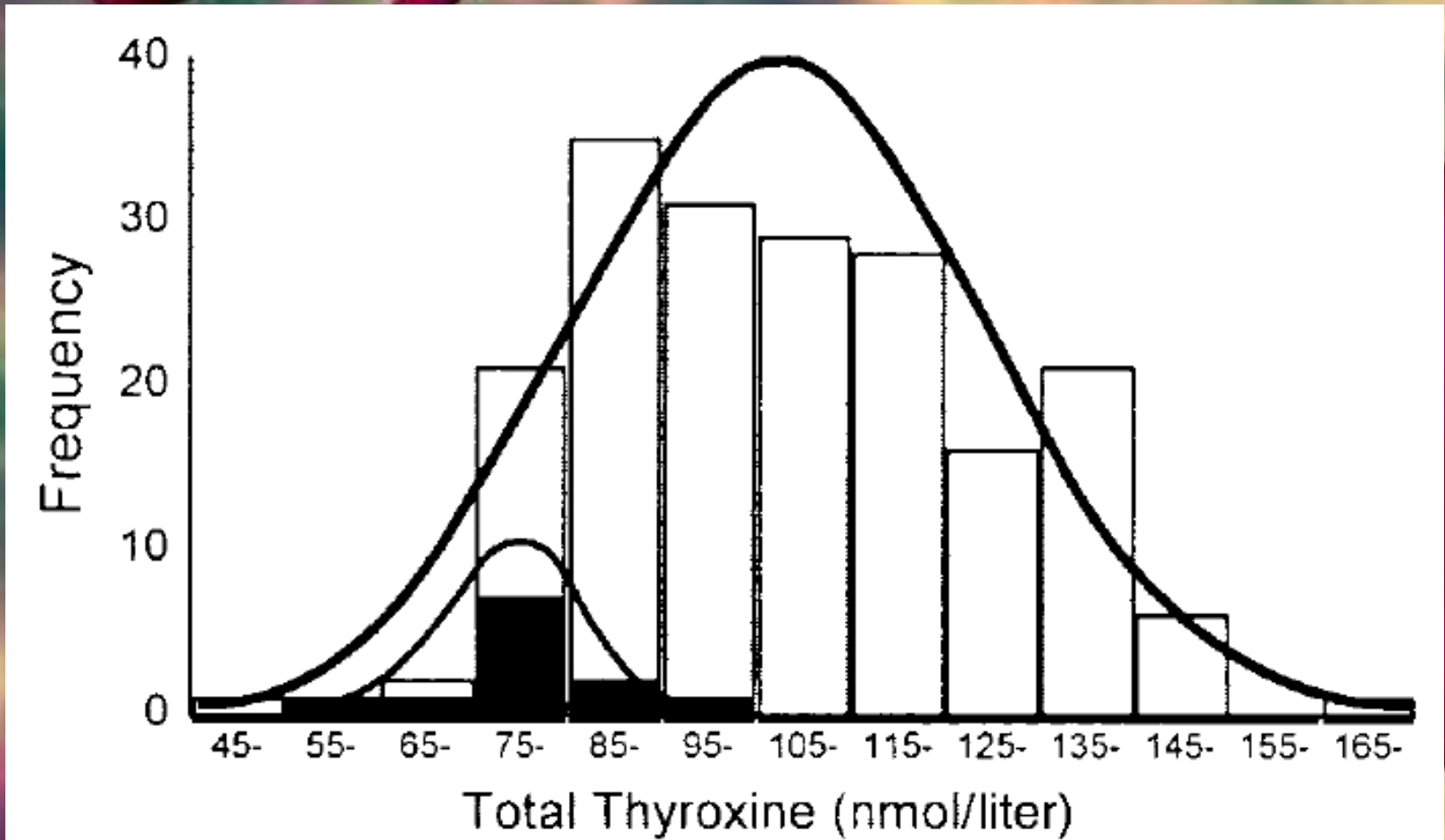
Most reference ranges are based on a normal distribution



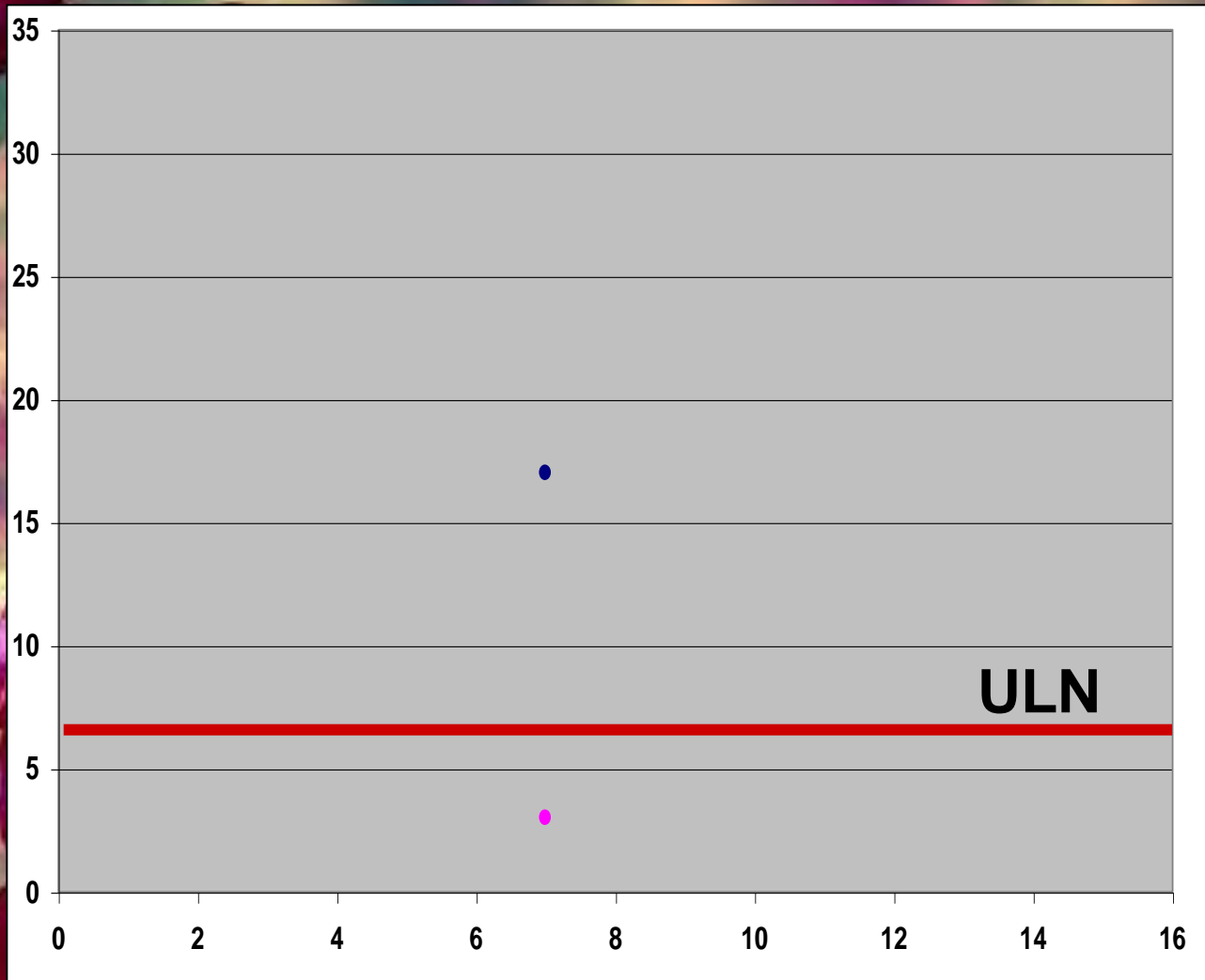
Abnormal laboratory results because of statistics?



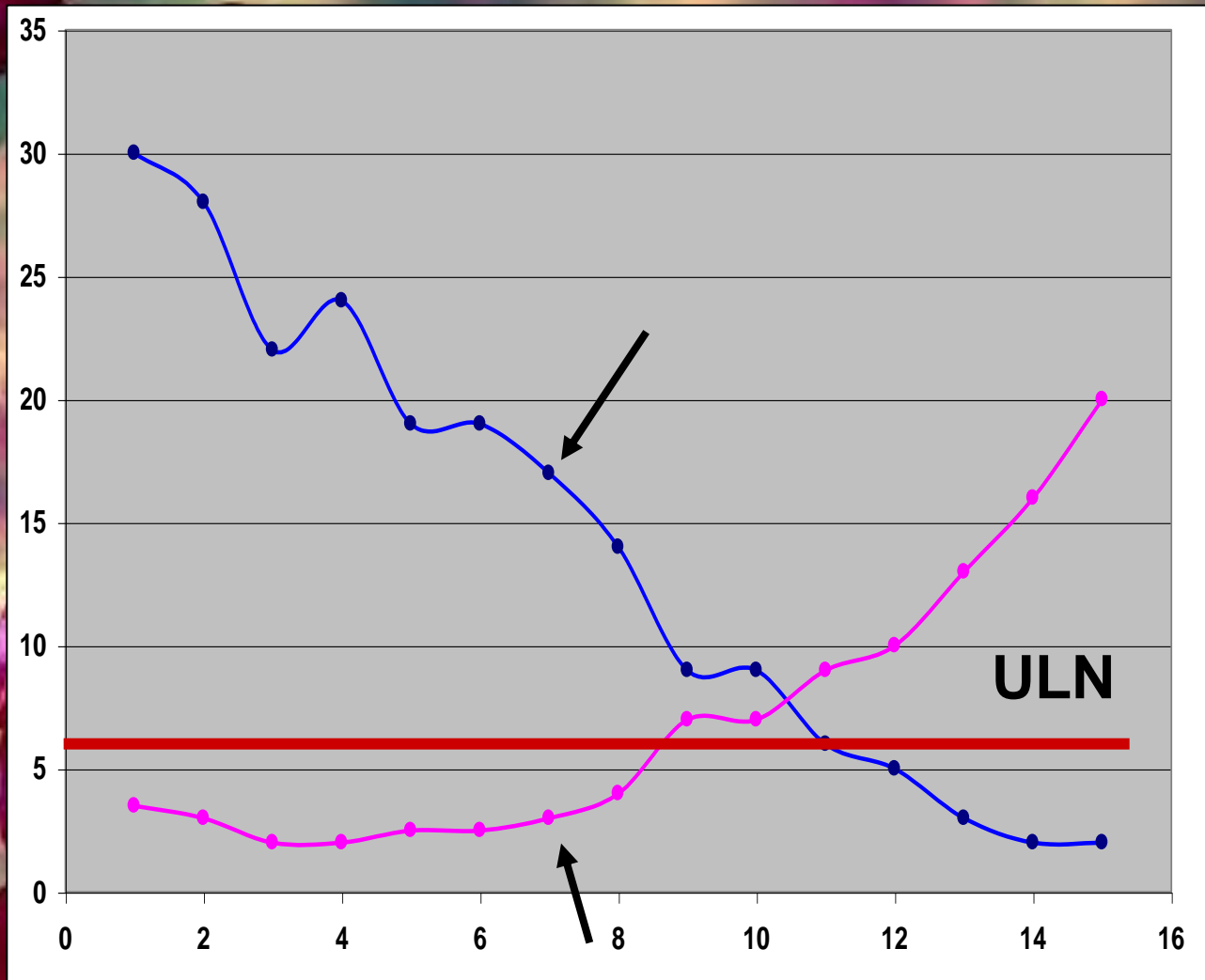
Reference ranges are population-based



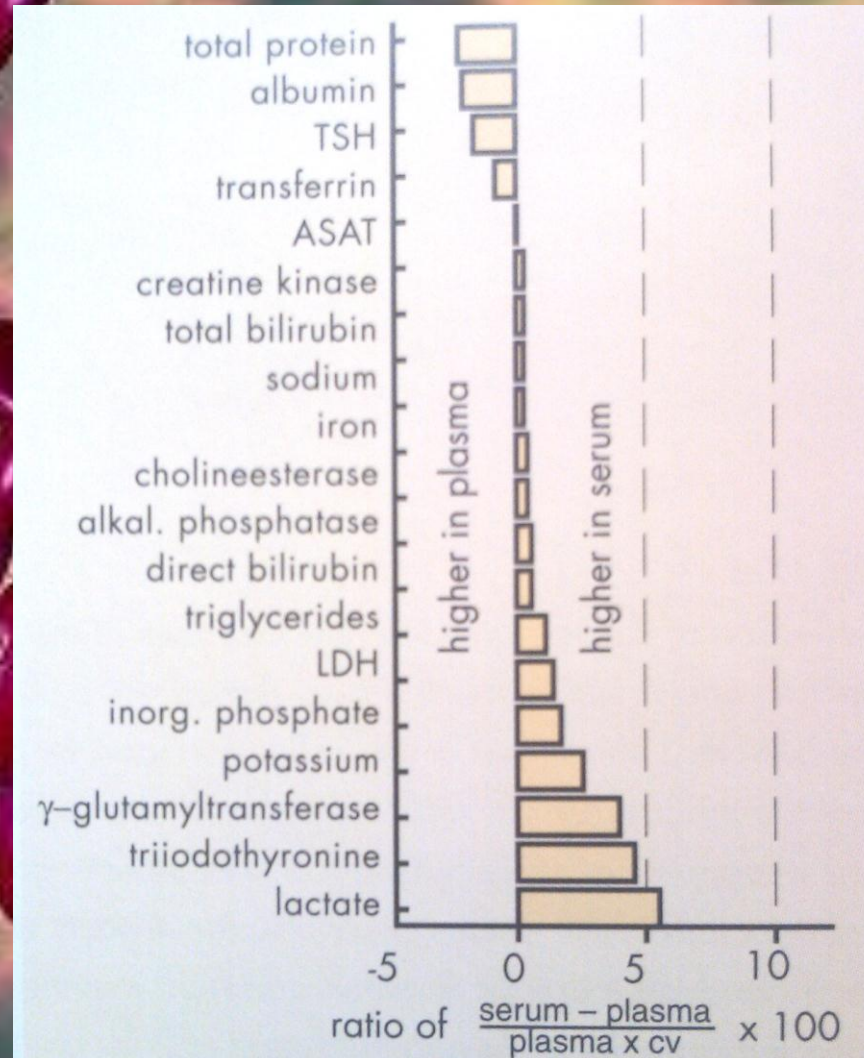
What is “normal”



What is "normal"



Serum or plasma



matrix (in analysis)

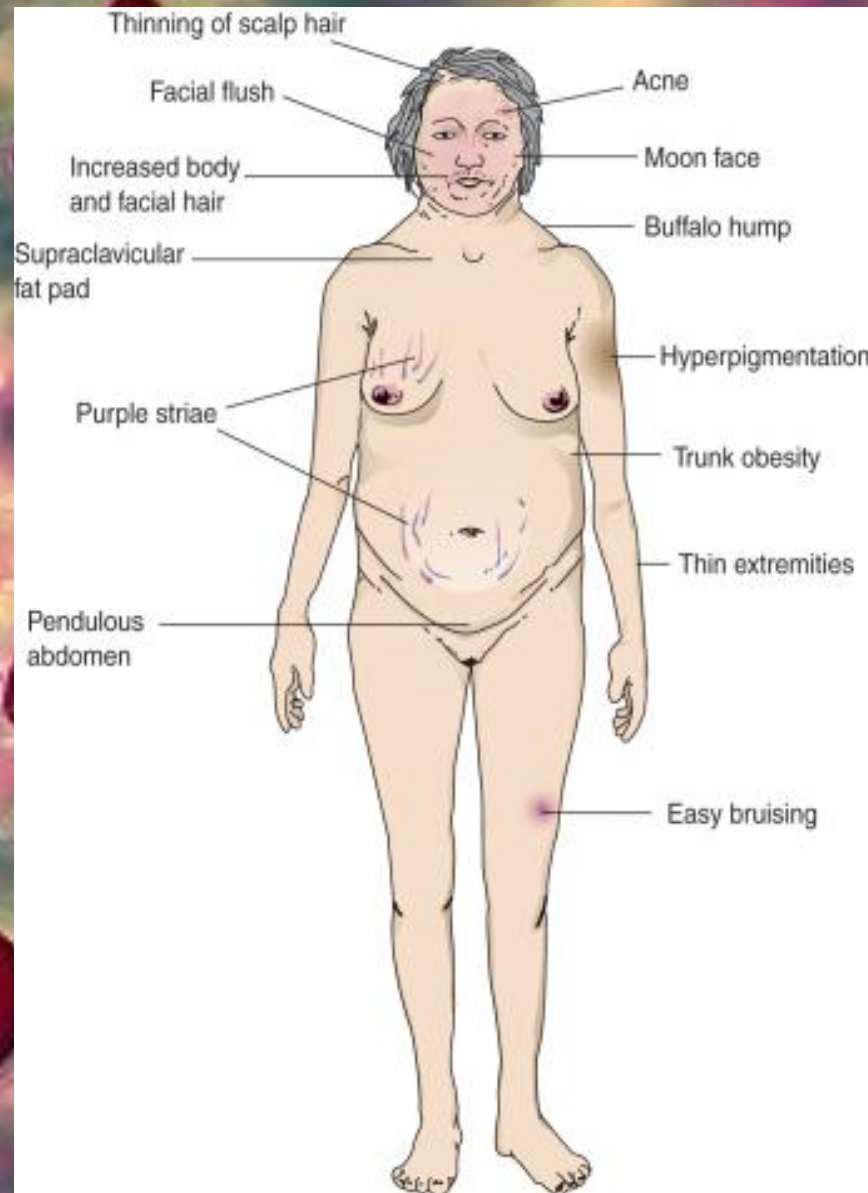
The components of the sample other than the analyte.

matrix effect

The combined effect of all components of the sample other than the analyte on the measurement of the quantity.

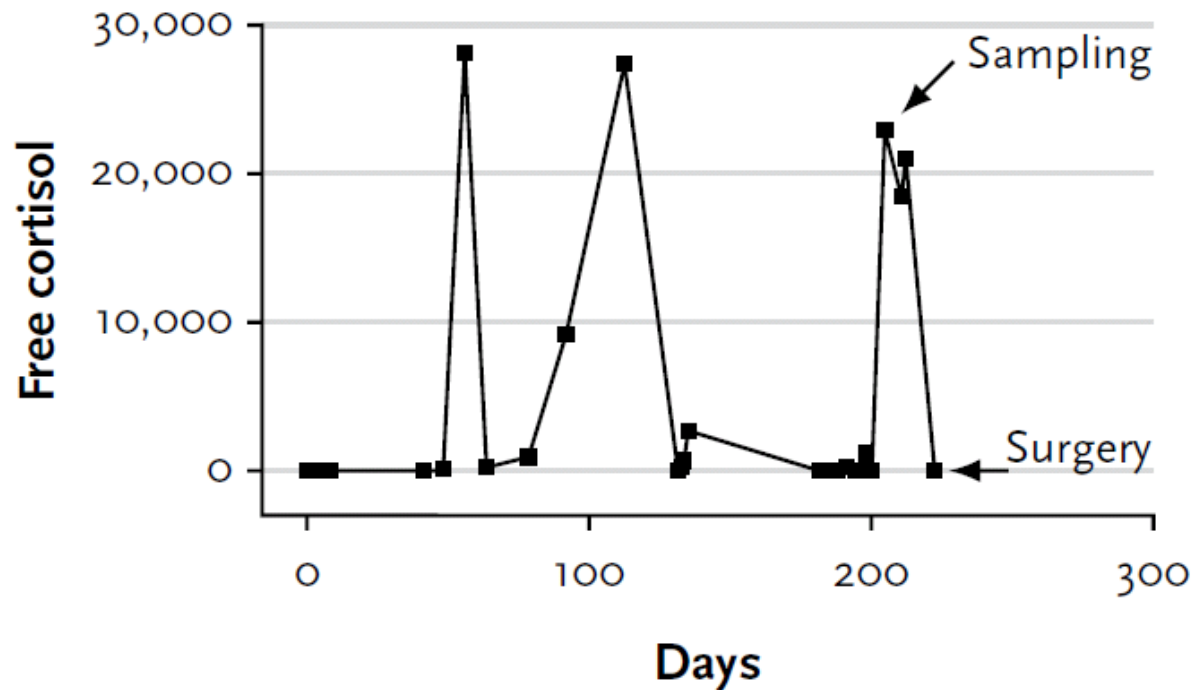
If a specific component can be identified as causing an effect then this is referred to as interference.

Cushing's syndrome: High cortisol levels



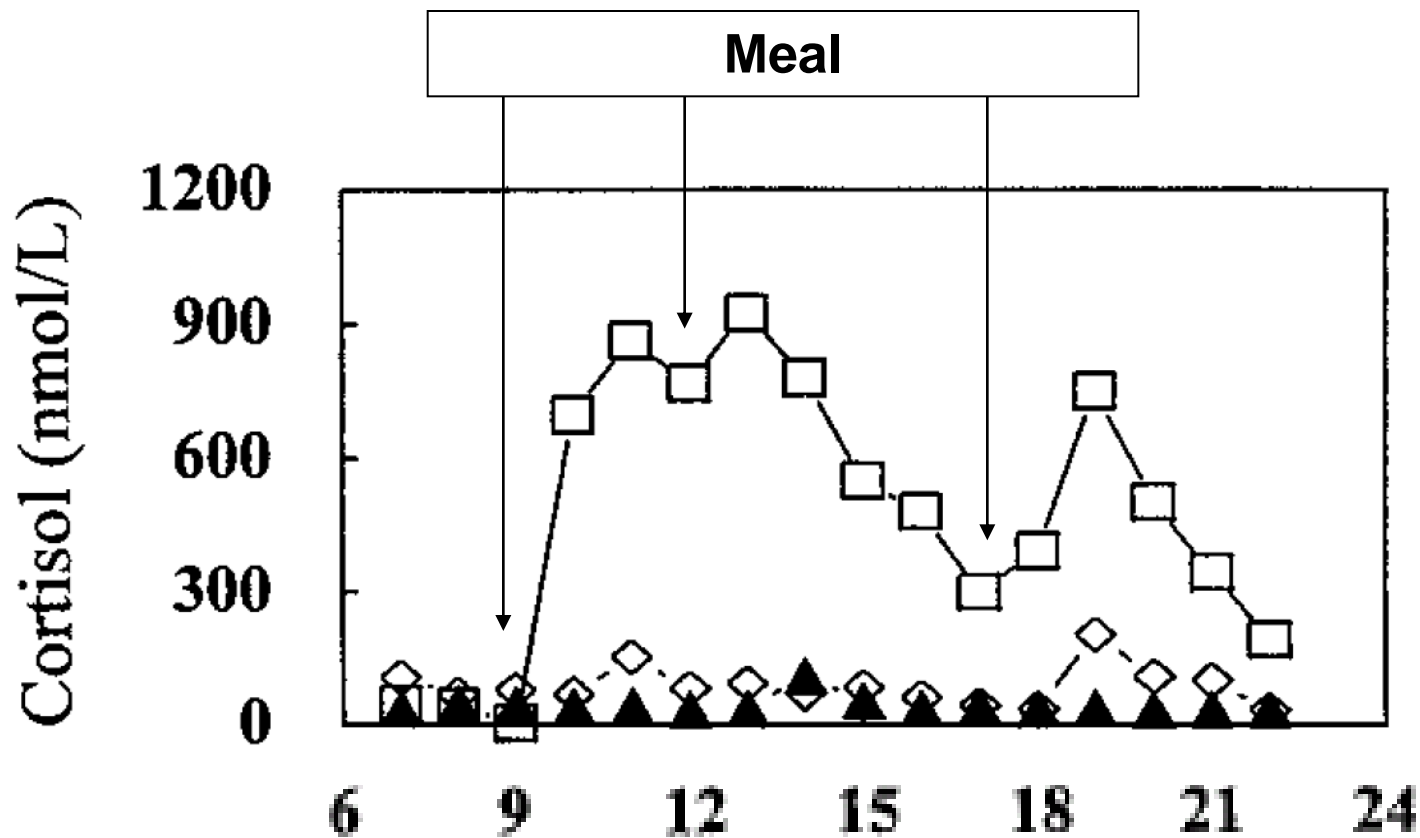
Cyclic Cushing

Figure 1. *Excretion of urinary free cortisol (nmol/24 h) before surgical removal of the thymic carcinoid*

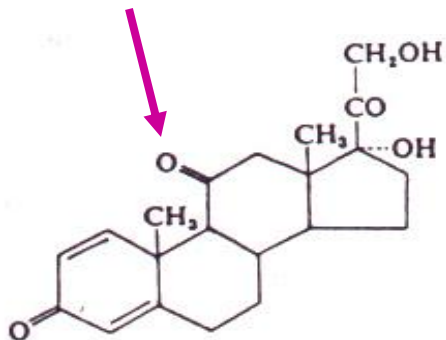


Meinardi J et al.

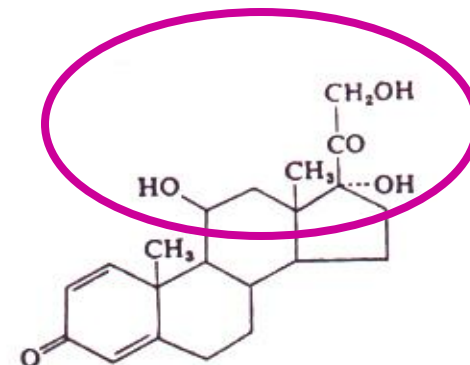
Neth. J. Med 2006 64: 23-27



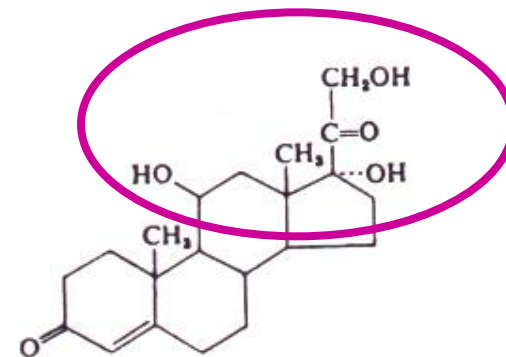
W.W. de Herder et al.
(J Clin Endocrinol Metab 81: 3168-3172, 1996)



Prednisone



Prednisolone

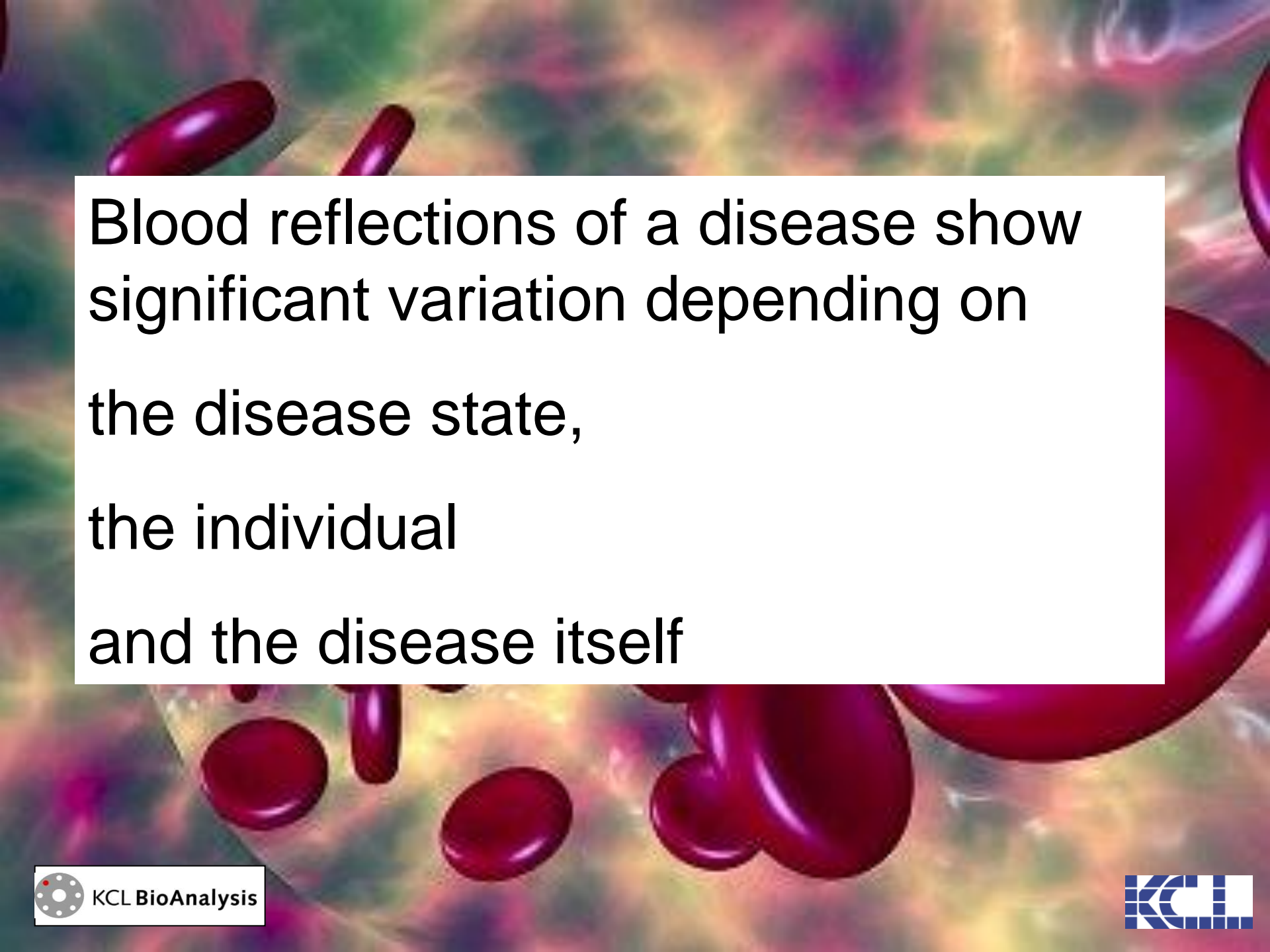


Cortisol

Immunological crossreactivity with cortisol:

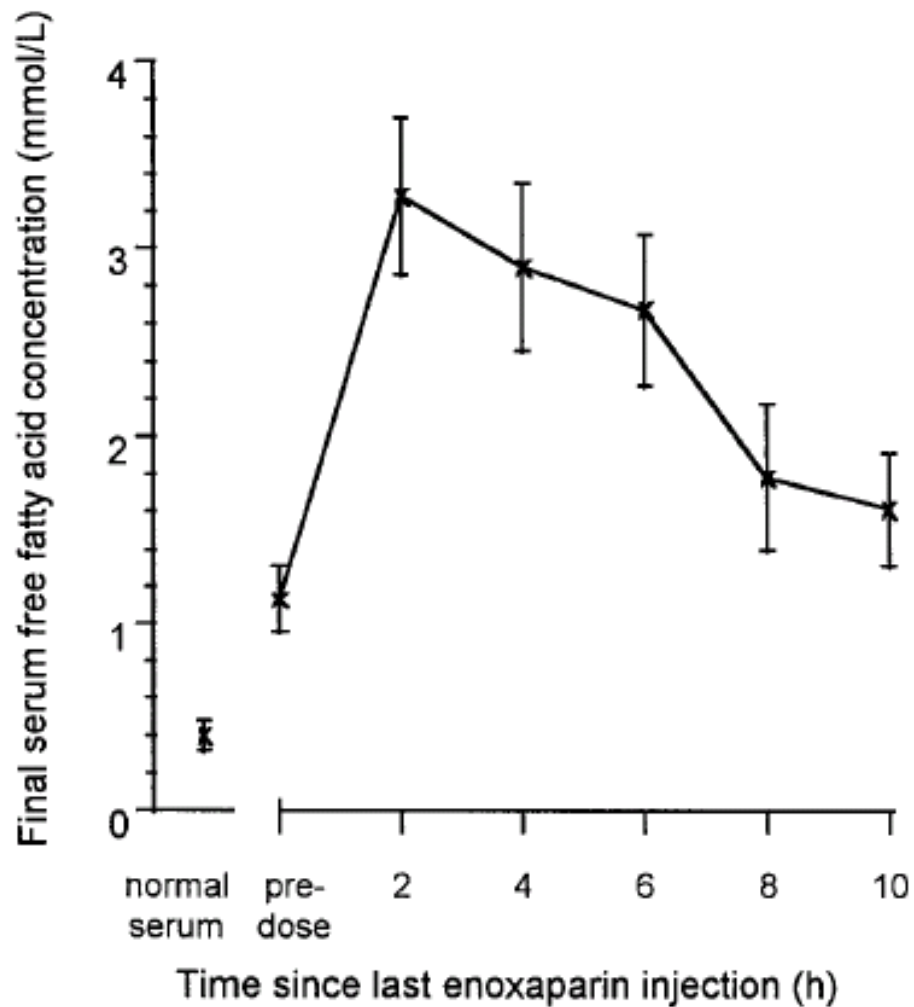
Prednisone 0,28%

Prednisolone 100 %

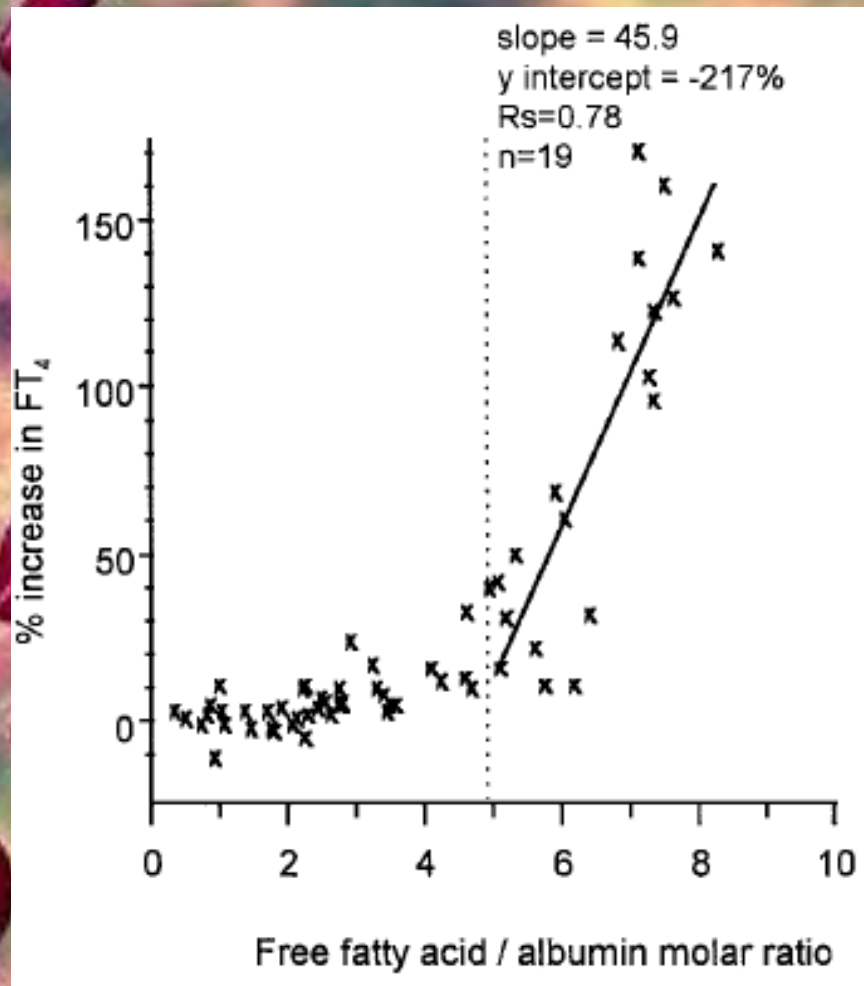
A microscopic view of red blood cells (erythrocytes) in a fluid medium. The cells are shown in various orientations and sizes, with some appearing as bright red discs and others as more elongated shapes. The background is a colorful, blurred mix of green, yellow, and purple, suggesting a complex biological environment.

Blood reflections of a disease show significant variation depending on the disease state, the individual and the disease itself

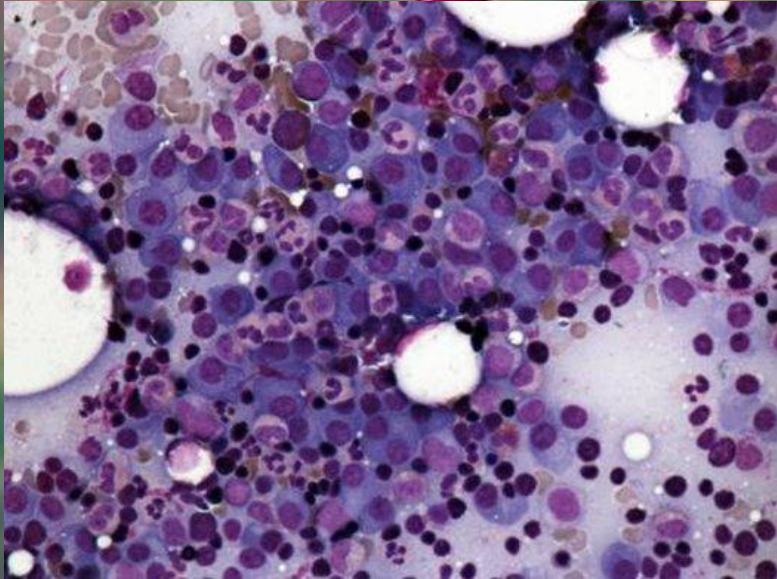
Free hormone measurements



Free hormone measurements

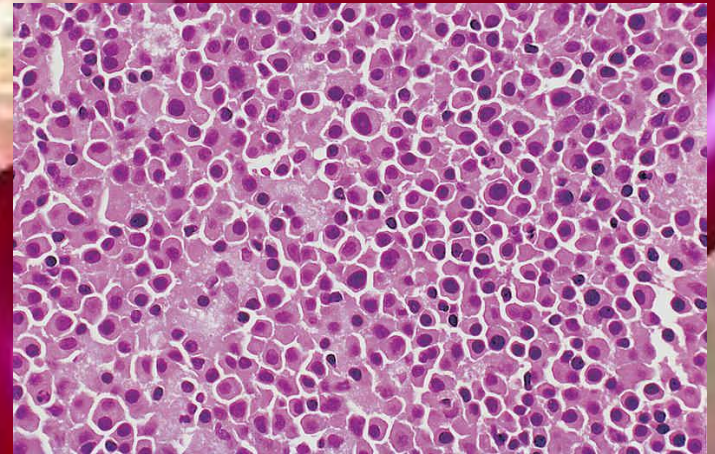


Plasmacytoma

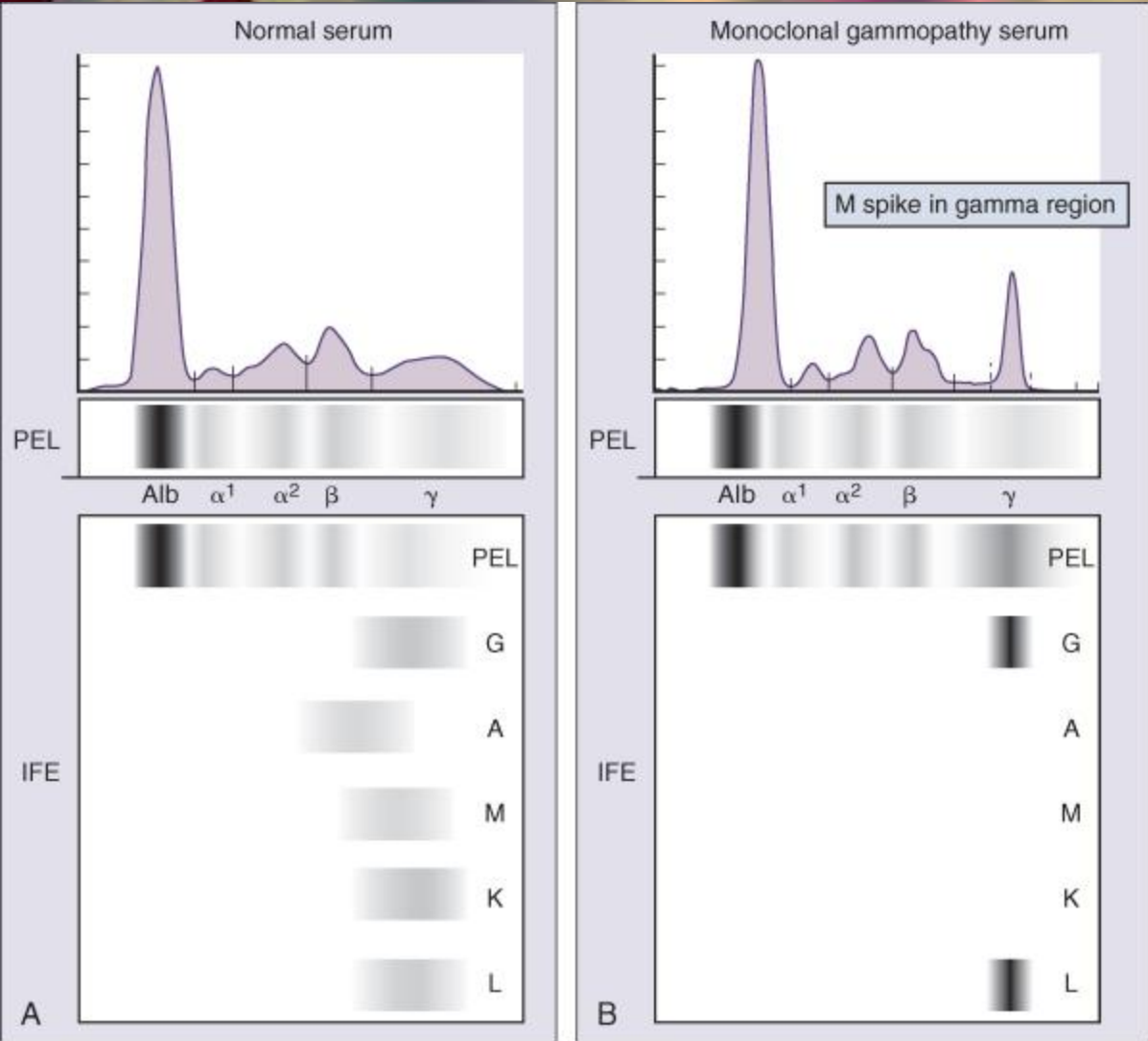


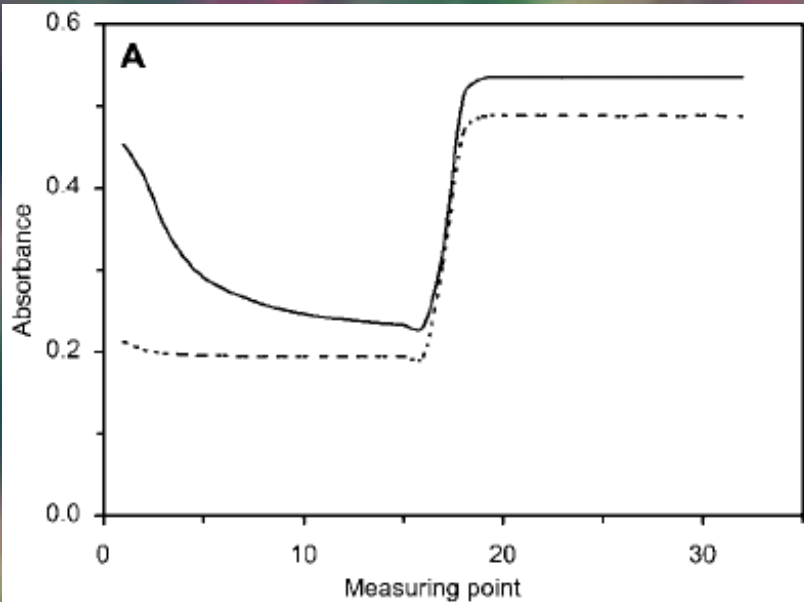
Bone marrow

Extramedullary: Nasopharynx region



Plasmacytoma



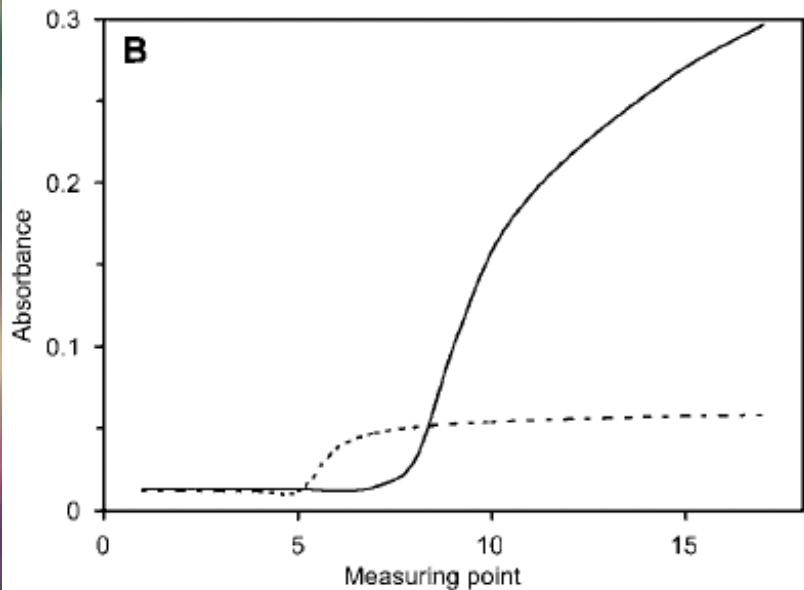


Glucose

(Roche-Hitachi Modular D)

—————: M-proteins

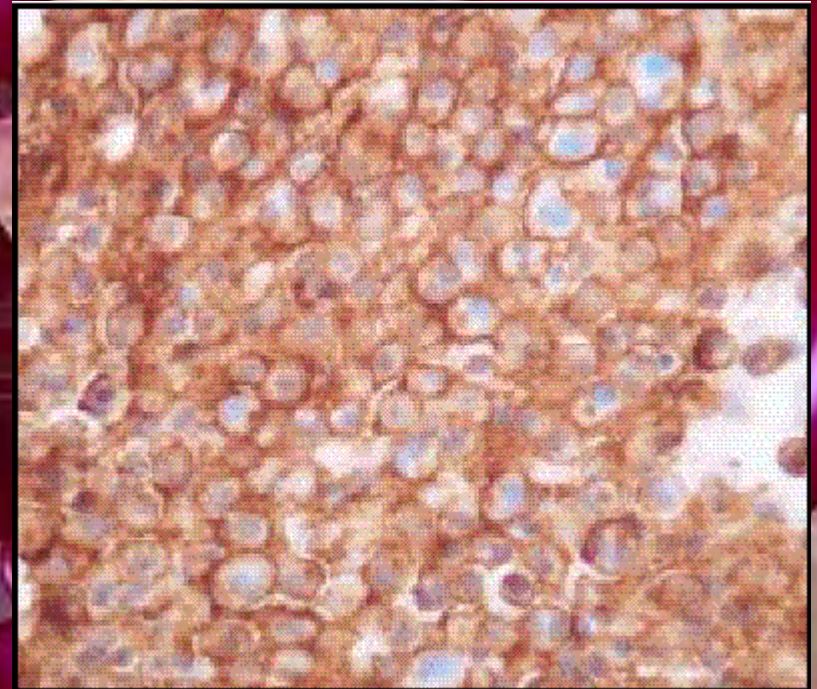
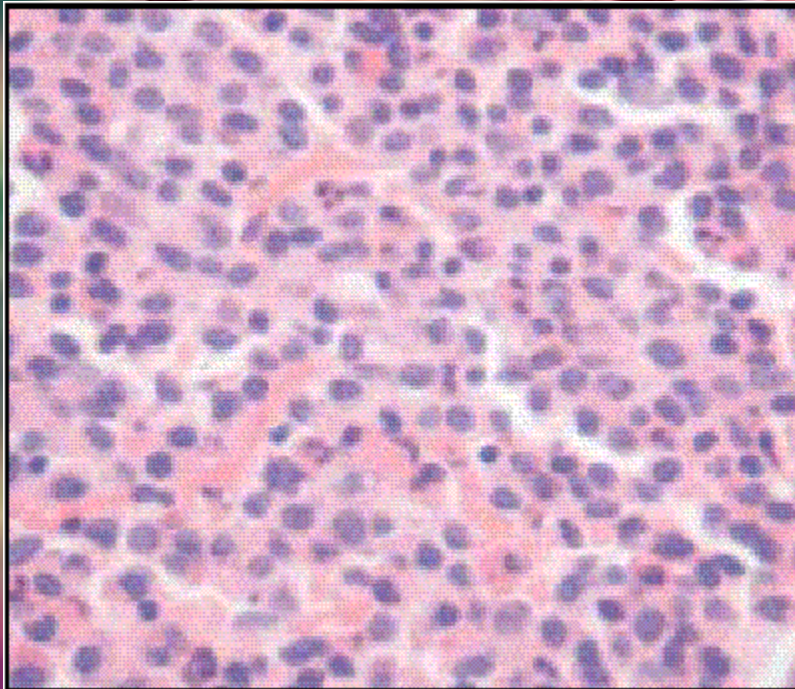
-----: No M-proteins



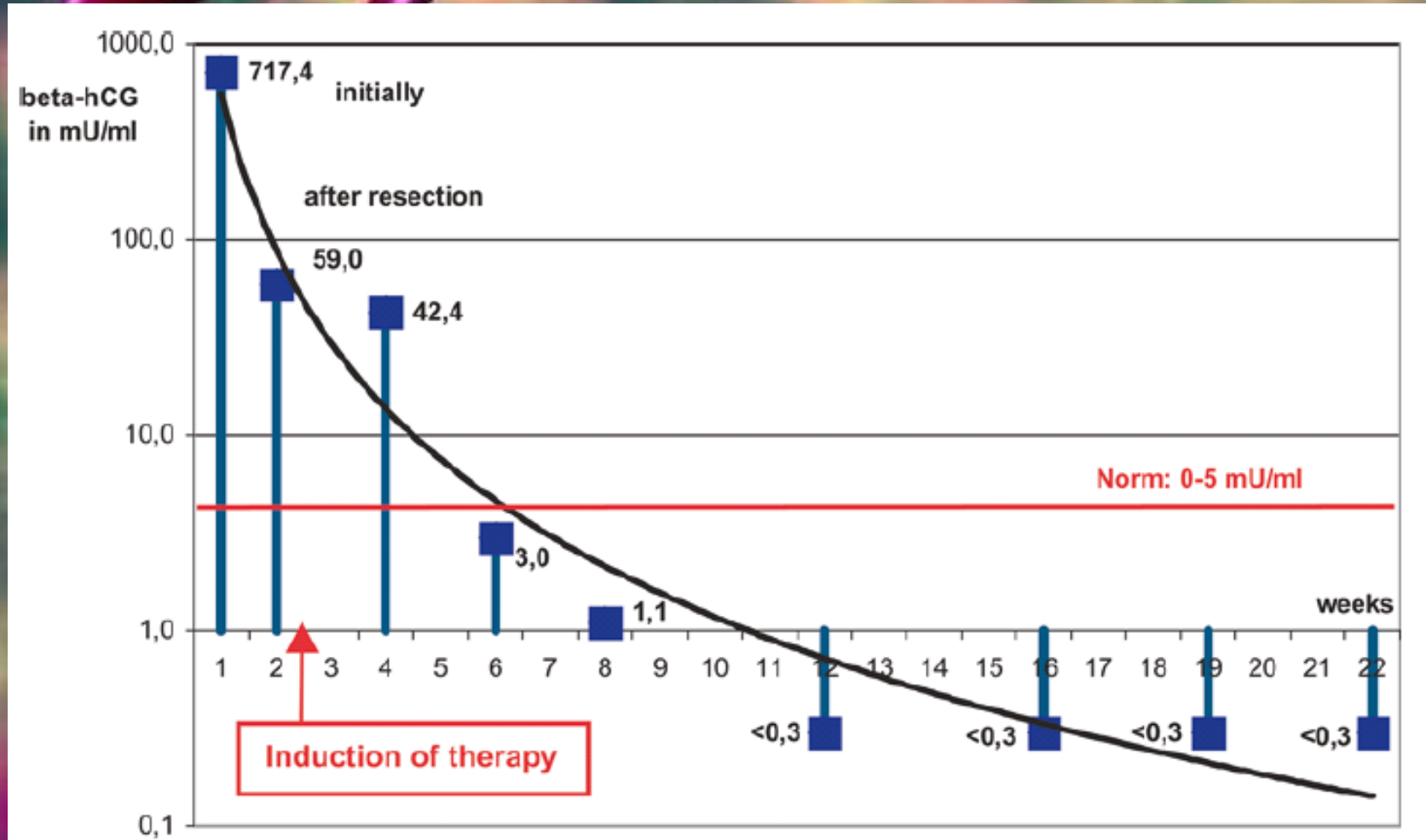
Total Bilirubin

(Roche-Hitachi Modular D)

Unexpected positive pregnancy test Case 1



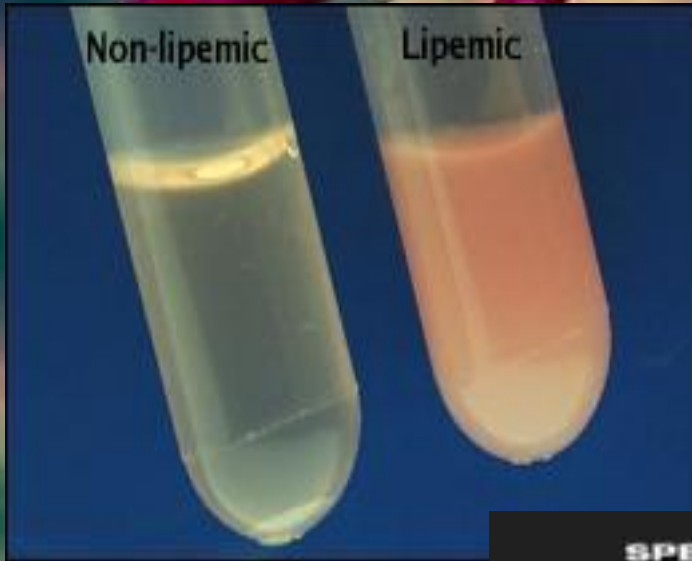
Unexpected positive pregnancy test Case 2



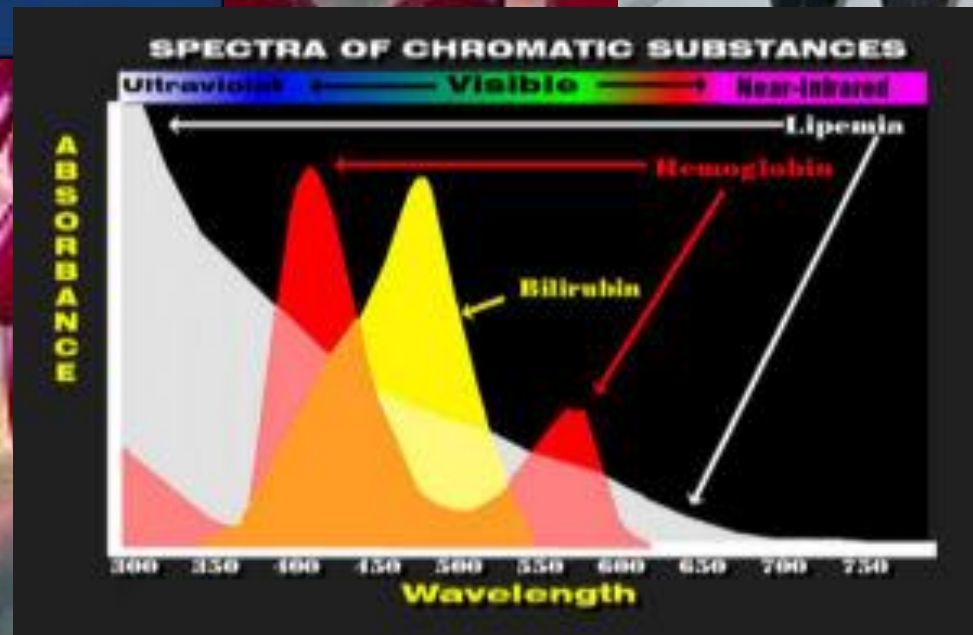
B. Leidinger et al.
J Cancer Res Clin Oncol (2004) 130: 357–361

Sample aspect

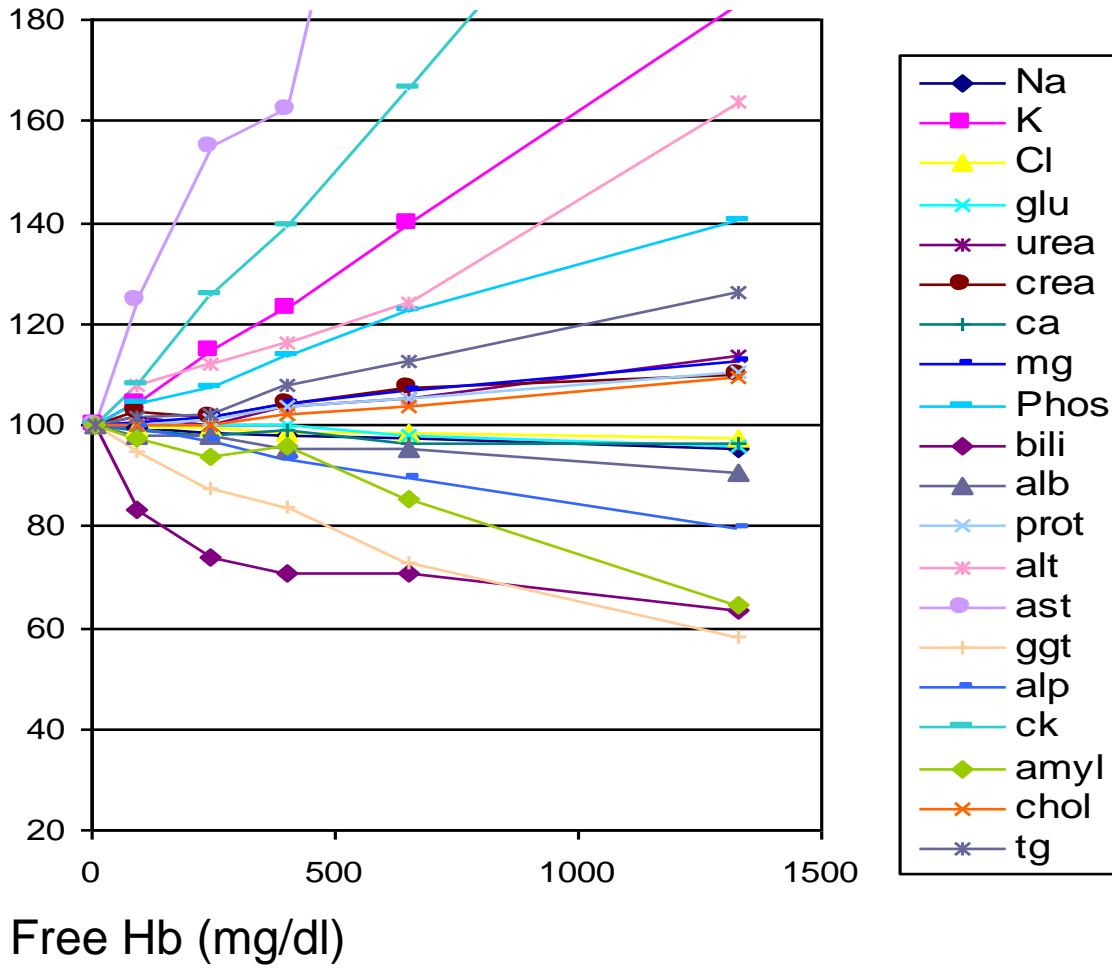
Lipemia: high triglycerides



Hemolysis: free hemoglobin



Hemolysis intra vascular or ex-vivo



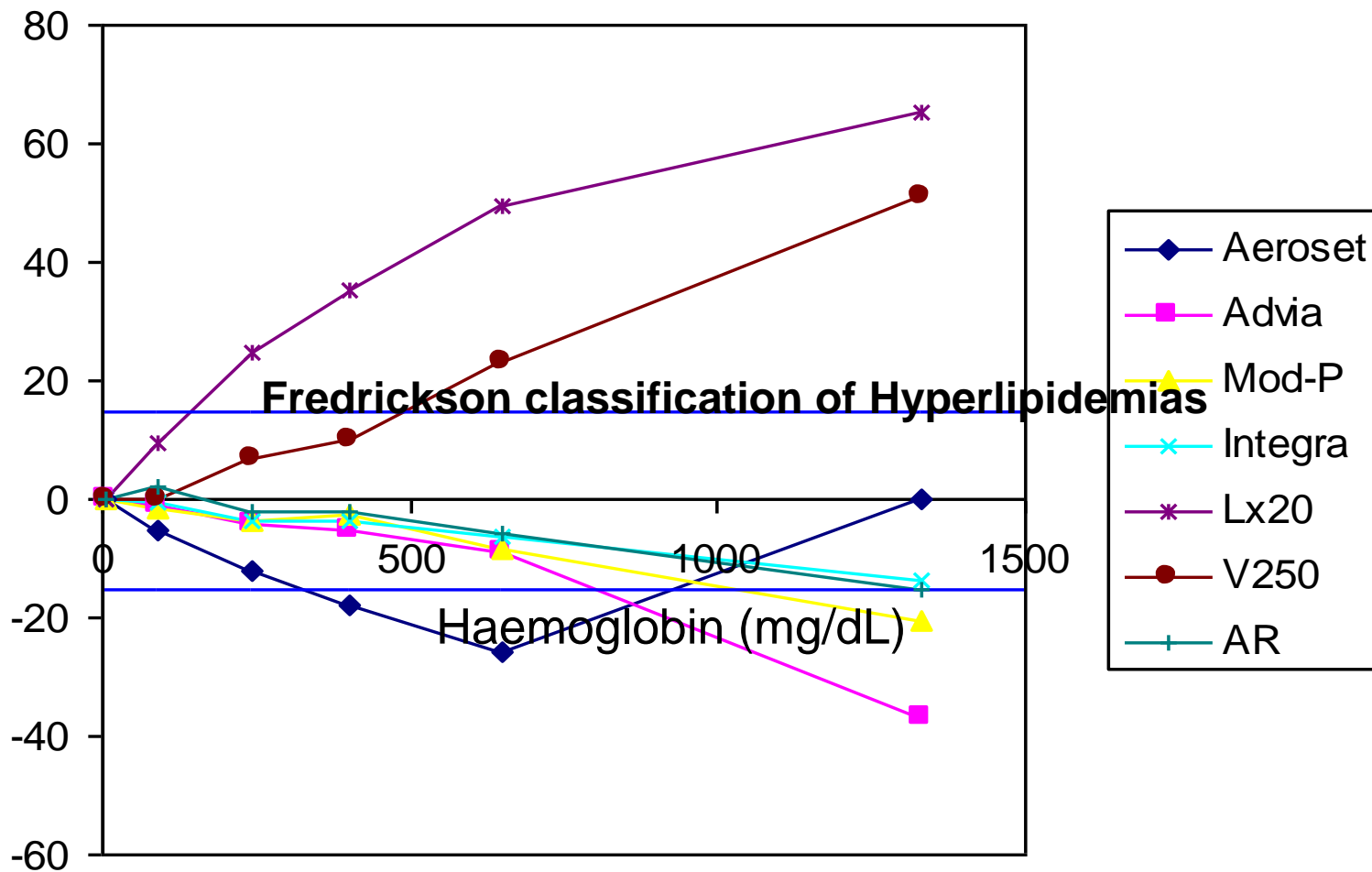
Roche Modular
<P>

Haemolysis

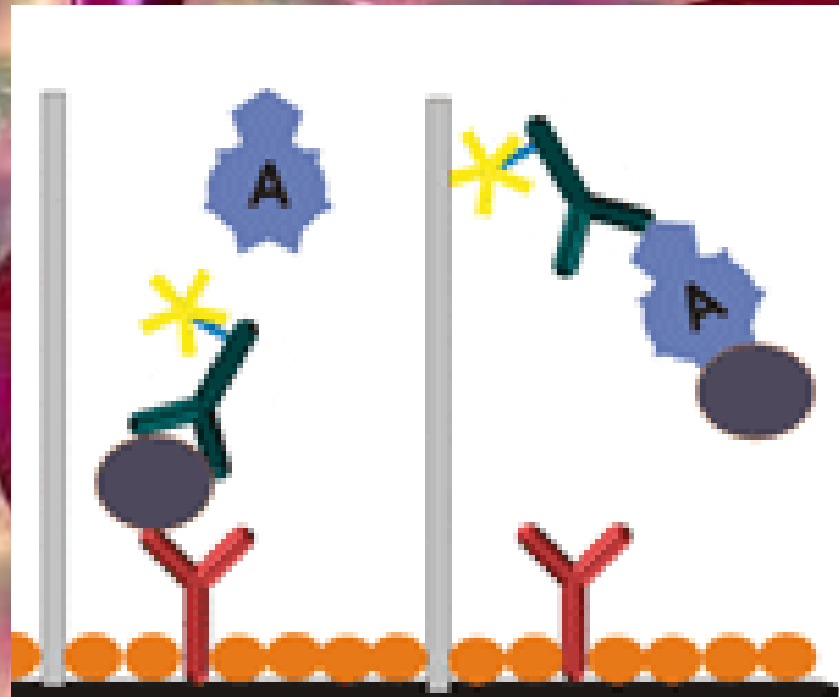
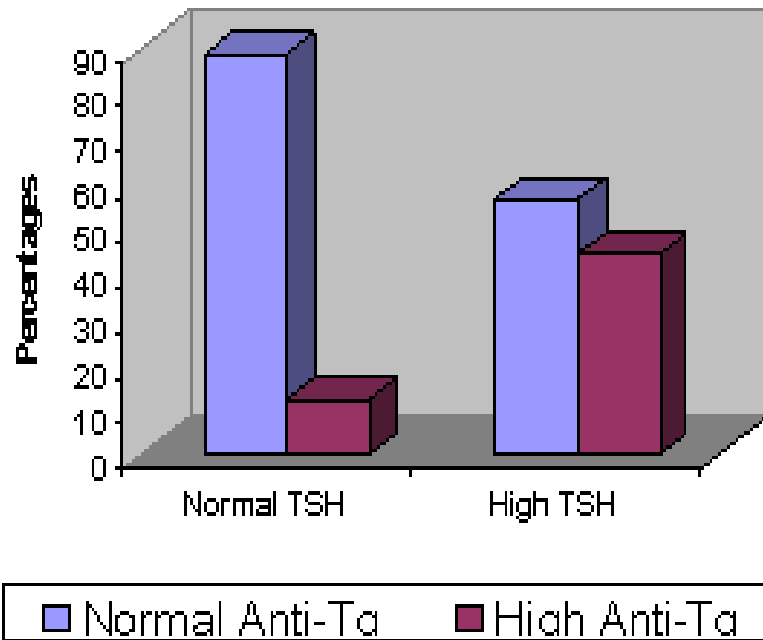
Haemolysate added
to patient samples
and concentrations
measured

Graham Jones
Department of Chemical
Pathology
St Vincent's Hospital, Sydney

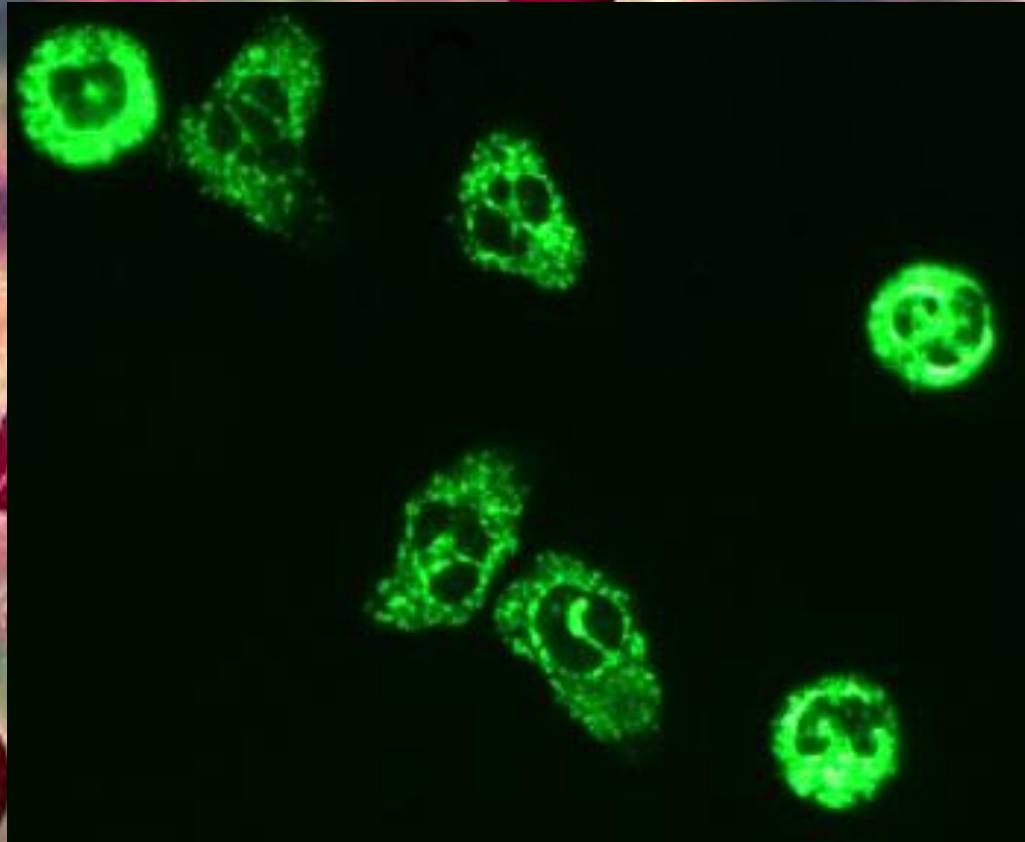
Hemolysis intra vascular or ex-vivo Amylase assay



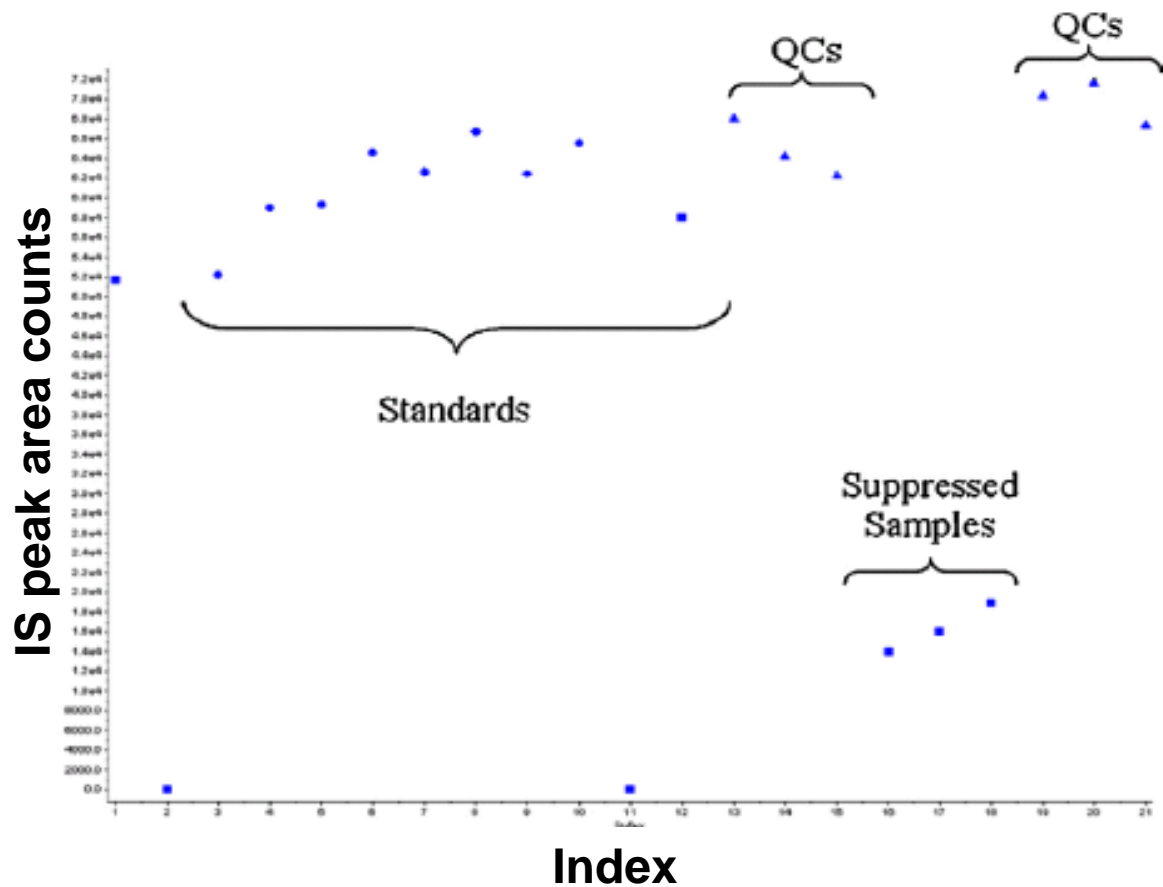
Antibodies to Thyroglobulin: Both usefull and a problem



Autoimmune testing: A serological interference

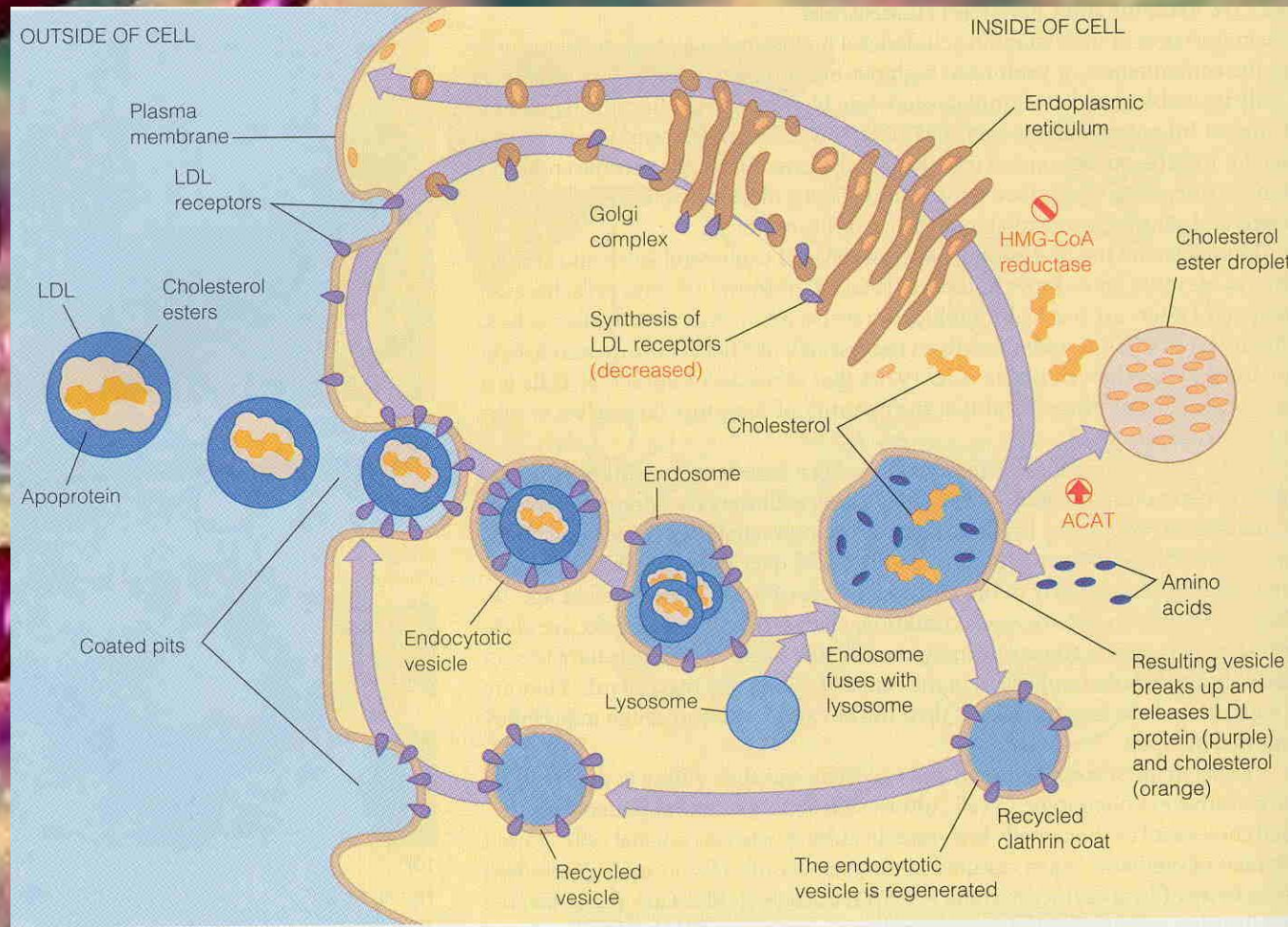


Ionisation suppression



Phospholipids

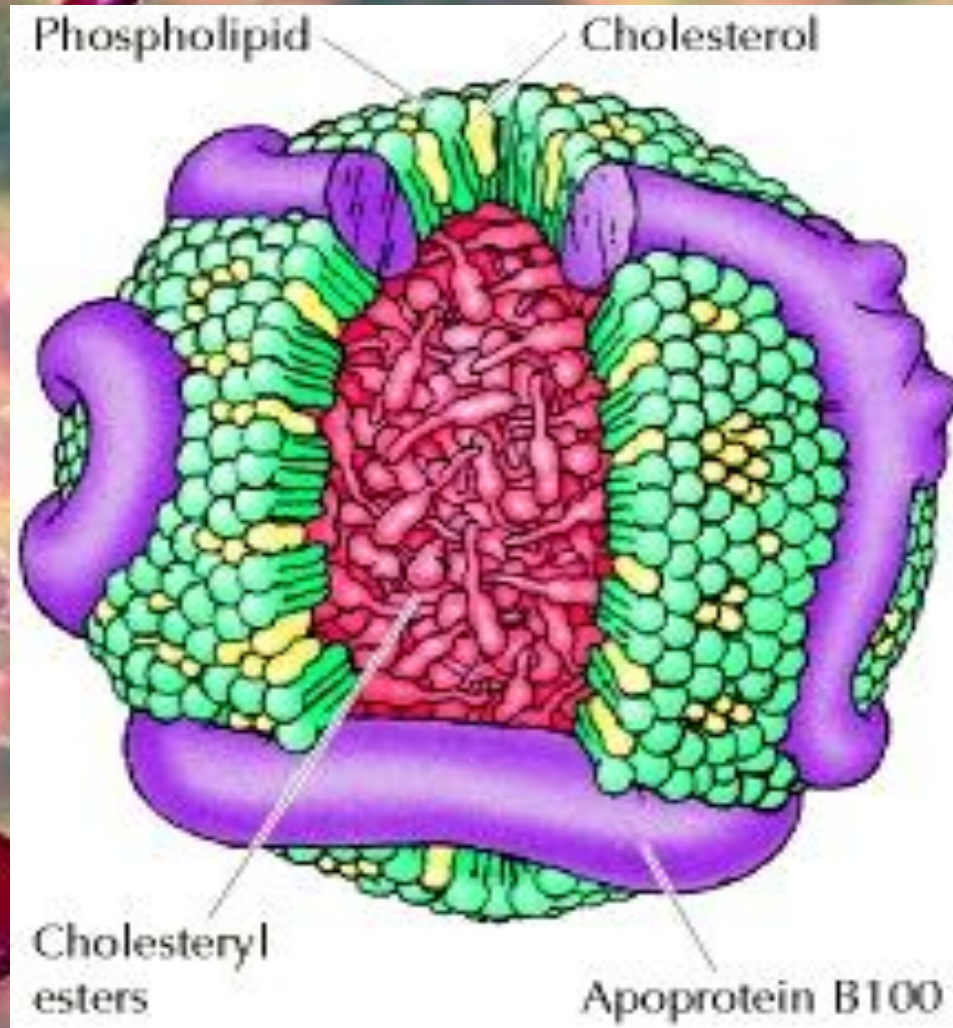
Familial Hypercholesterolemia



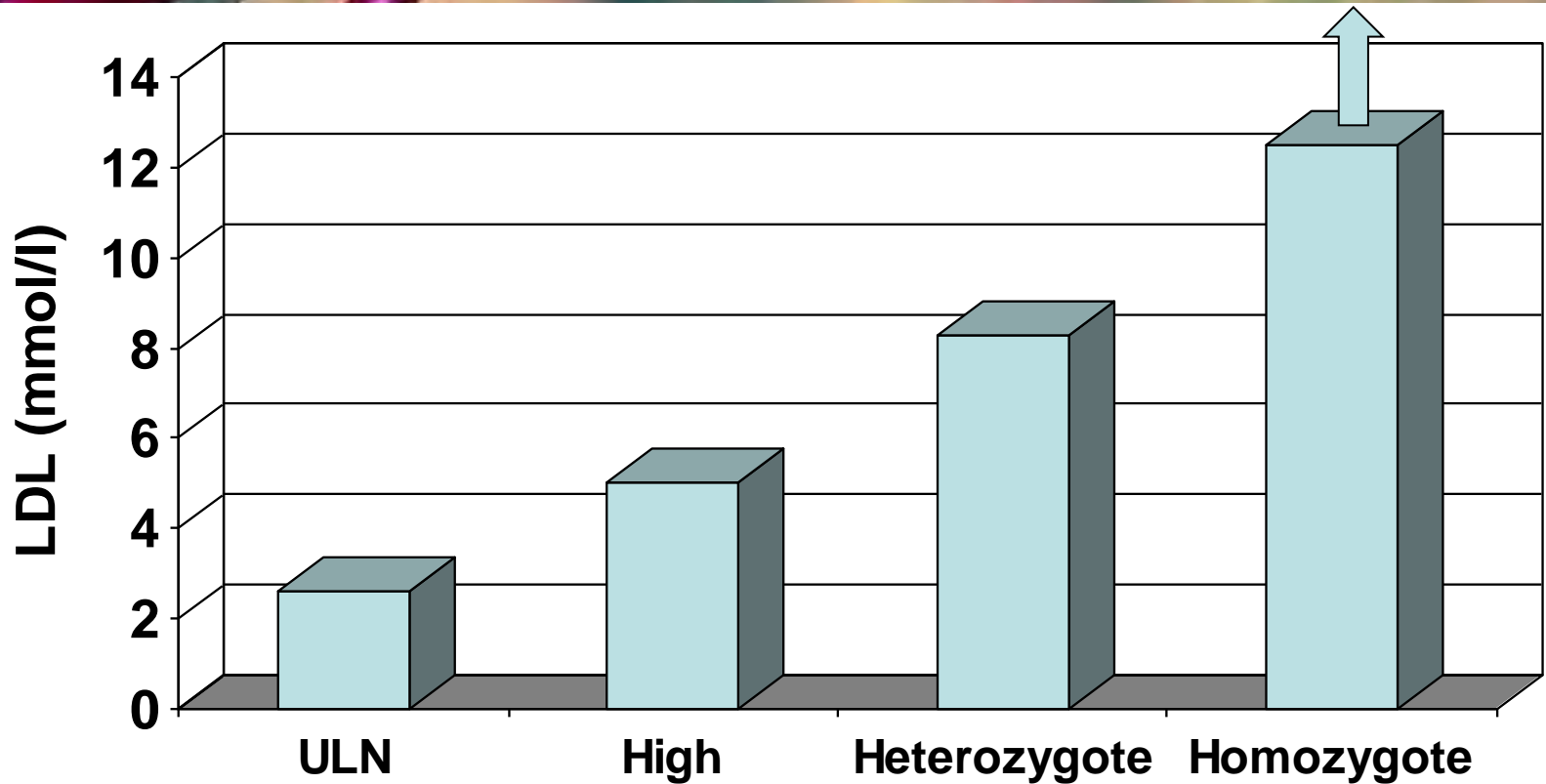
Familial Hypercholesterolemia



Low density lipoprotein (LDL)



Familial Hypercholesterolemia



Prevalence

1:500

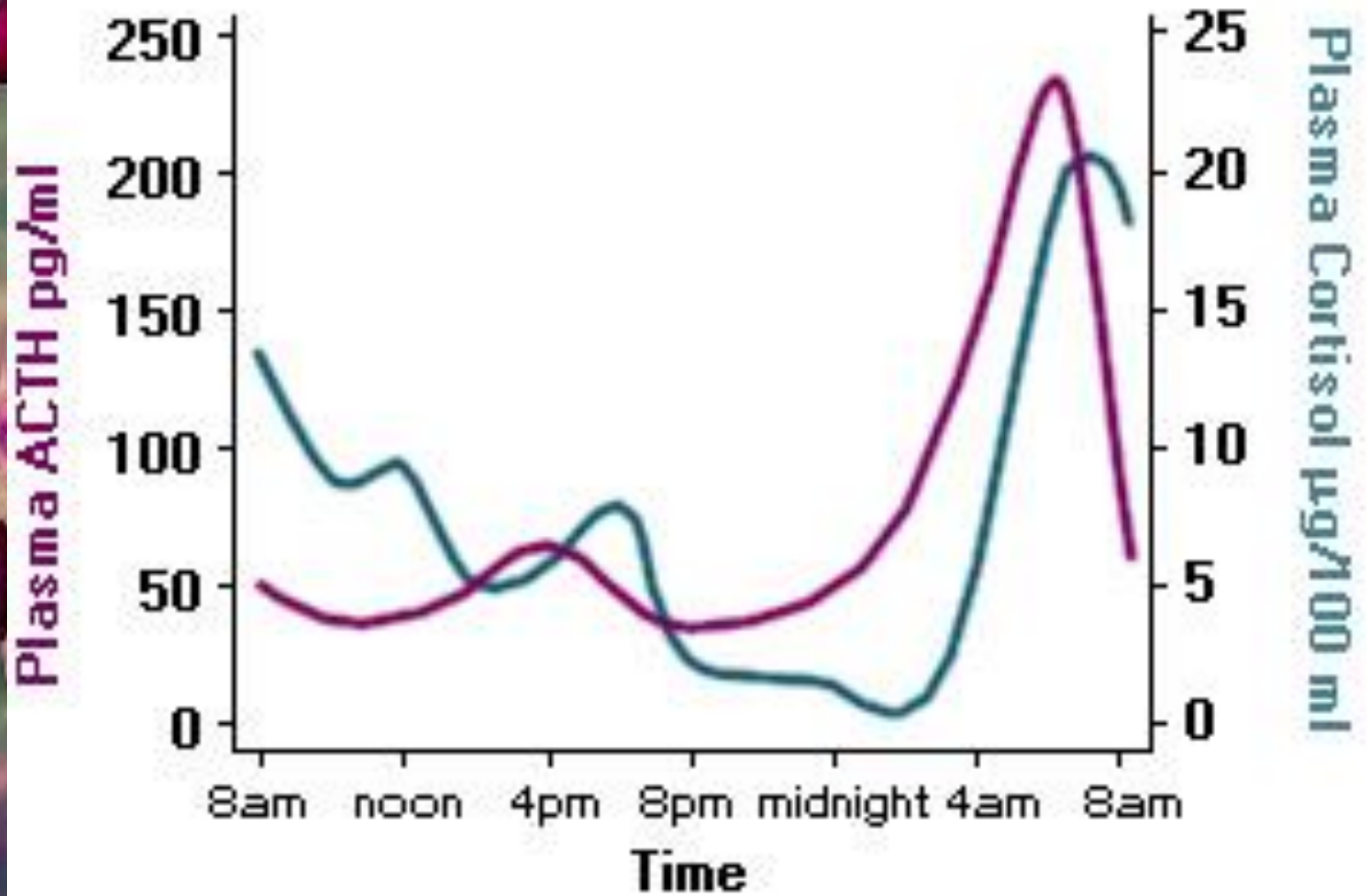
Prevalence

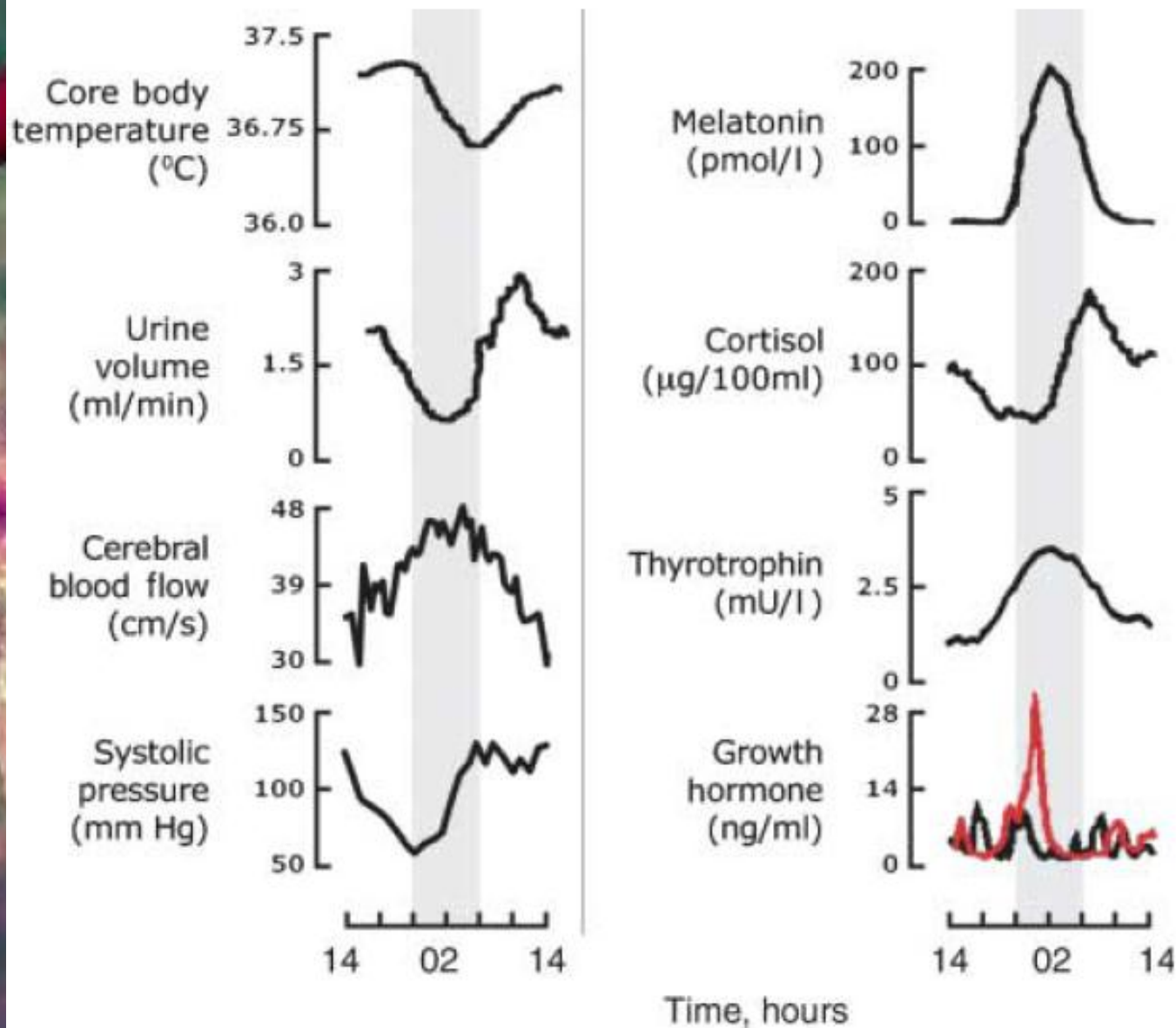
1:1.000.000



Finally:

**Nature's rhythm
makes it difficult**







THE TRICK IS FINDING THE RIGHT MIRROR