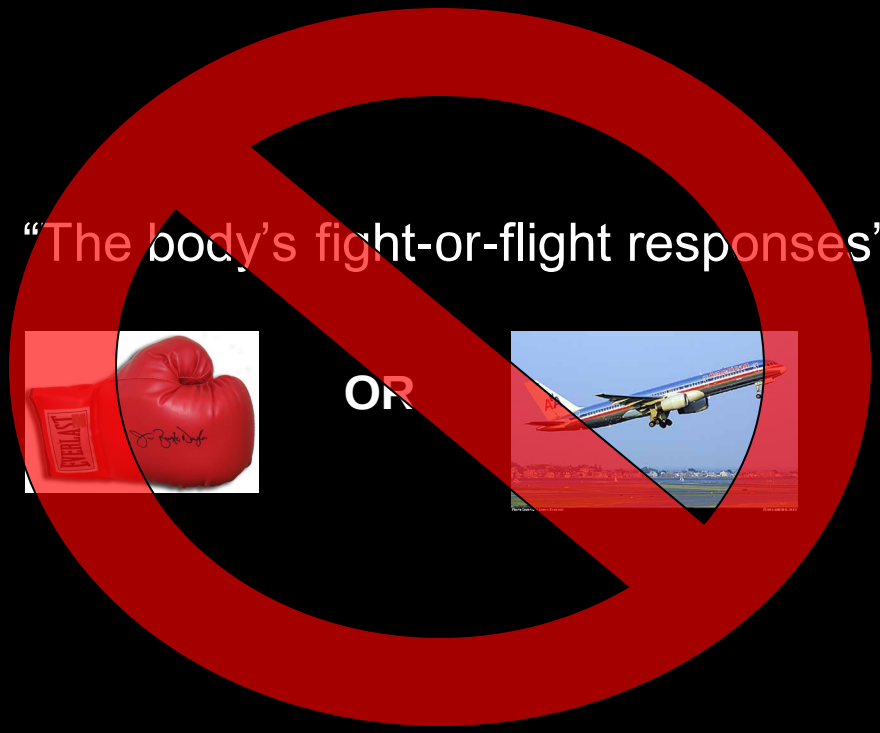
Beta Blockers & Their Effect on The Sympathetic Nervous System



"The body's fight-or-flight responses"

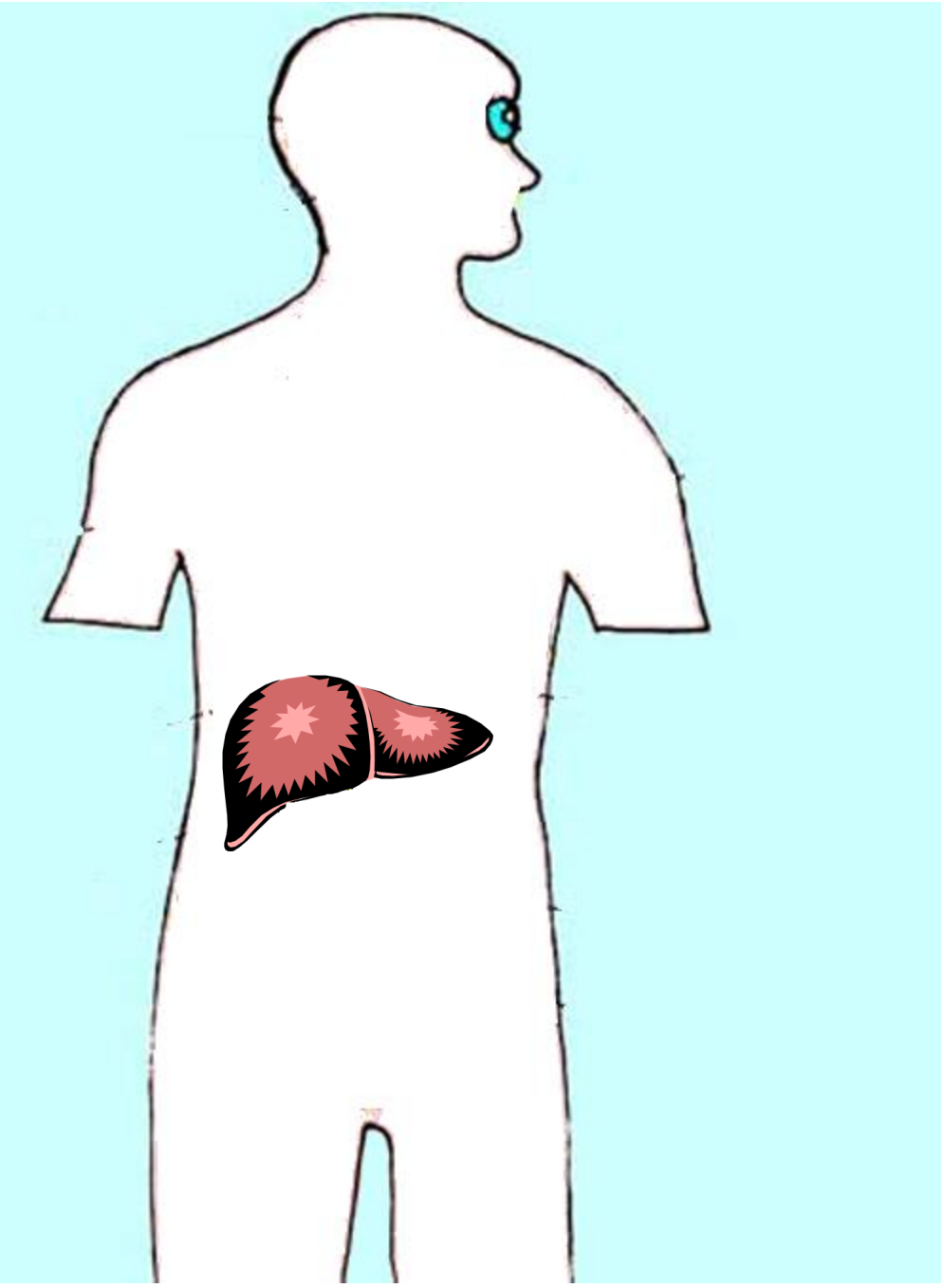
OR

Understanding Beta Blocker Pharmacology:

#1 Learn the Fight or Flight Response
#2 Think opposite

Fight or Flight is the body system designed as an emergency response to help you fight an enemy or run away. If this stress response is sustained over time, it becomes **harmful**.

The chief mediator of the fight or flight is epinephrine. Epinephrine is highly active at Beta 1&2 and Alpha 1 receptors



LIVER

Beta 2

Hepatocytes

Glycogenolysis & Gluconeogenesis

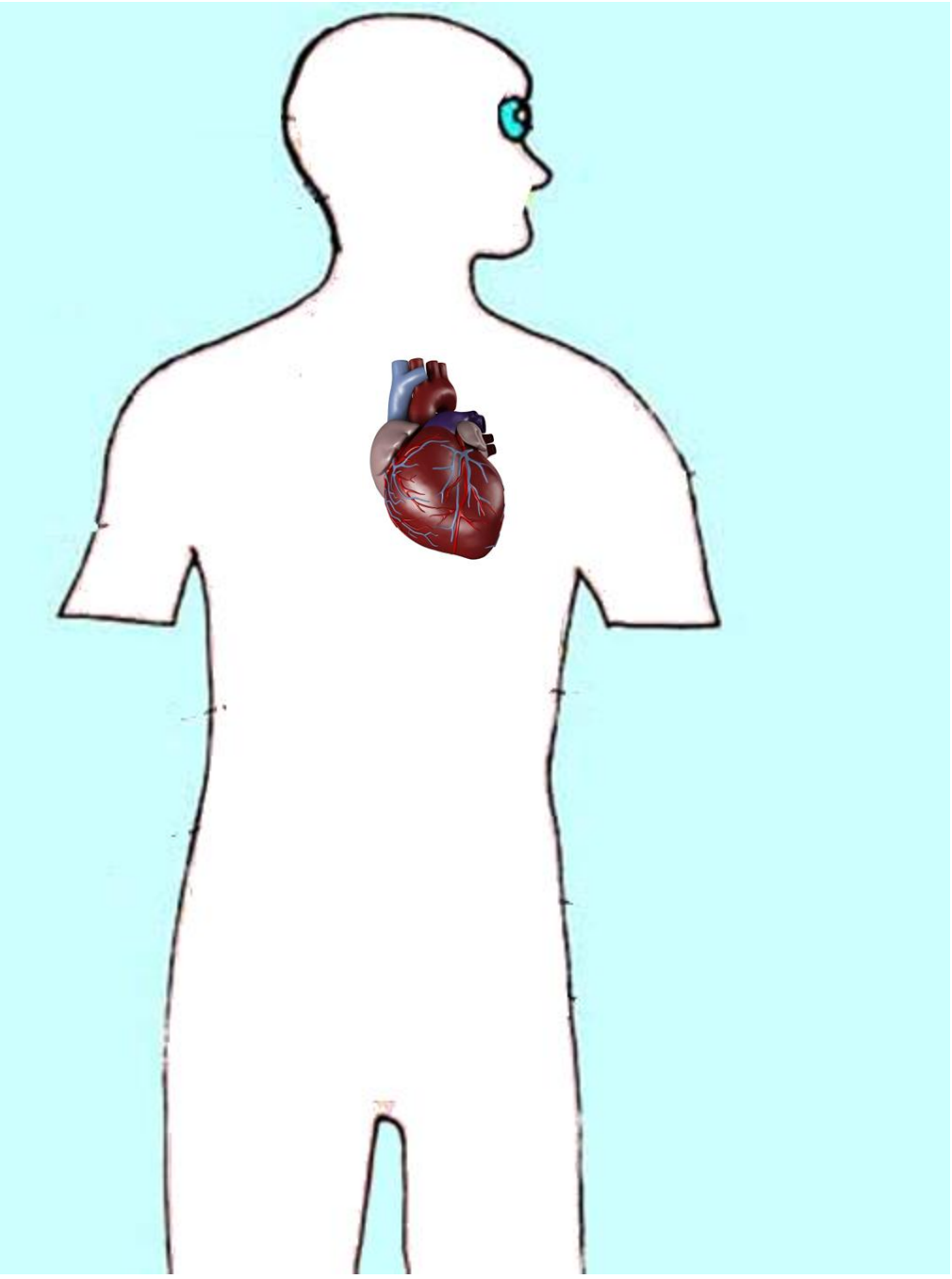
OR

Mo Suga → Mo Energy

Beta Blockade

Hepatocytes
Decreases Glycogenolysis & Decreases Gluconeogenesis

Resulting in poor response to low blood sugar and decreased symptoms



HEART

Beta 1

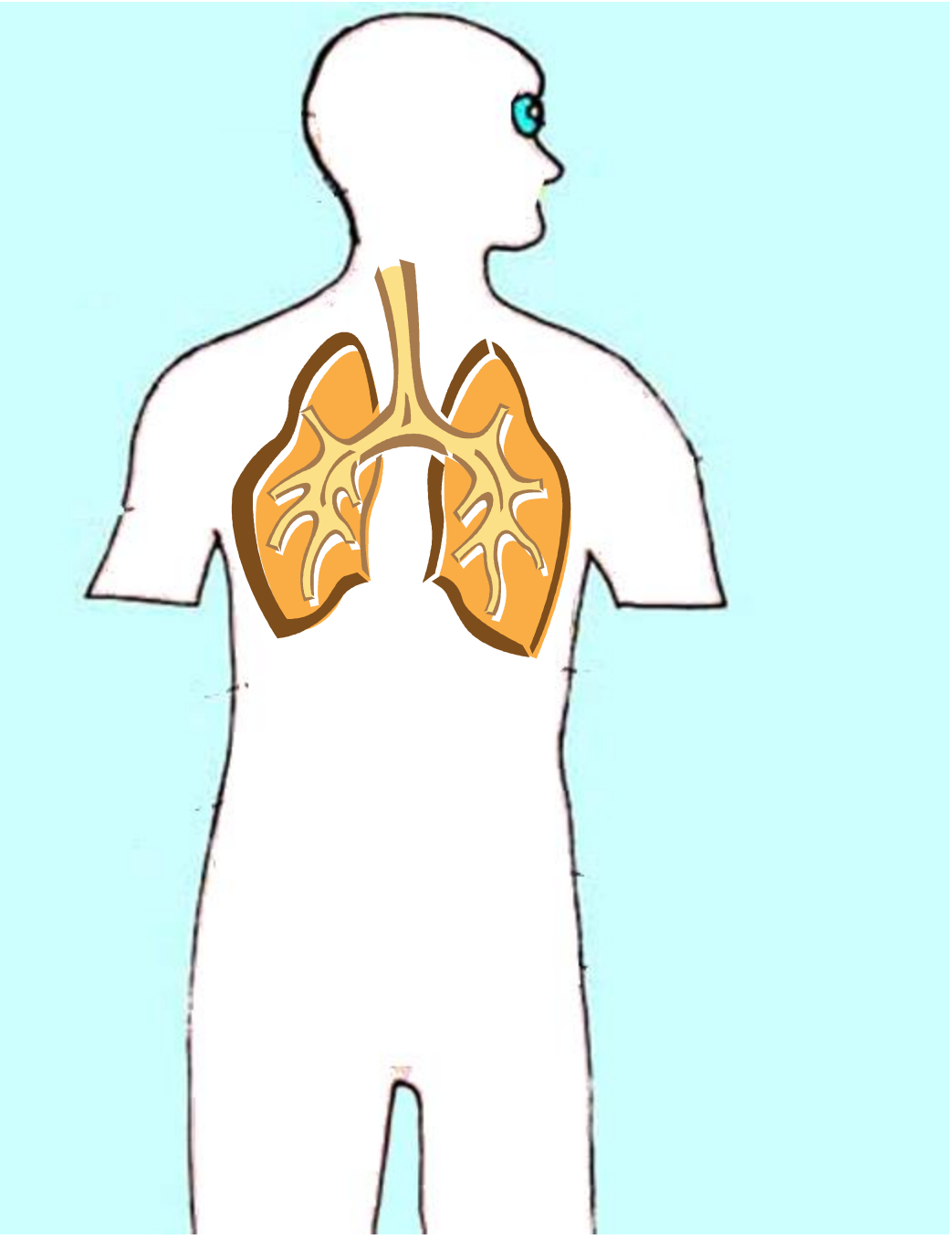
Heart Rate, AV Conduction, Atrial Contractility/Conduction, Ventricular Contractility/Conduction
Increase

OR

Maintain adequate blood supply to important organs.

Beta Blockade

Heart Rate, AV Conduction, Atrial Contractility/Conduction, Ventricular Contractility/Conduction
Decrease



LUNGS

Beta 2

Bronchial Smooth Muscle
Relaxation

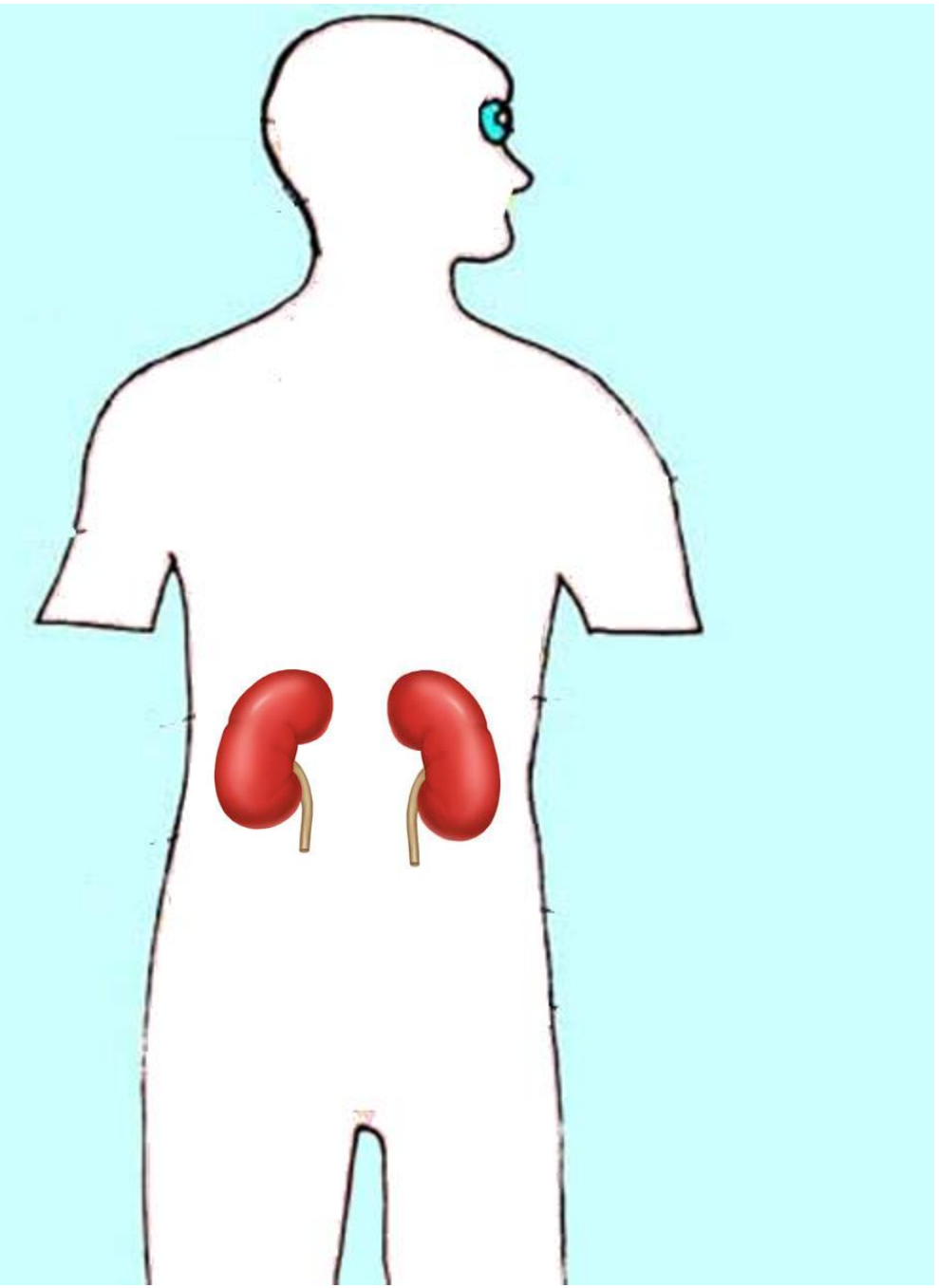
OR

Makes breathing easy

Beta Blockade

Bronchial Smooth Muscle
Bronchoconstriction

****Use with caution in patients with asthma****



KIDNEYS

Beta 1

Glomerulus

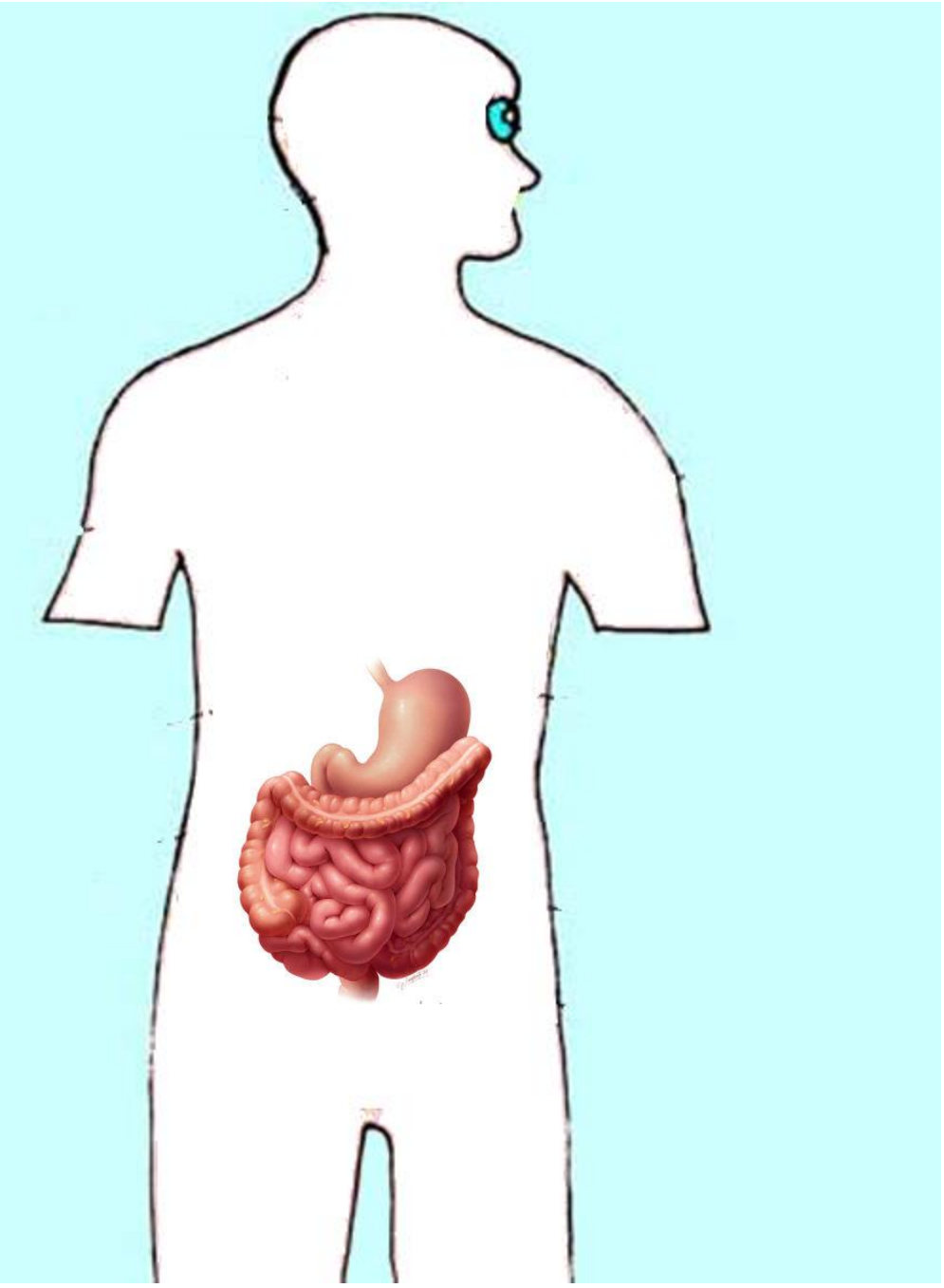
Increase Renin

OR

Keep that BP up!!!

Beta Blockade

Glomerulus
Decrease Renin



STOMACH / INTESTINE

Beta 1

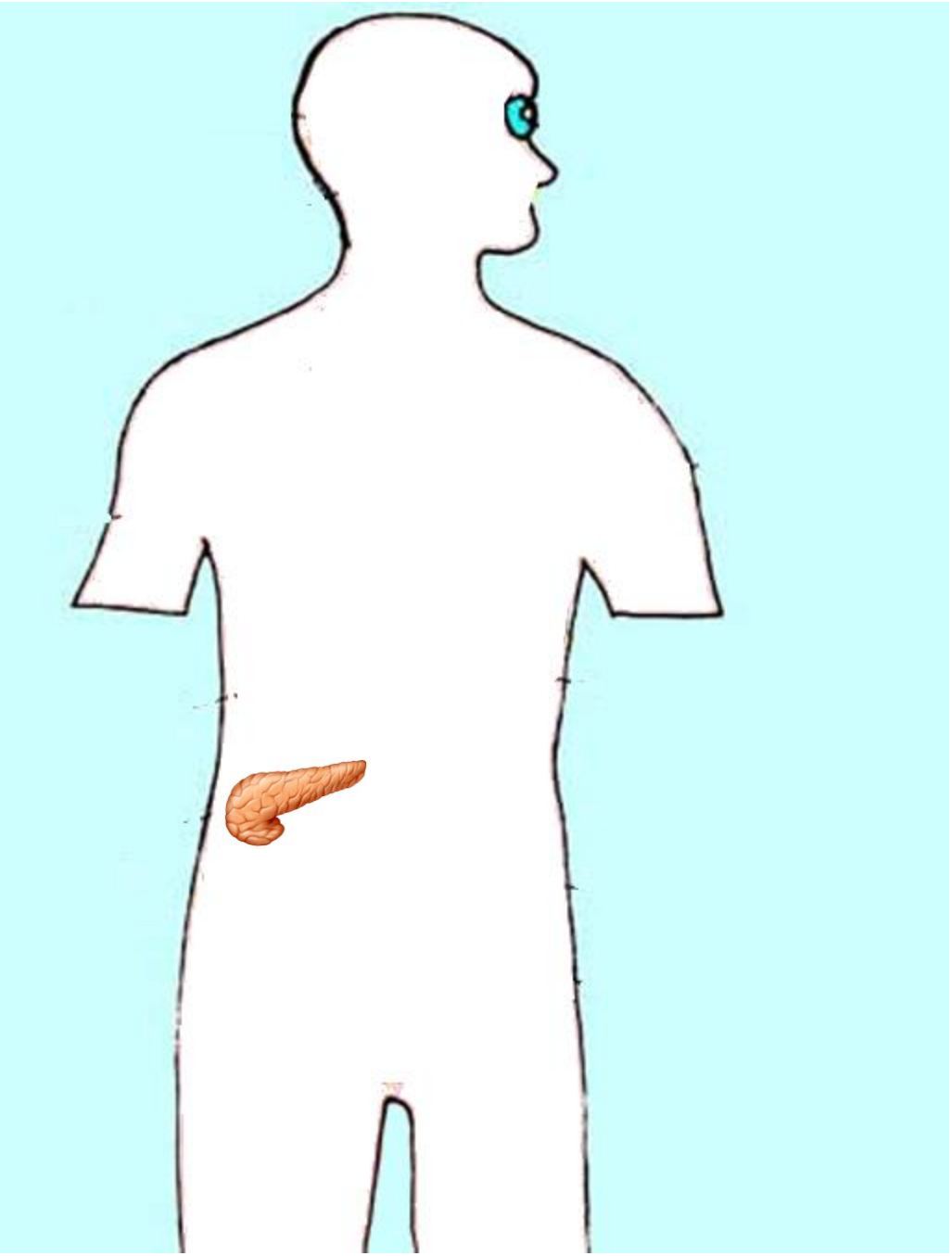
Motility and Tone
Decrease

OR

Allows blood supply and energy to be used elsewhere

Beta Blockade

Motility and Tone
Increase



PANCREAS

Beta 2

Islet Cells

Increased Secretion

OR

Gets glucose into muscles

Beta Blockade

Islet Cells
Decreased Secretion

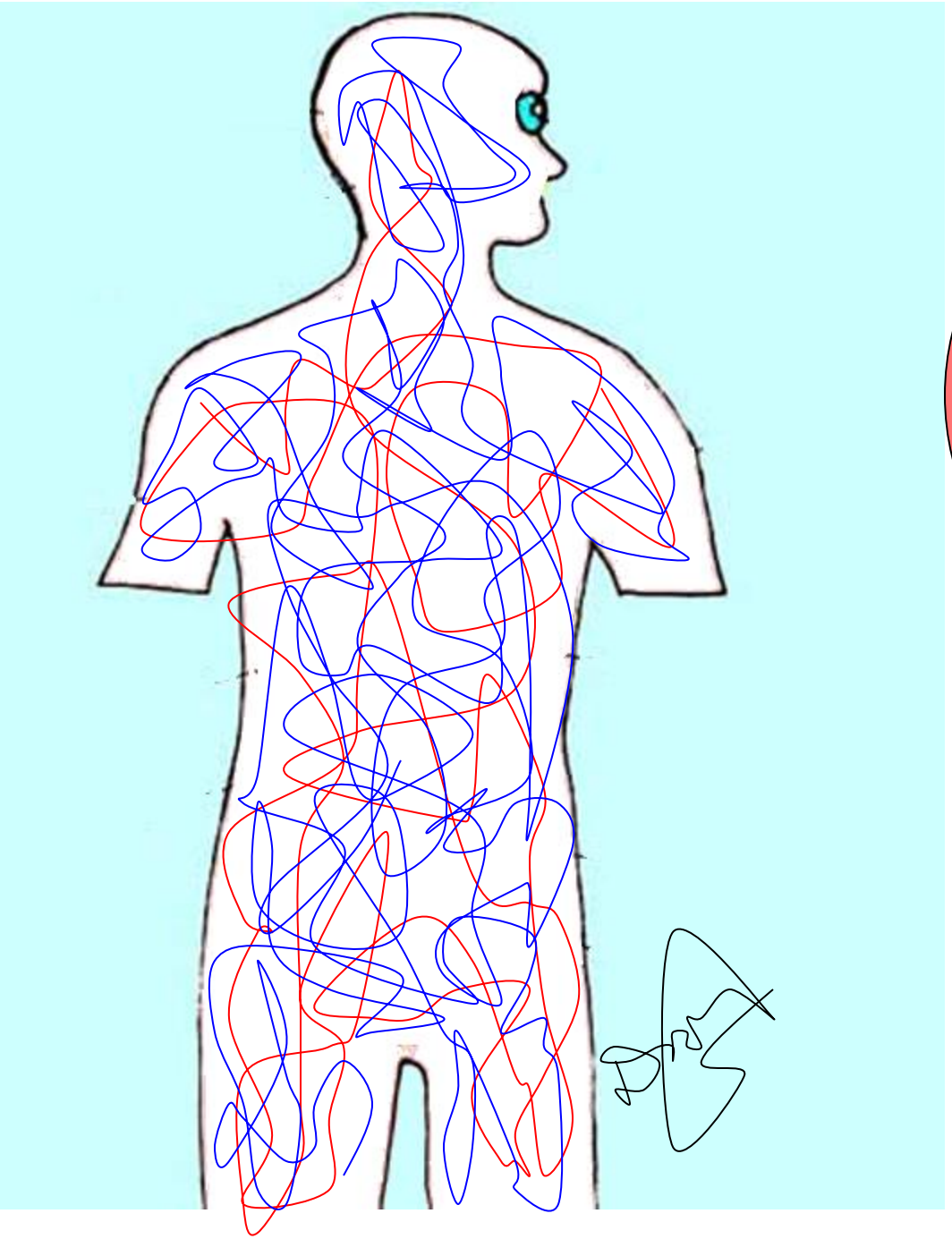
Beta Blockade and Diabetes Summary

↓ gluconeogenesis and ↓ glycolysis

Insulin dependent diabetics on beta blockers have a decreased ability to respond to hypoglycemia

↓ islet secretion

While insulin **in**dependent diabetics may have worsening glucose control



BLOOD VESSELS

Beta 2

Coronary, skin & mucous membranes, skeletal muscles, pulmonary, abdominal viscera

Dilation

OR

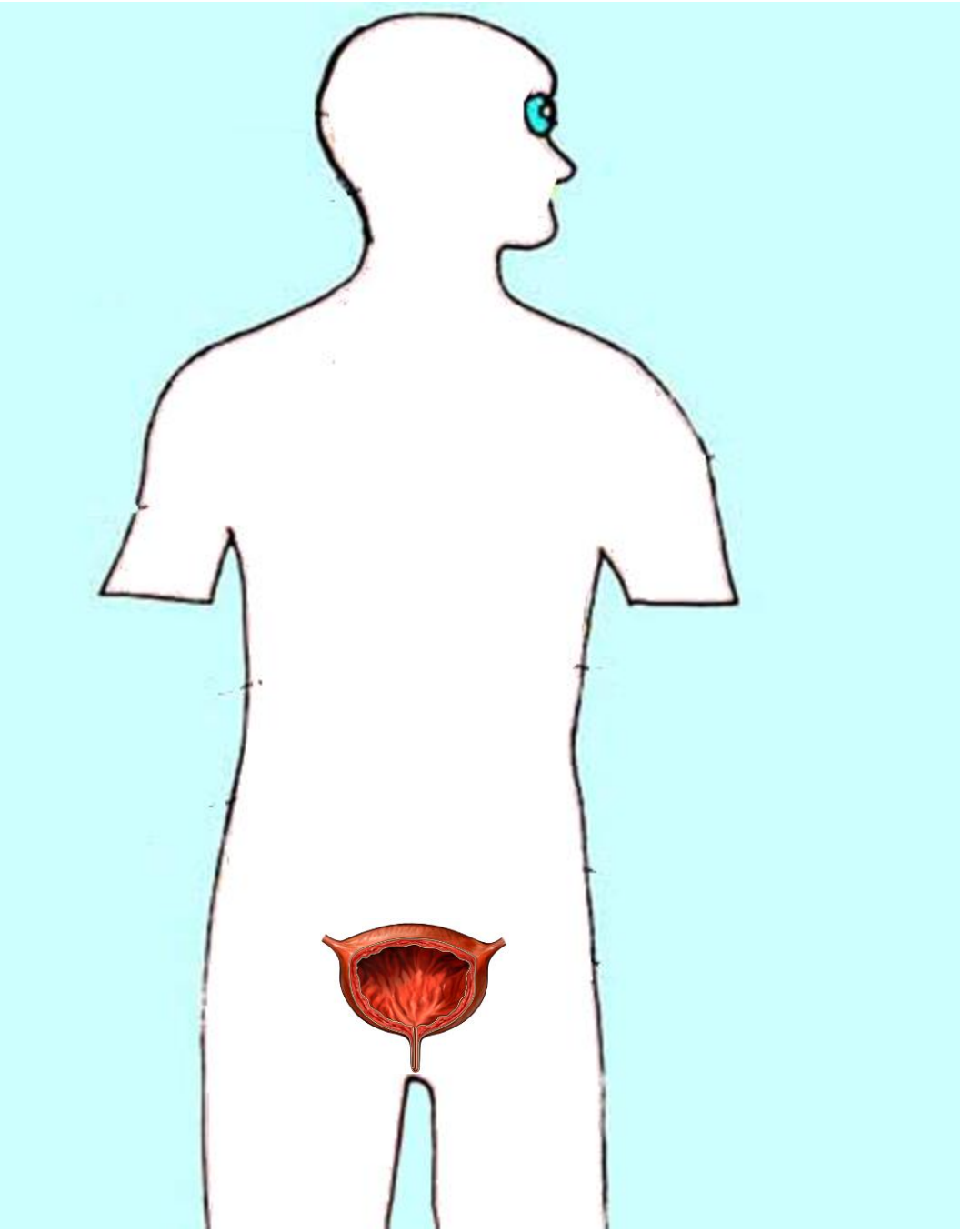
Keeping the BP up and the blood where it needs to be

Beta Blockade

Coronary, skin & mucous membranes, skeletal muscles, pulmonary, abdominal viscera

Constriction

Yes, this is counterintuitive, but true!



BLADDER / URETER

Beta 2

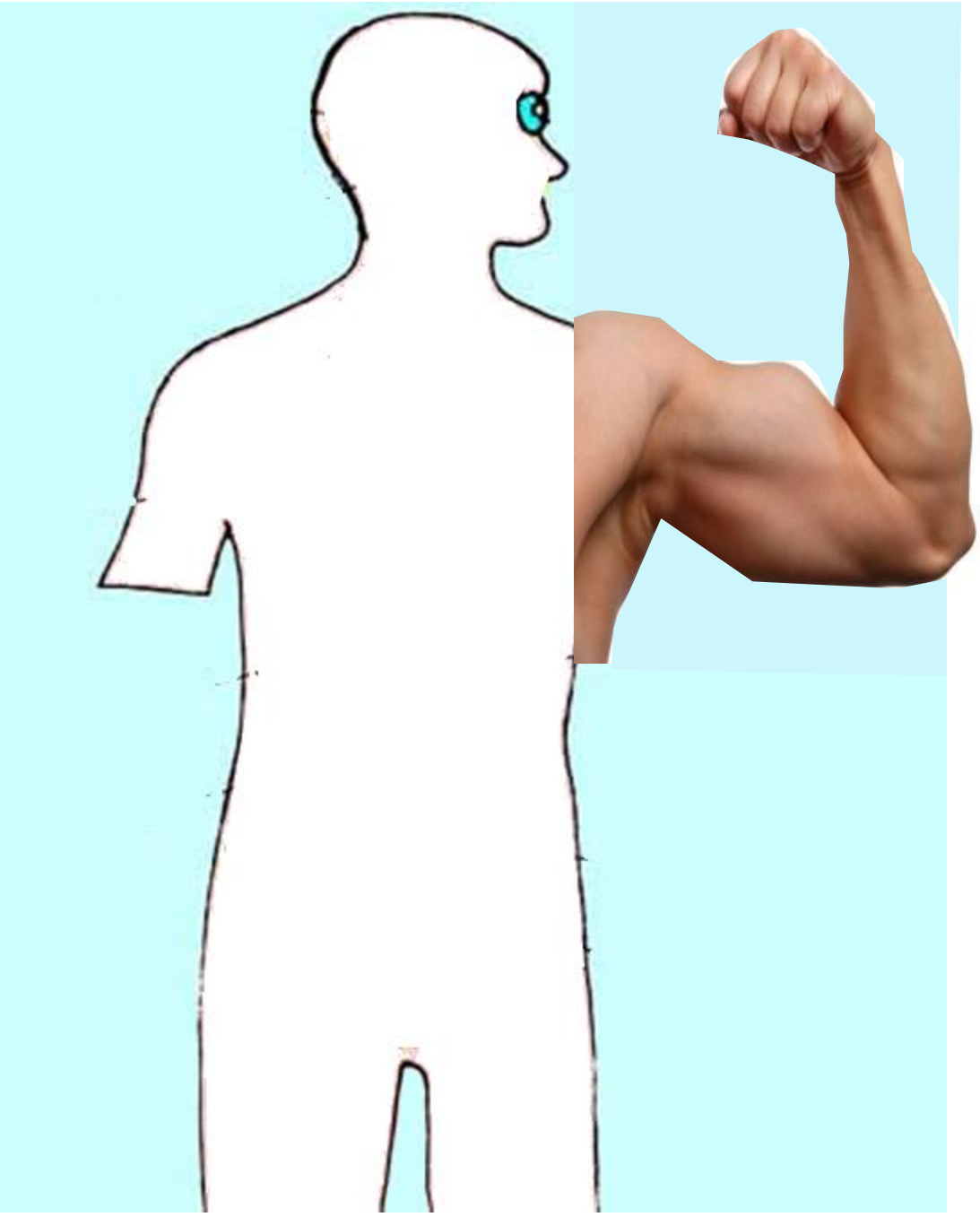
Detrusor muscle
Relax (usually)

OR

It would be inconvenient to have to find a toilet

Beta Blockade

Detrusor muscle
Contract (usually)



SKELETAL MUSCLE

Beta 2

Skeletal Muscle throughout Body
Increased Contractility
Glycogenolysis

OR

So you can throw down…or run away quickly

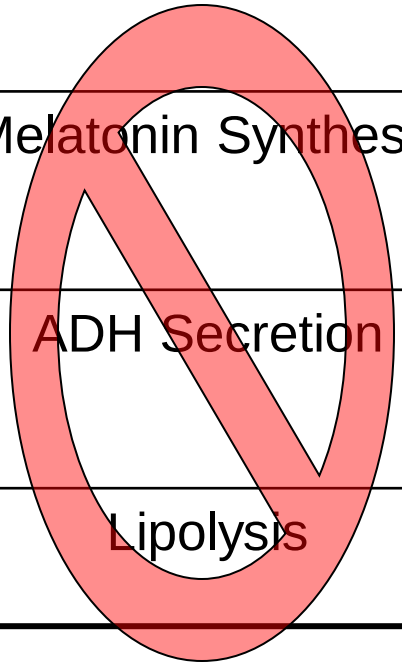
Beta Blockade

Skeletal Muscle throughout Body
Decreased Contractility
Decreased Glycogenolysis

Could contribute to the asthenia experienced by some patients

Miscellaneous Organs

	Receptor	Action	Beta Blockade
Pineal Gland	Beta 1 & 2	Melatonin Synthesis	Decreased Melatonin Synthesis
Posterior Pituitary	Beta 1	ADH Secretion	Decreased ADH Secretion
Fat Cells	Beta 1	Lipolysis	Decreased Lipolysis



Beta Blockers Can Turn This:

OR

Into This:

OR

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