Angiotensin II Synthesis

Angiotensin II is a vasoconstrictor hormone that is part of the renin-angiotensin-aldosterone system (RAAS). Decreased renal perfusion pressure, B1 receptor activation, and decreased NaCl delivery to macula densa cells activates the juxtaglomerular apparatus, which secretes renin. The juxtaglomerular apparatus consists of juxtaglomerular cells, mesangial cells, and macula densa cells located at distal convoluted tubule. Angiotensinogen, which is secreted from liver, is cleaved into angiotensin I by renin. Angiotensin converting enzyme (ACE), which is located in the pulmonary capillaries, catalyzes the conversion of angiotensin I to angiotensin II.

PLAY PICMONIC

Juxtaglomerular Apparatus

Juxtaglomerular Cells
Jar-glow-mare and Cell
One of the key parts of the juxtaglomerular apparatus is the collection of cells known as juxtaglomerular cells, which are modified smooth muscle cells located in the walls of the afferent arterioles.

Mesangial Cells
Maze-angel and Cell
Mesangial cells are located at the junction between the afferent and efferent arterioles and have a contractile function, which enables them to alter the vessel diameter and regulate GFR.

Macula Densa
Macula-Dracula in Den
Macula densa cells are epithelial cells located in the distal convoluted tubule that act as sensors of juxtaglomerular apparatus. If decreased NaCl is detected in the tubular fluid, juxtaglomerular cells release renin.

Distal Tubule
Disco Tube
Macula densa cells of juxtaglomerular apparatus are located in the distal convoluted tubule.

KEY MEDIATORS

Angiotensinogen
Angel-tennis Genie
Angiotensinogen is a protein that is the precursor of all angiotensin peptides. It is a non-inhibitory member of the serpin family of proteinase inhibitors that is also known as a renin substrate.

Secreted from Liver
Liver-secretions
Angiotensinogen is secreted from the liver.

Renin
Wrench
Renin (angiotensinogenase) is a protease enzyme that plays a crucial role in the renin-angiotensin-aldosterone system.

Secreted from Juxtaglomerular Cells
Secretions from Jar-glow-mare and Cell
Renin is secreted from juxtaglomerular cells.

Catalyzes Angiotensinogen to Angiotensin I

Angel-tennis Genie To Angel-tennis One-Wand

Renin catalyzes the conversion of angiotensinogen into angiotensin I.

Angiotensin Converting Enzyme (ACE)

Ace-Curtain

Angiotensin-converting enzyme (ACE) is an enzyme located on the surfaces of endothelial cells of pulmonary capillaries that converts the hormone angiotensin I into the active vasoconstrictor angiotensin II.

Pulmonary Capillaries

Lungs Caterpillar

While angiotensin-converting enzyme is expressed in many tissues (e.g., kidneys, testes), it is particularly abundant in endothelial cells of pulmonary capillaries where it participates in the synthesis of angiotensin II.

Catalyzes Angiotensin I to Angiotensin II

Angel-tennis One-Wand to Angel-tennis in (2) Tutu

Angiotensin-converting enzyme catalyzes the conversion of angiotensin I to angiotensin II.