	Arginine & sepsis	**Potassium** & hypertension	**Copper** & Alzheimer's
Chemistry	Positively polar charged AA $C_6H_{14}N_4O_2$	K+, Atomic #19,resp. for oslmolarity of intracellular fluid. Decreases Ca^{2+} excretion.	3rd most abundant micromineral. First row transition metal.RDA 900 µg/d. Seafood & liver, legumes, dried fruits, nuts.
Digestion	Via PRO digestion in mouth, stomach, and small intestine. End products in small intestine include peptides and free AA (including arginine).	AI 4700 mg/d. Bound to CHO or Pro. Digestion begins in mouth w/salivary amylase to hydrolyze α-1,4 glycosidic bonds. In stomach, chem. & mech. Dig. Finishes in SI with pancreatic amylase & disaccharidases.	Begins in the stomach with HCl. HCl activates pepsinogen which cleaves denatured proteins --> enhances release. Pancreatic and duodenal proteases further break down protein releasing copper.
Absorption	Absorption into enterocyte in proximal SI via an AA transport system (does not req. Na.) ~60% of <u>dietary intake</u> absorbed . Other 40% broken down into ornithine, citrulline, proline, CO2, or urea.	Majority of K+ absorption in SI (duodenal & jejunal mucosa). Minor in colon. 85% of dietary intake absorbed by passive diffusion and K^+/H^+-ATPase pump.	Trace amounts absorbed by the stomach. Absorption by enterocytes occurs via active carrier-mediated transport. High copper --> passive diffusion. Absorption of Cu piggybacking on AA? Enterocyte: Cu transported by chaperones. Enterocytes store in metallothionein. Cu transported to basolateral membrane. Active transport across basolateral membrane.
Transport	Portal blood. Portal vein.	K diffuses basolateral membrane. Enters portal circ. Travels to liver, heart, and body tissue. Entry to non-intestinal cells by active transport.	Albumin, transcuprein, & certain AA. To liver thru portal circ. Hepatocytes absorb Cu via facilitated diffusion. In liver, stored in metallothionein.
Metabolism	<u>Important in:</u> Growth & differentiation; Urea synthesis Removal of N from urea cycle Syn. of creatine; Formation of collagen. NO formation (for vasodilation, angiogenesis, adequate O_2 for wound healing.) <u>Formation of arginine</u> Involves kidney, liver, intestine. Arginine is syn. In kidneys from aspartate & citrulline. The liver uses arginase-I to breakdown arginine to urea & ornithine.	Generation of membrane potential (Na^+/K^+-ATPase pump). Acid/base balance (formation of bicarbonate, spares Ca^{2+} from being mobilized). Prevents/reduces hypertension by promoting natriuresis, reducing peripheral vascular resistance, inhibiting free radical formation.	Cofactor (e.g., ceruloplasmin, SOD1, Cyt c oxicase. Ceruloplasmin transports Cu to extrahepatic tissues. Ceruloplasmin is taken up by extrahepatic cells by channel proteins or protein transporters.
Excretion		Primarily the kidneys (aldosterone).	Most by biliary excretion. Some Cu is lost through bodily fluids, hair, and nails.
Physiological Effects	Conditionally essential AA	Hyperkalemia (cardiac arryth., cardiac arrest). Hypokalemia (mulcular weakness, nervous irritability, glucose intolerance	Menkes disease, Wilson's disease. Amyloid-β peptides (plaques) in brain tissue with Cu bound to it through His/Cys. Aβ complexes can produce H2O2 from molecular O2 in presence of precursors.

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