MNT I

Renal

- Explain the different parts of the nephron and how these parts function to create urine and filter the blood
    - The nephron is the functional unit of the kidney
        - The kidney is important in key functions:
            - Maintain fluid and electrolyte/solute balance via continuous filtration out of the blood
            - Excretion of metabolic waste
            - Maintain BP (renin-angiotensin aldosterone produced by kidney)
            - Maintain pH
            - Production of hormones
        - The nephrons (1.2 mil in each)
            - Consists of glomerulus and tubules
                - Proximal convoluted tubule
                - Loop of Henle
                - Distal tubule
                - Collecting ducts
            - Glomerulus: mass of capillaries surrounded by a membrane (Bowman's capsule)
            - Blood passes through capillaries
            - Glomerulus blocks the passage of blood cells and large molecular weight molecules such as protein
                - Protein and blood are NOT supposed to be in the urine
            - Other small substances can pass out of the capillaries into tubules
                - Water, nitrogenous wastes (urea, end-products of protein metabolism), Na, K and other electrolytes
                - Creatinine, uric acid and ammonia
                - Called ultrafiltrate
- Describe tubular reabsorption and secretion and how these function to alter urine and blood composition
    - Tubules reabsorb much of what is filtered out by the glomerulus
        - Ultrafiltrate moves through
        - Reabsorption of water, glucose and sodium, etc
            - ex.) sodium increase leads to exchange with potassium in the blood
                - Low serum sodium and blood pressure will trigger aldosterone and sodium reabsorption
                - Water: vasopressin→ increase water reabsorption
                    - Ultrafiltrate is adjusted and changes composition

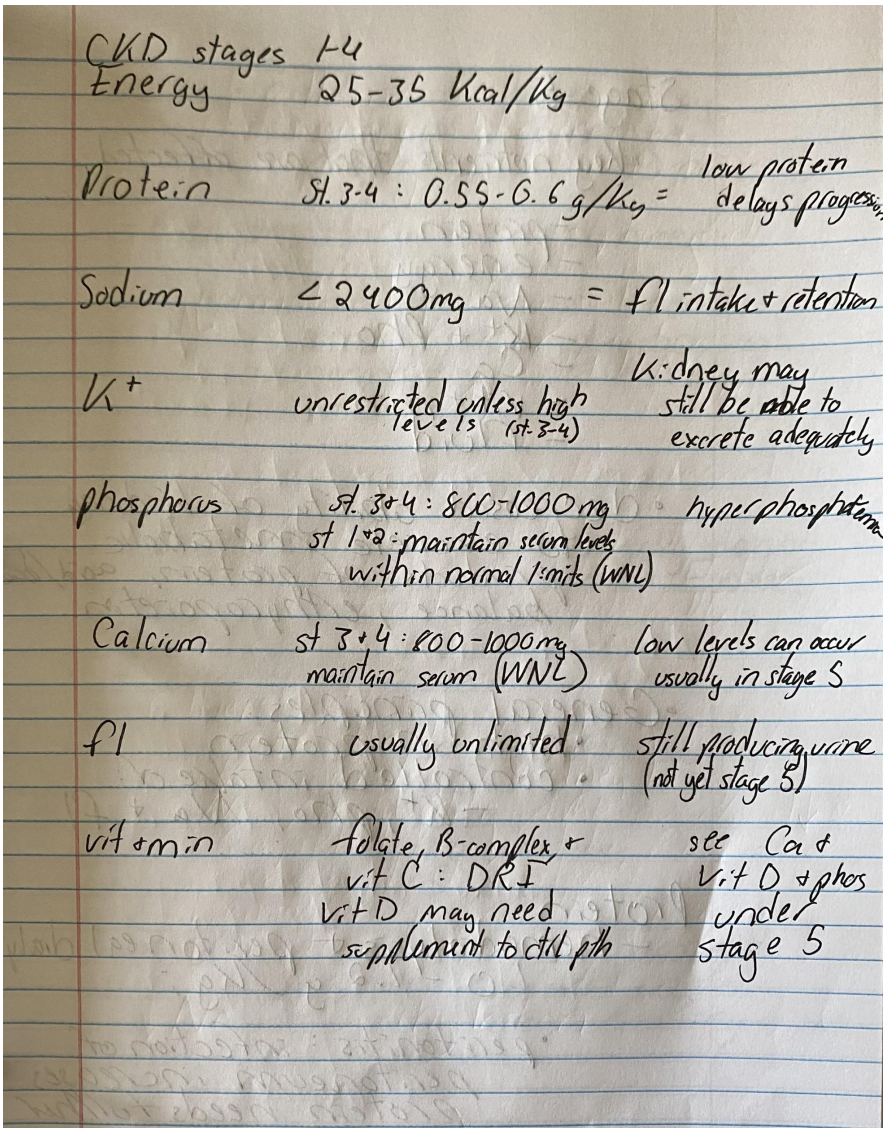
- Name the other functions of the healthy kidney
    - Urine funnels into ureter which empties into the bladder
        - Amount of urine produced varies widely - 500 ml to 12 liters
        - Concentration varies: 500 mOsm to 1200 mOsm
    - Fluid, electrolyte balance and excretion of waste → production of urine
    - Maintenance of BP
        - Through regulation of (fl) balance and blood volume, sodium reabsorption
        - Production of renin, converts angiotensinogen to angiotensin I
    - Production of hormones
        - Vit D
            - Conversion of 25-hydroxylcholecalciferol to 1,25 dihydroxcholecalciferol
        - Erythropoietin: stimulate the production of red blood cells in bone marrow
        - pH balance: reabsorbs bicarb, secrete H+
- Name the pathophysiological alterations that occur in renal failure and why these alterations occur
    - Edema: fluid retention
    - Hypertension: fluid and sodium retention
    - Metabolic acidosis: inability to excrete H ions
    - Hyperkalemia, hyperphosphatemia: inability to excrete potassium and phosphorus
    - Anemia: lack of erythropoietin
    - Azotemia: blood urea nitrogen increases (buildup of nitrogenous waste production in blood).
    - Oliguria: inability to produce urine
    - Bone mineral disorders: inability to activate vit D, excrete phosphorus
    - Uremia
        - Cluster of symptoms, resulting from disordered biochemical processes
        - Fatigue, pruritus(itchy) and slowed thinking
- Explain GFR and how it is used to assess kidney function
    - Glomerular filtration rate
        - GFR: volume of plasma cleared of solute in a given time
        - Calculations: modified CKD-EPI creatinine equation
            - Takes blood creatinine, gender, race and age into account
- What are the stages of kidney failure and what happens to GFR as kidney disease progresses? (Don't memorize the GFR value for each stage)
    - Chronic Kidney Failure
        - Progressive loss of function of the kidney
        - Cause: damage to kidney (check macro and micro albuminuria)
            - Diabetes (check microalbumin)
            - Hypertension

        - Glomerulonephritis
    - Others at increased risk
        - African Americans, Native Americans and hispanics
        - Family history of CKD
        - Direct and forceful blow to kidneys
        - Prolonged consumption of some medications

Stage I	GFR: 90-130	Kidney damage but normal
Stage II	60-89	Mild decrease in function
Stage III	30-59	Moderate decrease in fxn
Stage IV	15-29	Severe decrease in fxn
Stage V	<15	End stage renal disease

- Explain what happens to BUN, creatinine, potassium, phosphorus lab values in renal failure and why.
    - Microalbumin increases in urine
    - Elevated BUN and creatinine = not excreted
    - Elevated Potassium and Phosphorus
- Explain the process of dialysis and how waste products are removed. In what stage is dialysis typically initiated?
    - Dialysis = End Stage
        - Replaces function of kidney, waste products and excess fluid are removed
        - Uses a semipermeable membrane and fluid called dialysate
        - Diffusion: waste products are removed
        - Osmosis: excess water removed
        - Dialysate has varying electrolyte content similar to normal blood
- Explain the process of hemodialysis. How often is this normally done and for how long at each session? What are the two routes of access?
    - Hemodialysis
        - Blood is removed from the body
        - Passed through an artificial kidney-semipermeable membrane and dialysate
        - Blood returned to the body
        - Assess
            - Arteriovenous fistula: joins radial artery and cephalic vein in forearm to strengthen

            - More blood flow into vein → grows larger
            - Repeated sticks
        - Frequency: 3 times a week for 4 hrs at a time
    - Daily home hemodialysis 5-7 days a week for 2-3 hrs
    - Nocturnal home hemodialysis 3-6 nights / week all night while asleep
- Explain peritoneal dialysis. What are the two types?
    - Uses the semipermeable membrane of the peritoneum
    - Dialysate is instilled in the peritoneal cavity using a catheter
    - Wastes and water in blood diffuse across the peritoneum and enter the dialysate
    - Dialysate is removed and then replaced
    - Two types
        - Continuous ambulatory peritoneal dialysis (CAPD) = no machine
            - Replaced 3-4times a day, left in at night
            - Dwell time: 4-6 hrs
        - Continuous cyclical peritoneal dialysis (CCPD) -
            - Treatments done at night by machine 3-5 times
            - Once a day-stays entire day
- What factors contribute to protein-energy malnutrition in renal failure patients? What are the limitations in using albumin and prealbumin to assess protein status? What is another method of assessing protein status?
    - Protein-energy malnutrition
    - Albumin and prealbumin susceptible to hemodilution and inflammation
        - Increased morbidity and mortality
        - Etilogy:
            - Dietary restrictions and fears
            - Anorexia (chronic disease)
            - Taste changes
            - Fatigue
            - Depression, emotional distress
            - Loss of protein in dialysate
            - nausea/vomiting (due to buildup of nitrogenous waste)
- Comorbid conditions in CKD—Common ones, how nutrition recommendations are influenced by
    - Comorbid conditions: drug/nutrient interaction (diabetes, HT, hyperlipidemia, cholesterol)
    - Social barriers:
        - Inability to prepare meals, depression, lack of family support, food insecurity, availability of safe food storage
    - Food and nutrient intake
        - Usual food intake

        - Appetite changes, taste changes, nausea, vomiting
        - Kcal, protein, fat, Na (fluid retention), K , Ca, PHo, fluid, vitamin and minerals
- Energy, protein, potassium, sodium, fluid and phosphorus recommendation in CKD stages 1-4
    - 

- Stage 5—protein, energy, potassium, fluid, sodium and phosphorus recommendations.
    - Key nutrients that are affected:
        - Protein
        - Energy
        - Na less than 2300 mg
        - Potassium and Phosphorus = depending on stage and blood level
        - Ca limited cause of dairy
        - Vit and min
        - fluid

- What should interdialytic weight gains be limited to? How does this affect fluid recommendations? How does excess fluid gain impact laboratory values?
    - Less than 5% BW
    - Usual BW-current BW /usual BW x 100
- Identify reasons for increased protein needs in stage 5. Identify ways to increase protein intake.
    - Hemodialysis and peritoneal dialysis
        - 1.0-1.2 g/kg
        - Peritonitis: infection of peritoneum increases protein needs further
        - Plant based proteins may be helpful to reduce phosphorus and CKD progression
    - Reasons for increased needs
        - Lost in dialysate
        - Metabolic acidosis (increased amino acid degradation)
        - Inflammation
        - Infection
            - Edema free weight (dry weight) to calculate protein and energy needs
- What types of foods are considered protein foods? What are examples of protein servings?
    - Servings of protein
        - 1 egg
        - 1 oz cooked meat, fish and poultry
        - 1 cup milk
        - 1 oz cheese
        - ¼ cup cottage cheese
        - 2 Tbsp PB
    - Increase consumption: protein powder, eat cooked protein foods cold, avoid cooking odors
- Identify body weight that is used when calculating energy and protein needs (according to KDOQI guidelines). Be able to calculate adjusted body weight using standard body weight if provided the formula and know when weight should be adjusted.
    - Edema free weight
- Name general fruit and vegetable consumption guidelines in potassium restriction. What is one method for reducing potassium content in vegetables? Name examples of high potassium fruits and vegetables.
    - Potassium fruits and veggies;
        1 serving of high group
        2 servings of medium
        3 servings of low

1 serving = ½ cup

- Explain renal osteodystrophy. Explain how blood calcium levels are maintained in the healthy kidney and alterations that occur in renal failure
    - Renal osteodystrophy
        - Bone disease; excess collagen production and inadequate mineralization
        - Bones prone to fracture
        - Vascular and soft tissue calcification
- Name high phosphorus foods. Provide an example of a guideline that may be provided to a patient to help them limit phosphorus in the diet. Explain how phosphate binders work and why they are used. What is the danger of high phosphorus levels in the blood?
    - 800-1000 mg /d
    - <17 mg/kg, IBW and SBW or adjusted weight
    - Limit high phos.
        - Dairy, beans, whole grains nuts and chocolate
- What vitamins and minerals are often supplemented in renal failure?
    - Supplementation of water soluble due to:
        - Losses in dialysate
        - Anorexia and poor intake
        - Renal diet low in fresh fruits and veggies, whole grains and dairy
    - Renal vitamin supplementation
        - B vitamins, folic acid and vit C
        - Do not include A, E and K
            - Vit A levels elevated in decreased kidney catabolism
            - Vit E levels decreased catabolism and excretion by kidney and not removed by dialysis
            - Vit K maybe if on antibiotic therapy, but caution if on anticoagulant therapy
- Explain what acute renal failure is and provide examples of why it may occur.
    - Definition: Abrupt reduction or loss of renal function
    - Etiology:
        - Prerenal azotemia: reduced perfusion to the kidney
            - ex.) conditions that result in PA = severe dehydration, burning and extensive blood loss
        - Acute tubular necrosis: ischemia damages kidney, may be irreversible
    - Intrinsic: damage to structure of the kidney
        - Causes: toxins (chemotherapy, antibiotics)
        - Causes: blockage, tumor

- Explain how ARF is treated. Describe nutrition therapy in these patients.
    - Treatment
        - Continuous renal replacement therapy: continually dialyzing
    - Nutrition Therapy
        - May be catabolic
        - May need enteral or parenteral nutrition support if oral intake is not adequate
        - Protein
            - Not dialyzed: 0.6 g/kg
            - Hemodialysis: 1.2-1.4 g/kg
            - Continuous renal replacement therapy: 1.5-2.0 g/kg
            - Kcal
                - 25-35 kcal
            - Urine output + 500 ml = fluid
                - Consider ins and outs
- Explain what nephrotic syndrome is
    - Loss of albumin in urine due to increased permeability of the glomerulus

Exam I Material

- Nutrition Assessment
    - Anthropometric measures
        - Calculate BMI and memorize the BMI categories
            - BMI = [weight (lbs) / height (in) ^2] X 703

BMI	
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30-34.9	Obese, Class 1
35-39.9	Obese, Class 2
> 40	Obese, Class 3, Extreme Obesity

    - Biochemical data
        - Explain the difference between positive and negative acute phase proteins.
        - Impact of surgery, infection etc on albumin and prealbumin and how this complicates the interpretation of these labs when assessing nutritional status.

- Negative = Albumin, Transferrin, Transthyretin, RBP = decrease with inflammation
- Positive = C-Reactive Protein = increases with inflammation

- Which is used to assess the level of inflammation a person is experiencing?
  - CRP
- Half life for albumin and prealbumin
  - Albumin: 14-20
  - Prealbumin: 2 day

- Nutrition Intervention
  - Define modular products and provide examples
    - Products that provide a single nutrient
    - Polycose = carbs
    - Promod and Beneprotein = protein powder, changes taste and texture slightly
    - MCT oil = fat; medium chain triglyceride oil
  - Commercial beverage supplements—what they are and how they are used. About how many kcal and grams of protein do they contain?
    - Used as a between meal snack
    - Administer with meds in place of water
    - Single portion -250 ml, lactose free
    - Some have fiber some do not
    - 250-350 kcal, 7-15 g protein

- Documentation of the Nutrition Care Process
  - Be able to indicate which part of the SOAP and ADIME note a statement from the medical chart belongs in.
    -

- Fluid and Electrolyte Balance
  - Signs and symptoms of dehydration
    - Cause: loss of fluid
    - GI losses: vomiting and diarrhea
    - Burns and draining wounds, fistula
    - increased renal excretion: HYPERosmolar-hyperglycemic nonketotic syndrome
    - Fever, environmental heat
    - Signs and symptoms:

                - Decreased blood BP
                - Decreased cardiac output
                - Tachycardia, weak pulse, dizzy
        - How do labs change based on hydration status? What is one major lab that indicates dehydration?
            - Hemodilution is the cause of some abnormally low lab values
                - Na, Cl, Hemoglobin, Hematocrit, BUN, albumin
                - Hyponatremia
                    - Also due to IV fluids without electrolytes, exercise induced hyponatremia

                Treatment:

                    Restrict fluids and sodium
        - What is edema?
            - Swelling of body due to water moving into interstitial spaces in the body
        - What can cause potassium levels to be low? What is the danger of high and low potassium values?
            - Hypokalemia
                - Vomiting and diarrhea can cause hypokalemia
                    - Loss of gastric ACID = metabolic alkalosis = kidney increase bicarb excretion = potassium excreted along with bicarb = hypokalemia
        - Calculate fluid needs using the kcal/kg method or 1 ml/kcal method.
            - 1.0-1.5 kg/kcal

Exam II Material

- Obesity
    - Weight loss—realistic initial goal and what is considered a safe rate of loss.
        - 10% weight loss in 6 months
        - 1-2 lbs a week
    - How much should kcal be restricted by to cause a weight loss of 1-2 lbs per week? What are the recommended kcal levels in men and women to induce weight loss?
        - -500 to -1000kcal
    - What is the most accurate energy estimation formula to use in overweight and obese clients? What weight should be used with this formula?
        - MSJ with actual weight x Activity factor -500 or 1000 kcal
    - Bariatric surgery— what is done to the stomach and small intestine in each type, what is required to be a candidate for this surgery, drawbacks

- Who
    - Those who have failed to lose weight by other means
    - Adults: BMI > 40 or >35 with significant comorbidities conditions
    - Obesity is a CHRONIC disease
        - SIGNIFICANT COMORBIDITIES
            - Sleep apnea
            - Type 2
            - Idiopathic intracranial hypertension
            - HTN
            - Severe nonalcoholic steatohepatitis
            - Blount's disease
            - Slipped capital femoral epiphysis
            - GERD
    - Must consider ability to adhere to post op dietary regimens
        - Substance abuse problems
        - Psychiatric, psychosocial, cognitive conditions
        - Planned pregnancy with in 12-18 mths
- DIFFERENT TYPES
    - Restrictive
        - Laparoscopic adjustable gastric banding (LAGB)
            - Inflatable silicone ring or band placed around the upper part of the stomach

        - Creates narrow opening and smaller pouch for stomach (30ml)
        - Port placed under skin; saline can be injected to inflate the band
        - Done laparoscopically
        - Lose weight at slower rate
    - Laparoscopic vertical sleeve gastrectomy
        - Surgically remove 85% of stomach
        - Laparoscopic procedure
        - Portion of stomach that is removed normally produces ghrelin
            - Hormone that stimulates appetite
- Restrictive: malabsorption
    - Roux-en-XY
        - Surgically create a small pouch at top of stomach
        - Bypasses rest of stomach, duodenum and part of jejunum, attach lower part of small intestine to newly created pouch

- Dumping syndrome— tips to prevent
    - Nausea and vomiting too much food consumed at one time
    - Dumping
        - Hyperosmolar contents enter the small intestine too quickly
        - Increased gastric emptying rate (pyloric portion of stomach bypassed or removed)

- Food dumps into small intestine
    - Hyperosmolar
    - Fluid enters small intestine to dilute
    - Cramping, abdominal pain, hypermotility, diarrhea
    - Dizziness, weakness, tachycardia (fluid change in blood vessels)
    - Occurs
        - Early: 10-20 mins
        - Intermediate: 20-30 mins(food ferments in colon)
        - Late: 1-3 hrs (quick movement and absorption of food through small intestine → too much insulin → hypoglycemia
- Intervention
    - Protein with every meal
    - A lil fat
    - Avoid simple sugars: to prevent hyperosmolarity and hypoglycemia
        - Sweetened beverage and yogurt
    - Lactose may need to be avoided
        - Use products with lactase or lactose free milk
        - Liquids only between meals: promote quick movement
        - Avoid caffeine

        - 5-6 small meals

- Diabetes
    - Long term consequences of DM
        - Long-term complications
            - Risk of death for adults with DM is 50% higher than adults without DM
            - Medical costs for people with diabetes are twice as high as for people without DM
        - Macrovascular cardiovascular disease
            - Hyperglycemia damages endothelial and basement membrane layers of blood vessels
            - Leads to acceleration of atherosclerosis → heart attack
            - Those with DM often have comorbidities such as HTN, dyslipidemia
        - Microvascular
            - Nephropathy and kidney disease
                - Hyperglycemia damages the glomerulus
                - Microalbuminuria = presence of albumin in the urine
                - Macroalbuminuria = albumin in urine
                - Renal failure
            - Retinopathy
                - Hyperglycemia: damages the blood vessels in the eye
            - Neuropathy
                - Hyperglycemia damages nerve cells

            - Several symptoms: numbness in hands and feet
        - GI tract
            - Gastroparesis
            - Delayed empty in stomach
            - Nausea, vomiting, early satiety
            - Constipation or diarrhea
        - Genitourinary
            - Incontinence
            - UTI
            - Sexual disfunction
        - Cardiovascular: hypotension, tachycardia, silent heart disease
        - Research studies on the importance of glycemic control
        - Several large, well designed studies
- Symptoms of DM, hyperglycemia and hypoglycemia (be able to tell the difference b/w)
    - Symptoms of DM and casual plasma (CPG) > 200 mg/dl
        - Symptoms: polyuria, polydipisa, unexplained weight loss
        - Casual: any time of day regardless of time of last meal
    - Fasting plasma glucose
        - FPG > 126 mg/dL
        - Fasting - no caloric intake for at least 8 hrs
    - Oral glucose tolerance (OGT) test > 200 mg/dL
        - Overnight fast of 8-14 hrs
            -

	Fasting Plasma Glucose (FPG)
Normal	Less than 100 mg/dl
Prediabetes	100 mg/dl to 125 mg/dl
Diabetes	126 mg/dl or higher

- 75 g of C are consumed and blood glucose is checked 2 hrs later
  - Dissoled in H2O
  - Consumed in 5 min
  - Take blood in 2 hrs
- Hemoglobin A1C > 6.5%
  - Tests average blood glucose concentrations
  - Historically was not approved for diagnosis
  - ⅓ fewer
  - Prediabetic A1C = 5.7 - 6.4%

- Know fasting blood glucose level that is normal, pre-diabetic and diabetic

Blood Sugar Classification	Fasting Blood Sugar Levels	Post Meal Blood Sugar Levels
Normal	70-100 mg/dL	70-140 mg/dL
Prediabetes	101-125 mg/dL	141-200 mg/dL
Diabetes	125 mg/dL and above	200 mg/dL and above

- Do NOT memorize the exact minute/hours, but know how the types of insulin compare with each other in terms of onset, peak and duration
  -
- Which types of insulin are used as basal insulin and which are bolus? Which are paired together?
  - Rapid acting = bolus + long-acting = basal
- Explain the difference between fixed insulin, flexible and intensive insulin regimens. How do these affect the timing of CHO at meals and snacks?
- Hypoglycemia is most likely with which type of oral medication?

        - Insulin secretagogues
    - Exchange diets
        - Average size of a meat/meat substitute, milk, fat, vegetable exchange
        - How much oatmeal, rice, pasta, sandwich bread, hot dog/hamburger bun= 1 starch exchange?
            - Cooked oats ½ cup = 1 choice
            - Rice ⅓ cup = 1 choice
            - Pasta ⅓ cup = 1 choice
            - Sandwich bread = 1 piece
            - Hot dog/hamburger bun = ½ one choice
        - Foods that fall into each list/exchange group
    - Carbohydrate counting
        - Be able to calculate the number of carbohydrate choices needed. How to space these out
            - Number of kcal/2 = 50% carb choices. Divide this number by 4 for grams and that grams by 15 for how many choices
        - What counts as a CHO choice? (don't forget starchy veg)
            - 3 servings nonstarchy veggies
            - Starches, fruits and milks
    - Hemoglobin A1C—what it measures, why it is used to measure this, and goal level for DM

        Hemoglobin A1c

            - Measure amount of glucose bound to hemoglobin (added to amino acid side-chains)
            - Higher glucose concentration → more hemoglobin is glycated
                - Blood glucose increases = increase glycated hemoglobin
    - Insulin to CHO ratio—know how many units of insulin should be provided based on the grams of CHO
        - Insulin to CHO ratio
            - Determine how much insulin to give based on the amount of CHO they will eat in meal

- 2 unit of rapid-acting insulin for every 10-15 g of CHO (to start)
    - ex.) if I consume 60g of CHO, how many units of rapid acting insulin will I need to take?
        - 1 unit to every 10 g
            - So 6 units
    - 500 rule
        - 500 / daily dose of insulin
        - E.g. total daily dose = 50 units rapid acting insulin
        - 500/50 = 10
        - Ratio = 1 unit of insulin for every 10 g CHO

- Hypoglycemia—level considered hypoglycemic and how to treat (15:15 rule)

Hypoglycemia—level of blood glucose that is defined as hypoglycemic; symptoms, treatment

- Symptoms:
    - Shakiness, sweat, rapid heartbeat, hunger
    - Confusion
    - Belligerent or lethargic
    - Unconscious
- Treatment:
    - Must be educated on
    - Mild
    - 15:15 rule consume 15 g of CHO, wait 15 mins then try again
    - If still low, repeat

        - Foods:
            - ½ cup fruit juice/soda , 6 saltine crackers, 3 glucose tablets, etc.
- How does physical activity impact blood glucose?
    - Decrease CVD risk (improved lipids and BP)
    - Weight management
    - Improved blood glucose control working muscle and uptake of blood glucose
    - Nutrition Implications
        - Hypoglycemia: Type 1 and Type 2 on insulin or secretagogues
            - During physical activity > 1 hr
            - Up to 24 hrs after strenuous, prolonged exercise
        - Nutrition therapy to prevent
            - Monitor blood glucose <30 min usually don't need extra CHO or insulin adjust
            - Longer than 30 mins
                - 15 g for 1 hr moderate activity
                - 30 g / hr for strenuous
            - Hyperglycemia
                - Not enough insulin: counterregulatory hormones increase glucose production
- Define hyperglycemic hyperosmolar nonketotic syndrome and diabetic ketoacidosis. What are the causes of each?
    - Diabetic ketoacidosis: uncontrolled diabetes
    - Hyperglycemic hyperosmolar nonketotic syndrome: resulting from very high blood glucose level

- Define dawn phenomenon.
  - High fasted blood glucose levels that result from increased insulin need during the early mornings hrs -4.8 am)
    - Counterregulatory hormones (growth, cortisol, glucagon, epinephrine increase and raise blood glucose).
      - Distinguish from Somogy Effect: high blood glucose in the morning that is the result of a rebound from low in the night

Exam III Material

- Atherosclerosis
  - Roles of HDL and LDL in atherosclerosis
    - HDL is high density lipoprotein and they help remove plaque from artery walls
    - LDL is low density lipoproteins and they invade artery walls and build up as plaque.
    - https://www.youtube.com/watch?v=fLonh7ZesKs
    -
  - Identify levels of LDL that are considered optimal and high. Identify HDL levels that are considered protective and the level that is considered high risk. Total cholesterol—optimal level
  -

Total Cholesterol Levels	
<199 mg/dL for adults of age > 21 years	"Desirable" level is associated with lower risk for heart disease; a cholesterol level of > 200 mg/dL or greater increases your risk
75-129 mg/dL for age 20 and younger	
HDL Levels	
40-59 mg/dL	Normal
60 mg/dL and above	HDL of 60 mg/dL and above is

	considered protective against heart disease
LDL Levels	
<70 mg/dL	For individuals with existing heart disease
<100 mg/dL	For high risk individuals
<130 mg/dL	For individuals at low cardiac risk
Triglyceride Levels	
Less than 150 mg/dL	Optimal for all individuals

- AHA/TLC diet
  - effect of different lipids on LDL levels and food sources of each
  - recommended amounts of saturated fat, cholesterol, ounces of protein per day and egg yolks

Saturated Fat	Reduce total saturated fat and trans fatty acids
Cholesterol	Raises LDL levels and total chol
Protein (oz)	5 oz a day
Egg yolks	< 2 egg yolks a week

  - soluble fiber, stanols and sterols—effect on blood cholesterol levels, food found in
    - soluble fiber—effect on cholesterol levels; grams of soluble fiber per day
      - Current soluble or viscous fiber intake recommendations for CVD are based on its ability to reduce LDL and total serum chol levels.

        - 20-30g ; 6-10 g soluble fiber
        - Reduces reabsorption of bile acids → remove LDL from circulation and use child to make new bild acids: body takes up chol to make more bile for the liver
        - Bile acid sequestrants
            - Cholestyramine, colestipol
            - Decrease LDL, increase HDL, decrease TG
        - Sources: legumes, oats and oat bran, veggies fruits
    - plant stanols and sterols- what are these, what effect do they have and where are they found?
        - Plants do not contain cholesterol but they do have similar chemical structure as they also have similar chemical structure as they also have sterol component/
        - Help lower serum cholesterol and LDL levels
        - Sources: fortified foods such as benecol, promise active
        - Consume in 2-3 doses with meals and snacks
- omega-3 fatty acids—why are these beneficial and what are their food sources (ALA, EPA, DHA)
    - Linolenic acid, omega-3 is a polyunsaturated fatty acid and is essentail
    - Important to intracellular processes, vasoconstriction, vasodilation, platelet function, immune system response, and inflammatory response (anti-inflammatory) and has been implicated as a

mediator in asthma and allergic reactions. EPA and DHA lower CVD risk

- Coldwater fish and fish oils are particular rich sources of linolenic acid. Flaxseed and flazseed oil are also significant sources of alpha-linolenic acid (ALA)
- Reduced mortality

- Effect of uncontrolled DM, high refined CHO intake and excessive alcohol intake on TGs
  - DM: CVD is the most common cause of death amongst patients with diabetes. The risk of death from heart disease and strokes in individuals with both types 1 and 2 is two to four times greater than those without.
  - Macrovascular complication of DM
  - Risk equivalent - those with DM are considered to have the same risk of heart attack as those who have already had one.
  - Often have other risk factor for CHD-HTN, dyslipidemia, obesity
  - Prediabetic/impaired fasting glucose
- HMG CoA reductase inhibitors—know how these lower cholesterol. Be able to id by name (they all end in –statin)
  - HMG CoA reductase inhibitors: Statins
    - HMG CoA reductase = enzyme that is the rate-limiting step of cholesterol synthesis
    - Lovastatin, provastatin, simvastatin, lipator
    - Decrease LDL, increase HDL, decrease TG
- Major statin benefit groups
  - Major beneficiaries:
    - Those who have CVD

- LDL > or equal to 190
- Diabetes type 1 or 2 ages 40-75 and LDL 70-189 mg/dL and > or equal to 7.5% 10 year risk of stroke or MI
- Do not treat to a goal level of LDL but reducing LDL is still the desired outcome

- Hypertension
    - Identify the level of blood pressure that classifies someone as normotensive, prehypertensive, hypertensive stage 1 and hypertensive stage 2.

	Systolic	Diastolic
Normal	120	80
Elevated	120-129	<80
HT stage 1	130-139	80-89
HT stage 2	> or equal to 140	> or equal to 90

    - Name factors that influence the development of HTN
    - Factors that may influence
        - Diet
        - Lack of exercise
        - Smoking
        - Stress
        - Obesity
        - Genetics
        - Excessive secretion of vasopressin
        - (ADH) or produce excess angiotensinogen (genetic)

- Be able to id ACE inhibitors by name (they end in –pril). How do they work?
  - ACE inhibitors block angiotensin converting enzyme from making angiotensin II and ultimately lowers BP
- Know the features of the DASH diet.
  - DASH Diet - Dietary Approaches to Stop Hypertension
    - General features:
      - Low sodium and saturated fat
      - Rich in Potassium, Mg, Ca and fiber
      - Emphasis: fruits and veggies, little meat, low fat / ff dairy, includes nuts
- Aside from the DASH diet and sodium consumption, what other things should be addressed with the patient in order to lower blood pressure?
  - Physical activity level, weight, smoking or alcohol consumption
- Sources of sodium in the diet. Label terms.
  - Sodium containing foods:
    - Condiments
    - Canned foods
    - Frozen processed
    - Frozen veggies with sauce or without
    - Table 13.5
  -

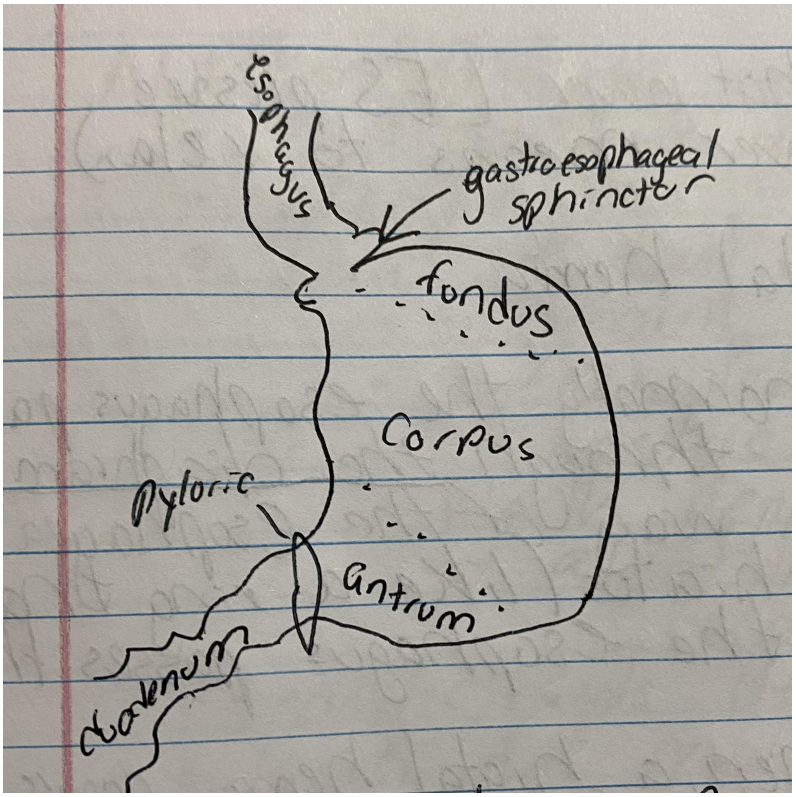
sodium	
Sodium free or salt free	Less than 5 mg per serving
Very low sodium	35 mg or less per serving
Low sodium	140 mg or less per serving
Low sodium meal	140 mg or less per 31/2 oz (100g)

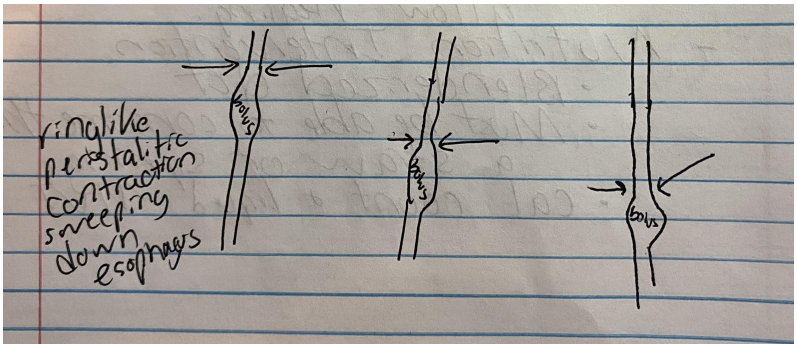
Reduced or less sodium	At least 25% less than the regular version
Light in sodium	50% less sodium than the regular version
Unsalted or no salt added	No salt added to the product during processing

- Heart Failure
    - Describe the symptoms that patients with HF experience and why (clinical manifestations)
        - What is dyspnea? Dyspnea = trouble breathing
    - What problem can occur due to the use of loop diuretics?
        - A loss of water soluble nutrients: potassium, magnesium, thiamin, riboflavin, pyridoxine
    - Explain nutrition concerns in patients with HF including sodium and fluid, decreased blood flow and cardiac cachexia
        - Sodium and fluid: need to control in order to control symptoms
        - Side effects and drug - nutrient interactions
        - Decreased blood flow to GI and gut edema
            - Slowed peristalsis and early satiety
            - malabsorption
    - Name the level to which sodium should be restricted
        - 2g Na
            - Can be difficult to adhere and may trigger nutritional deficiency
            - Don’t be too aggressive = could lead to other nutrition problems
            - Greater restrictions may be prescribed, but…
        - Low Na education
            - Table salt
            - High Na foods = table 13.13

        - Herb seasonings in place of salt
        - Nutrition label terms
    -

Exam IV Material

- Diseases of the Upper GI
    - Explain the normal role of the LES and how it malfunctions in GERD
        - Review of lower esophageal sphincter
            - Band of muscle at the end of the esophagus
            - Purpose: to prevent stomach contents from backing up into esophagus
            - Sphincter relaxes or open to allow food to pass through, then closes
            - Ringlike peristaltic contraction sweeping down esophagus
            - 

- 

-
- What is GERD? What are the consequences and symptoms of GERD?
  - Gastroesophageal reflux disease
  - Symptoms and consequences
    - Heartburn: retrosternal burning related to reflux of gastric contents into esophagus (remember these contents are acidic)
    - Belching
    - Esophageal erosions and ulcerations
    - Stricture (build-up of scar tissue which impairs swallowing)
    - Barrett's esophagus (BE)-
      - Cells lining the esophagus become abnormal: considered premalignant
      - Esophageal cancer can develop
- Describe nutrition interventions for GERD. What foods can act as triggers?
  - Food diary or 24 hr recall
  - Weight loss
  - Trial of food restriction
    - Spearmint, peppermint, chocolate
    - Coffee, black tea: *stimulate gastric acid secretion*

            - Black pepper, red pepper and alcohol: *stimulate gastric HCl secretion*
        - Smaller meals: delay gastric emptying
        - Lower fat meals
        - Remain upright after eating (3-4 hrs)
        - Acidic foods such as citrus juice, tomatoes, soft drinks
            - Not cause but may cause pain
        - Broth, baked chicken
    - What is PUD? What are the causes? What are the consequences
        - Peptic ulcers
            - Define peptic ulcer disease and describe potential consequences consequences
                - Ulcerations of the gastric or duodenal mucosa
                - Starts in the upper layers of the mucosa, but can erode into deeper layers
                - Can perforate the stomach
                - Can bleed and cause death
    - Nutrition intervention for PUD
        - Implications for assessment: pain can lead to decreased intake and weight loss
        - Similar to GERD
            - Avoid acidic foods, trigger foods, small meals, milk and cream

              NOT recommended: can increase acid production

- Diseases of the Lower GI

- What happens to the small intestine in celiac disease? What is the trigger? What are the symptoms?
  - Definition: ***inflammatory small intestinal disorders that result from an inappropriate autoimmune response to the ingestion of gluten***
- What nutrition problems can result from celiac? What nutrients may need to be supplemented?
  - Malnutrition: weight changes and nutrient deficiencies: micronutrient
  - Diet history: amount of gluten, self diagnosed inappropriate restriction
  - Client history: osteoporosis, anemia, bone mineral density, infertility
  - Biochemical and medical tests: nutrient deficiencies (e.g. H and H, ferritin, B12, folate, vit D), bone density screening
  - Knowledge and beliefs
-
- What foods must be avoided in celiac disease? What are the most common gluten containing ingredients?
  - ***Lactose free (at first)*** *= until small intestine heals*
    - *Lining of small intestine damaged = no lactase*
  - Gluten free - life long
    - Wheat, barley, rye, malt
  - Oats
    - May be contaminated*
    - Gluten free oats: below 20 ppm of gluten: ½ cup dry rolled oats
  - Must read ingredient lists and food label - gluten containing foods not always obvious
  - *Term 'gluten free' below 20 ppm*
  - Wheat free: does not mean gluten free

            - But allergen statement listing wheat does indicate the product is not safe for those w/ Celiac Disease
        - 5 most common ingredients to look for
            - Wheat
            - Barley-malt, malt extract, malt syrup, malt flavor
            - Rye
            - Brewer's Yeast
            - Oats (contamination, needs to say gluten free)
            - If these are in gluten free product, manufacturer must test below 20 ppm
- What is IBS? What are the symptoms? What is the FODMAP diet?
    - IBS
        - Define irritable bowel syndrome and the different types
            - Definition: abdominal pain or discomfort that occurs in association with altered bowel habits over a period of at least ***3 months***
            - Types:
                - Diarrhea predominant
                - Constipation predominant
                - Mixed diarrhea and constipation
        - Explain the pathophysiology of IBS
            - Most common GI compliant in US
            - NA: 12%
            - Women more than men

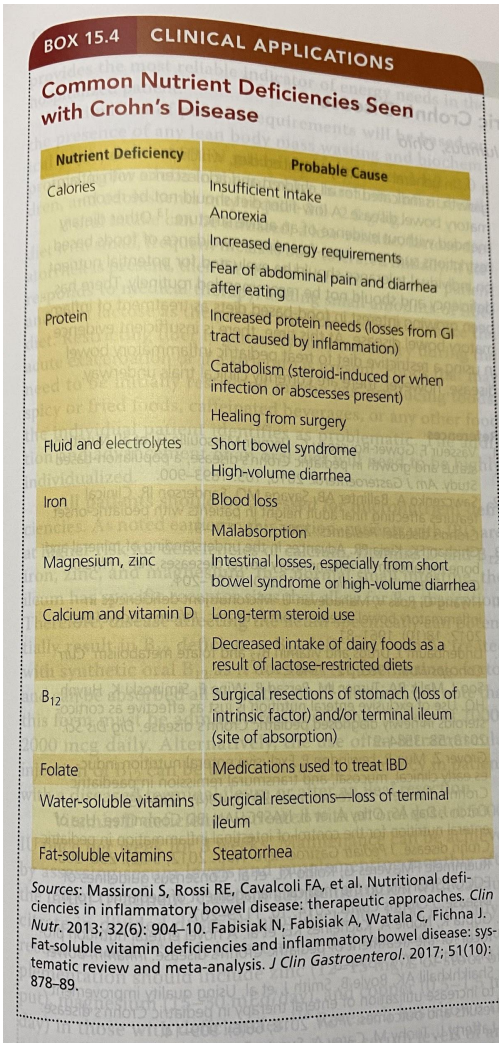
- Etiology:
    - Functional disorder: diagnose after all other possible causes are ruled out
    - Cause unknown
    - Genetic predisposition; food sensitivity and microbial environment → immune response; inflammatory response; increased sensitivity of enteric nervous system causing abnormal motility abnormal serotonin; small int. Bacterial
        - Associated with lactose intolerance and celiac**

- FODMAP

Fermentable	Gut bacteria can ferment food components when eaten in large portions. This can result in bloating, gas, abdominal pain, and diarrhea
Oligosaccharides	Fructan sources: *wheat, rye, garlic, onion, leeks and artichokes* Galacto-oligosaccharides (GOS) sources: *beans, lentils, soybeans, and nuts including cashews*
Disaccharides	Lactose sources: *Dairy products and ingredient from cow, goat, or sheep's milk*
Monosaccharides	Fructose sources: *Certain fruits, honey, and high-fructose corn syrup*
Polyols	Sources: *sorbitol, mannitol, maltitol, erythritol, xylitol, and isomalt, apricots, avocados, cherries, nectarines, peaches, and plums and mushrooms*

- What is IBD? What is the difference between Crohn's and UC (# 2 and 3 under Pathophysiology)
    - Inflammatory Bowel Disease
        - Define inflammatory bowel disease and describe the difference between ulcerative colitis and Crohn's.
            - Definition, Epidemiology, Etiology
                - Autoimmune, chronic inflammatory condition of the GI tract
                - Epidemiology
                    - Crohn's : 44-201 / 100,000
                    - Ulcerative colitis: 37.5 - 238 / 100,000
                    - Men and women
                    - Northern hemisphere, increasing worldwide
                    - *Caucasian*
                    - *Ashkenazi Jewish ancestry*
- What physical changes can occur to the GI b/c of IBD?
    - Ulcerative Colitis
        - Affects the colon
        - 50% only the rectum
        - One section at a time
        - Only the first two layers
    - Crohn's
        - Can affect any portion of GI
        - Skipping pattern

- Damages all layers

- Why is malnutrition a big risk in IBD?
  - Malnutrition is a big risk: Box 15.4
    - Decreased intake and anorexia due to symptoms
      - Malabsorption: diarrhea and restrictions
        - Especially iron (blood loss), zinc, Mg, electrolytes, B12 (loss of intrinsic factor).
        - 

BOX 15.4 CLINICAL APPLICATIONS

Common Nutrient Deficiencies Seen with Crohn's Disease

Nutrient Deficiency	Probable Cause
Calories	Insufficient intake Anorexia Increased energy requirements Fear of abdominal pain and diarrhea after eating
Protein	Increased protein needs (losses from GI tract caused by inflammation) Catabolism (steroid-induced or when infection or abscesses present) Healing from surgery
Fluid and electrolytes	Short bowel syndrome High-volume diarrhea
Iron	Blood loss Malabsorption
Magnesium, zinc	Intestinal losses, especially from short bowel syndrome or high-volume diarrhea
Calcium and vitamin D	Long-term steroid use Decreased intake of dairy foods as a result of lactose-restricted diets
B_{12}	Surgical resections of stomach (loss of intrinsic factor) and/or terminal ileum (site of absorption)
Folate	Medications used to treat IBD
Water-soluble vitamins	Surgical resections—loss of terminal ileum
Fat-soluble vitamins	Steatorrhea

Sources: Massironi S, Rossi RE, Cavalcoli FA, et al. Nutritional deficiencies in inflammatory bowel disease: therapeutic approaches. *Clin Nutr*. 2013; 32(6): 904–10. Fabisiak N, Fabisiak A, Watala C, Fichna J. Fat-soluble vitamin deficiencies and inflammatory bowel disease: systematic review and meta-analysis. *J Clin Gastroenterol*. 2017; 51(10): 878–89.

      - Drug-nutrient interactions

        - Protein loss-loss from GI due to inflammation; catabolism due to steroids, infection, abscess, healing after surgery
- When are enteral and parenteral nutrition support used in IBD?
    - During exacerbations
        - Enteral or parenteral
            - Children: enteral is preferred over corticosteroids: negative impact on bone growth
                -
            - EN: decrease symptoms
            - Adults: enteral when additional nutrition is needed; associated with lower inflammation, but no consistent effect on remission
                - " if the gut works use it."
                - Type: chemically defined maybe needed
            - Parenteral: not necessary, does not improve remission
            - May be needed immediately post-op
- Describe oral diet in exacerbations and remission of IBD
    - Low residue, lactose-free diet, small frequent meals
    - Restrict fiber during exacerbation and stricture: fiber adds volume to what they consume and their fecal material

Choose	Avoid
Refined and enriched grains	Seeds and nuts (even in bread and cereal)
Cream of wheat	Whole grains
Rice and corn cereals	Dried and raw fruits
White rice and noodles	Raw vegetables
Peeled fruit without seeds (bananas, cantaloupe, honeydew, canned fruit)	Beans, peas, broccoli, Brussels sprouts, cabbage, corn, potatoes with skin, cauliflower
Well cooked vegetables w/o seeds (green beans, asparagus tips, squash, pumpkin), cooked potatoes w/o skin	Preserves and jam with skins/seeds
Milk/dairy	Popcorn
Meats	Juice with pulp

- What is the difference between an ileostomy and a colostomy?
  - Distinguish between ileostomy and colostomy
    - Ileostomy: colon and rectum removed; end of ileum attached to stoma
    - Colostomy: rectum removed; colon attached to stoma (less removed)
- How do stool consistency and fluid loss differ for ileostomies and colostomies?
  - Stool consistency will vary in colostomy and ileostomy
    - Ileostomy: more liquid
      - Function of the colon: absorb water, electrolytes and some vitamins
      - Na, Cl, K and vit K and biotin
    - Colostomy: more solid
      - Most of the colon remains
- What foods have to be limited for 6-8 weeks after ileostomy/colostomy surgery?
  - Beginning oral diet
    - Can begin a day after, but often NPO for 2 days

- Liquids → 4-6 small meals
    - Approx. 6 weeks follow a low residue diet
- Foods to avoid: cause obstruction
    - Leafy green: spinach lettuce
    - Corn
    - Peas
    - Popcorn
    - Seeds
    - Fruits skins
    - Dried fruits
        - Avoid 6-8 weeks
        - Chew thoroughly

- Why should these foods be avoided?
    - Prevent obstruction of the stoma
- What foods can thin the stool? What foods can thicken it? What foods produce more gas?
    - Preventing gas
        - Things that increase amount of air swallowed
            - Chew gum, straw, carbonated beverages, smoking or eating quick
        - Foods that cause gas
            - Brussel sprouts, broccoli, cabbage, cauliflower, onions
            - Dried beans
            - Eggs, fish, onion, garlic produce odor
        - Foods that decrease odor

        - Buttermilk
        - Parsley
        - Yogurt
- Stool consistency
    - Foods that thicken stool: soluble fiber and starchy
        - Oats, applesauce, bananas, pasta, rice, potatoes
    - Foods that thin stool
        - Prune juice, high-sugar foods and beverages (high osmolaity), spicy foods