Immunodeficiency Disorders

Section 8

- Immunodeficiency Disorders
- Autoimmune Disorders
- Rheumatoid Disorders
- Systemic Lupus Erythematosis
- Scleroderma
- Crohn’s Disease & Ulcerative Colitis
- Fibromyalgia and Chronic Fatigue Syndrome
- Grave’s Disease and Thyroid Storm
- Polymyositis and Dermatomyositis
- Vasculitis
- Allergic Diseases
- Skin Disorders

Primary Immunodeficiency Disorders

- Apparent at birth or in infancy
- Over 70 different disorders identified
  - Some last a lifetime and some resolve as the immune system matures
- IgA deficiency is the most common
  - 1 in 500 births, in which B cells do not develop
  - The amount of IgA produced is either significantly reduced or absent.

IgA Deficiency

- The IgA antibodies protect body surfaces (like the nose, airway passages, digestive tract, ears, eyes, saliva, tears, and vagina) that are frequently exposed to foreign organisms and substances from outside of the body.
- Leads to increased URI, flu, sinsusitis, pneumonia, skin and mucus infections.

IgA Deficiency

- The disorder is considered selective because all other antibodies (IgD, IgE, IgG, and IgM) are present at normal or increased levels.
- Diagnosis
  - Lab tests and WBC differential
- Treatment
  - No favorable western care other then general health recommendations

Secondary or Acquired Immunodeficiency

- Can result from any prolonged serious illness
  - Cancer, kidney failure, liver disease, severe anemia, leukemia, diabetes
- Can also result from malnutrition
- AIDS – best known and most severe
  - Diagnosis – ELISA test (Enzyme-Linked Immunosorbent Assay) and confirmed by Western Blot test which are positive 1-2 months after the infection
    - P24 antigen and viral loads for the early days & weeks
  - S & S – swollen nodes, weight loss, fever, mental changes, opportunistic infections
  - Treatment
    - HAART (highly reactive anti-retroviral therapy)

Autoimmune (AI) Disorders

- Immune system recognizes and reacts to all foreign substances in the body and tries to destroy them by forming antibodies
  - The average adult has specific antibodies to up to 10 million antigens
  - Sometimes the immune system works to hard and can attack it’s own cells thinking they are foreign.

- The immune system is composed of two major parts.
- One component, B lymphocytes, produces antibodies, proteins that attack "foreign" substances and cause them to be removed from the body; this is sometimes called the humoral immune system.
- The other component consists of special white blood cells called T lymphocytes, which can attack "foreign" substances directly; this is sometimes called the cellular immune system.

- Over a lifetime, the immune system develops an extensive library of identified substances and microorganisms that are cataloged as “threat” or “not threat.”
- Vaccinations utilize this process to add to the library.
- Normally, the immune system can distinguish between “self” and “not self” and only attacks those tissues that it recognizes as “not self.”
- Autoimmune disorders are diseases caused by the body producing an inappropriate immune response against its own tissues.

- Sometimes the immune system will cease to recognize one or more of the body's normal constituents as "self" and will create autoantibodies – antibodies that attack its own cells, tissues, and/or organs. This causes inflammation and damage and it leads to autoimmune disorders.
- Causes
  - Normal tissue can be altered by a virus, drug, radiation
  - Defective programmed cell death may malfunction
  - Heredity
  - Hormonal changes
  - Middle age and elderly

- Autoimmune disorders fall into two general types:
  - Systemic autoimmune diseases
    - RA, JRA, SLE, Polymyalgia Rheumatica
    - Guillain-Barre syndrome
  - Localized
    - Type 1 Diabetes Mellitus, Hashimoto's thyroiditis, Graves' disease ,Celiac disease, Crohn's disease, Ulcerative colitis, Multiple sclerosis , Addison's disease

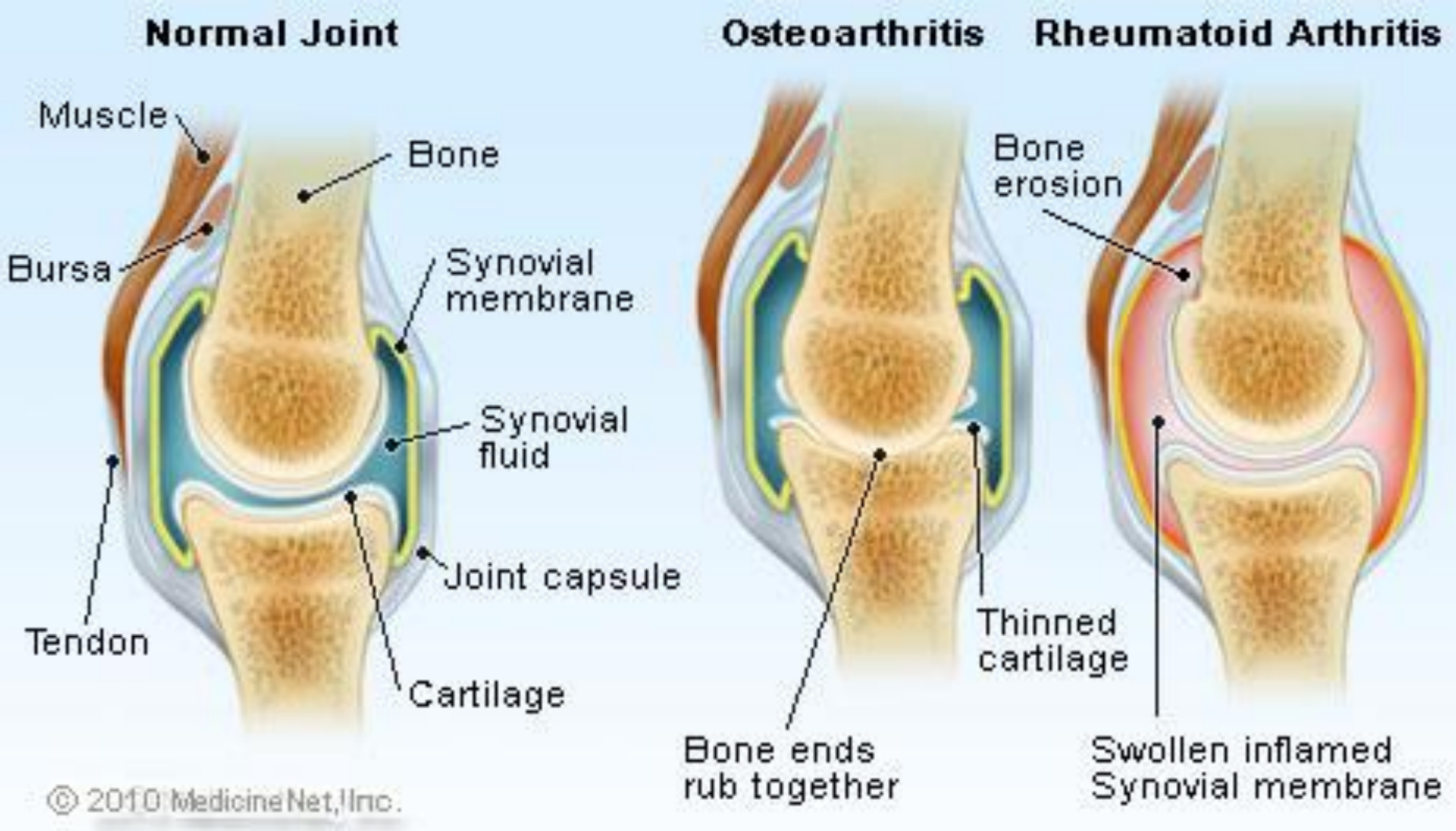
- S & S
  - Fever, fatigue, malaise
  - Other symptoms depend on the organ involved
- Diagnosis
  - History
  - Blood tests – ESR, CRP, RF, ANA, ELISA
- Treatment
  - Some drugs suppress the immune system
  - Some drugs reduce the inflammatory response
    - Steroids, NSAIDs
- Prognosis
  - Some AI disorders resolve
  - Most are lifelong chronic diseases needing lifelong care

Rheumatoid Arthritis

Rheumatoid Arthritis

- Most common Autoimmune Disorder
- Inflammatory arthritis affecting 1% population
- An autoimmune disease causing chronic joint inflammation
- A progressive illness that has the potential to cause joint destruction and functional disability
- Affecting approximately 1.3 million people in USA
- Three times more common in women as in men
- It afflicts people of all races equally
- Can begin at any age, but it most often starts after age 40 and before 60
- In some families, multiple members can be affected, suggesting a genetic basis for the disorder

- S & S
  - Symmetrical small joint pain with pronounced morning stiffness (morning gel), low grade fever, joints deformed
- Diagnosis
  - ESR, RF, ASO titer, HLA (human leukocyte antigen)
  - Joint fluid contains WBC, biopsy rheumatoid nodules
- Treatment
  - Supportive – rest, PT, hold and cold packs, DME
  - NSAIDs, Methotrexate, antimalarials
- Prognosis
  - 50-75% remission in a few years, the rest have progressive disease process and dies 10-15 years premature



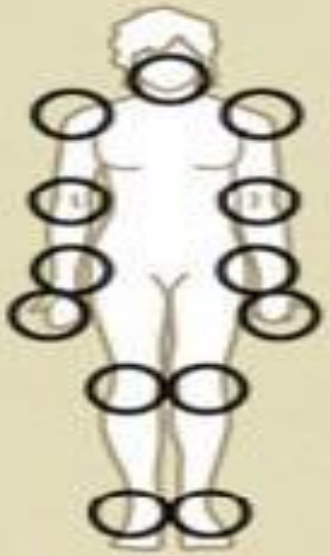
Normal and Arthritic Joints

Rheumatoid arthritis

One of the most common and debilitating forms of arthritis, three-quarters of the 2.1 million Americans affected are women.

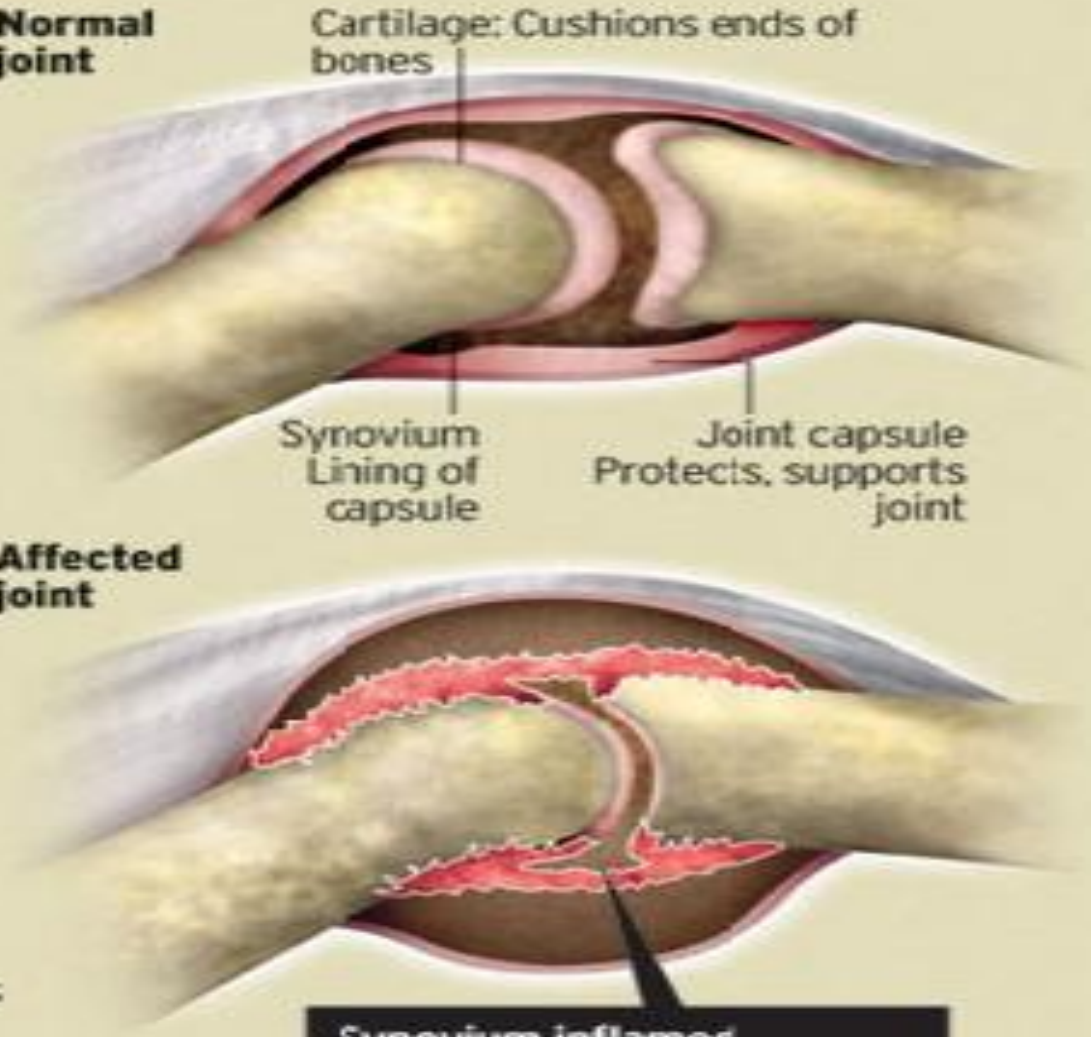
What is it

- Inflammatory condition; autoimmune disease; body's immune system attacks tissue lining joints; no known cure



Joints that may be affected

- Occurs symmetrically (both sides of body at once)
- Wrist, finger joints closest to hands are often affected



Symptoms, signs

Can vary widely

- 30 minutes or more of joint pain, stiffness after long rest
- Fatigue, low fever during flare-ups

Treatment

Lifestyle changes, pain and inflammation drugs, surgery, monitoring

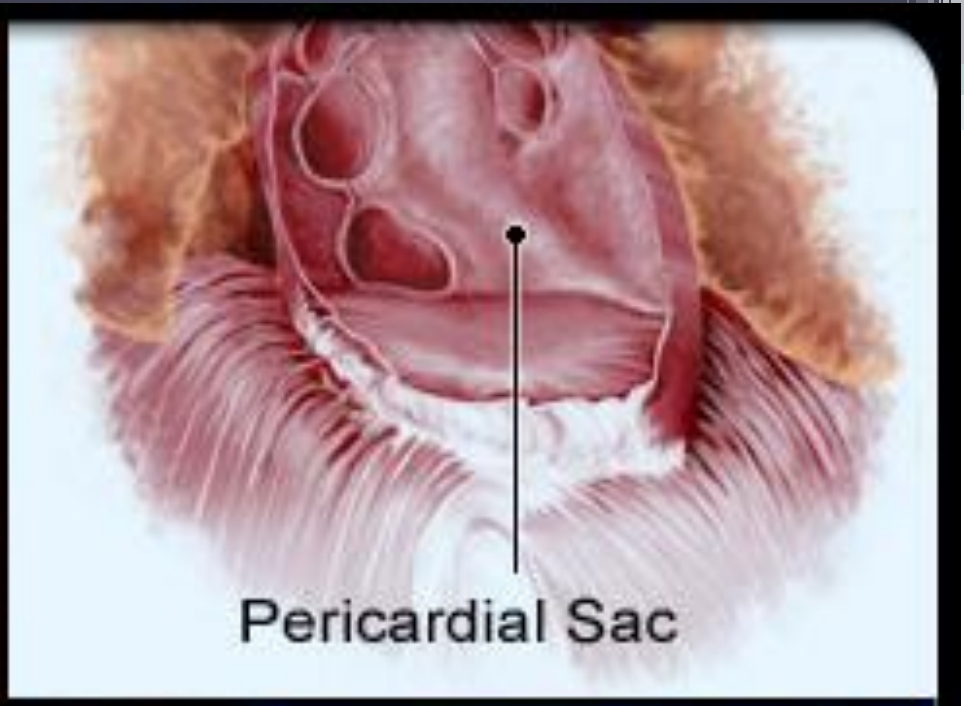
Reason for early treatment: Bone damage begins in first year or two of disease

Rheumatoid arthritis - YouTube


Normal
Rheumatoid Arthritis

- What causes rheumatoid arthritis?
  - Cause is largely unknown
  - Has a strong genetic link
  - It is suspected that certain infections or factors in the environment might trigger the immune system to attack the body's own tissues
- Symptoms
  - Come and go, depending on the degree of inflammation
  - When body tissues are inflamed, the disease is active
  - The course of rheumatoid arthritis varies from patient to patient, and periods of flares and remissions are typical
  - Inflammation usually symmetrical and of the small joints
  - Pronounced morning stiffness – “morning gel”

- Rheumatoid arthritis and inflammation of organs - can affect organs and areas of the body other than the joints
  - Sjogren's syndrome is inflammation of the glands of the eyes and mouth and causes dryness of these areas
  - Rheumatoid inflammation of the pleura
  - Pericarditis
  - Can have lowered RBC (anemia) and WBC
    - Felty’s Syndrome (lowered WBC and spleenomegaly)


Pericardial Sac

- Diagnosis
  - Positive RF (rheumatoid factor) and RF titer, ASO titer
  - WBC changes
  - Joint fluid with WBC and proteins
  - X-ray changes
- Treatment
  - Supportive and appliance measures
    - Hot and cold packs, walkers, etc
  - NSAIDs and COX2 inhibitors
  - Steroids are the main treatment
  - Rest and mild ROM exercises

Juvenile rheumatoid arthritis (JRA) causes joint inflammation and stiffness for more than six weeks in a child aged 16 or younger

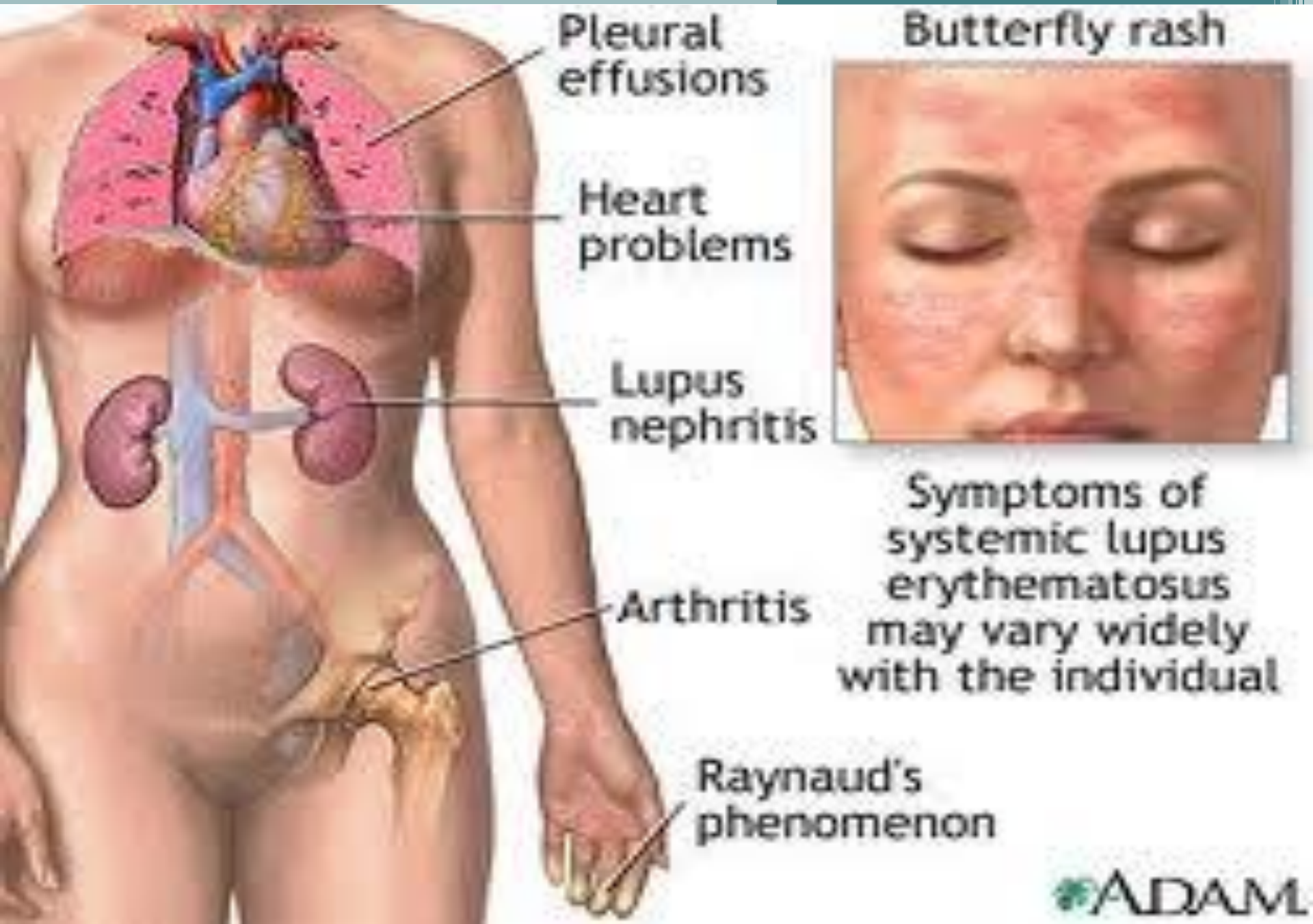
Affects 50,000 children

SLE – Systemic Lupus Erthyematosis

- Generalized AI involving joints, skin, brain, mucus membranes, kidneys, bone marrow, vessel walls
- 50,000 new cases per year
- 90% are young women in their late teens to 30s
- Four types:
  - Systemic lupus erythematosis – most common
  - Drug-induced lupus – resolves when drug stopped
  - Discoid lupus – affects skin with the classic butterfly rash
  - Neonatal lupus – transmitted to fetus
- Spontaneous remissions & relapses is the typical course

- S & S
  - Arthralgia (95%), inflammatory arthritis (90%)
  - Fever (90%), fatigue (81%) rashes (74%)
  - Anemia, kidney involvement, chest pain, alopecia
  - Cognitive dysfunction, photophobia, headaches
  - Blood clotting problems, Raynaud's
  - Mucosal ulcers, pericarditis, vasculitis
  - Seizures, psychosis, peripheral neuropathy
- Diagnosis
  - Confirmed by four or more of the above symptoms
- Lab tests
  - ANA (95%), RF usually negative, antibodies (40%)
  - Anemia (60%), proteinuria, hematuria
  - Tissue biopsy of rash

- Treatment
  - Very little western treatment effective – supportive
  - Avoid sun exposure with rash
  - NSAIDs
  - Hemodialysis is needed
  - Other meds
    - Hydroxycortisone, prednisone, Medrol
    - Decadron
    - Topical corticosteroid creams and oinments
    - Cytoxin, Imuran, Methotrexate
    - Antimalarials
    - DHEA


Pleural effusions
Heart problems
Lupus nephritis
Arthritis
Raynaud's phenomenon
Butterfly rash
Symptoms of systemic lupus erythematosus may vary widely with the individual
A.D.A.M.

Scleroderma

- Inflammation and fibroids in connective tissue, skin and supporting tissues around joints
- More in women
- Signs and Symptoms
  - Skin hardening, tendon friction rubs, migratory polyarthritis (90%), low grade fever, spider veins, calcified lumps, dysphagia, heatburn, GI tract fibrosis, pulmonary fibrosis
  - Usually starts with Raynaud's, finger swelling and tightness
  - CREST syndrome – less severe form
    - C – calcium deposits
    - R – Raynaud's of fingers and toes
    - E – Esophageal dysfunstion
    - S – Sclerodactyly –finger hardening
    - T – Telangioectesia – spider veins

The limited symptoms of scleroderma are referred to as CREST

Calcinosis- calcium deposits in the skin

Raynaud's phenomenon- spasm of blood vessels in response to cold or stress

Esophageal dysfunction- acid reflux and decrease in motility of esophagus

Sclerodactyly- thickening and tightening of the skin on the fingers and hands

Telangiectasias- dilation of capillaries causing red marks on surface of skin

- Diagnosis
  - Suggestive history and physical
  - Positive ANA, ELISA, skin biopsy thickened skin
- Treatment
  - No current effective western care
  - Supportive treatment
  - NSAIDs, corticosteroids
- Prognosis
  - Course varies widely and progresses to rapid decline and death
  - Survival rate averages 9 years

Telangiectasia

Dilation of small vessels and capillaries cause flat red marks to appear on the skin

A.D.A.M.

Other AI Diseases

- Crohn's disease – see Section 6
- Ulcerative colitis – see Section 6
- Fibromyalgia – see Section 4
- Chronic Fatigue Syndrome – see Section 4
- Graves' Disease – see Section 5
- Thyroid storm – see Section 5

Crohn's disease

- Chronic lifelong illness thought to be an autoimmune inflammatory disease
- S & S
  - Pain, cramping, fever, malaise, weight loss, frequent bowel movements
  - 50% involve small & large intestine, 35% involve small intestine only, 15% involve only large bowel
- Diagnosis
  - Clinical history with x-ray findings
- Treatment
  - Strict nutritional program with low lactose, low fiber, vitamin and mineral supplements
  - Corticosteroids (Prednisone)
  - Antibiotics (Flagyl)
  - Immunosuppressant drugs (Imuran)

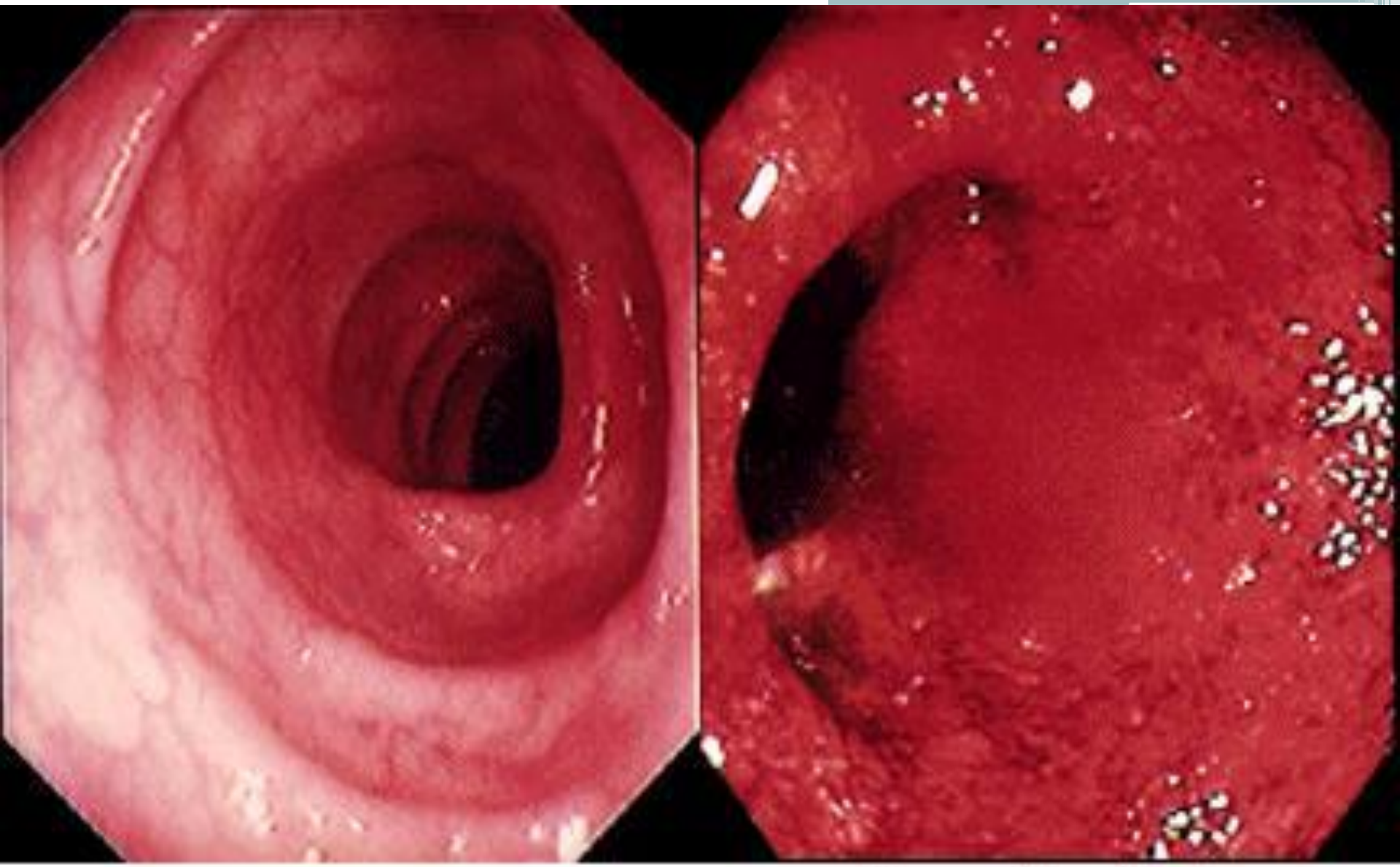
Films on Demand Video
Living with Crohn's Disease (Section 1 & 3)

< Normal ileum

Source: L. Bailen

Ulcerative colitis

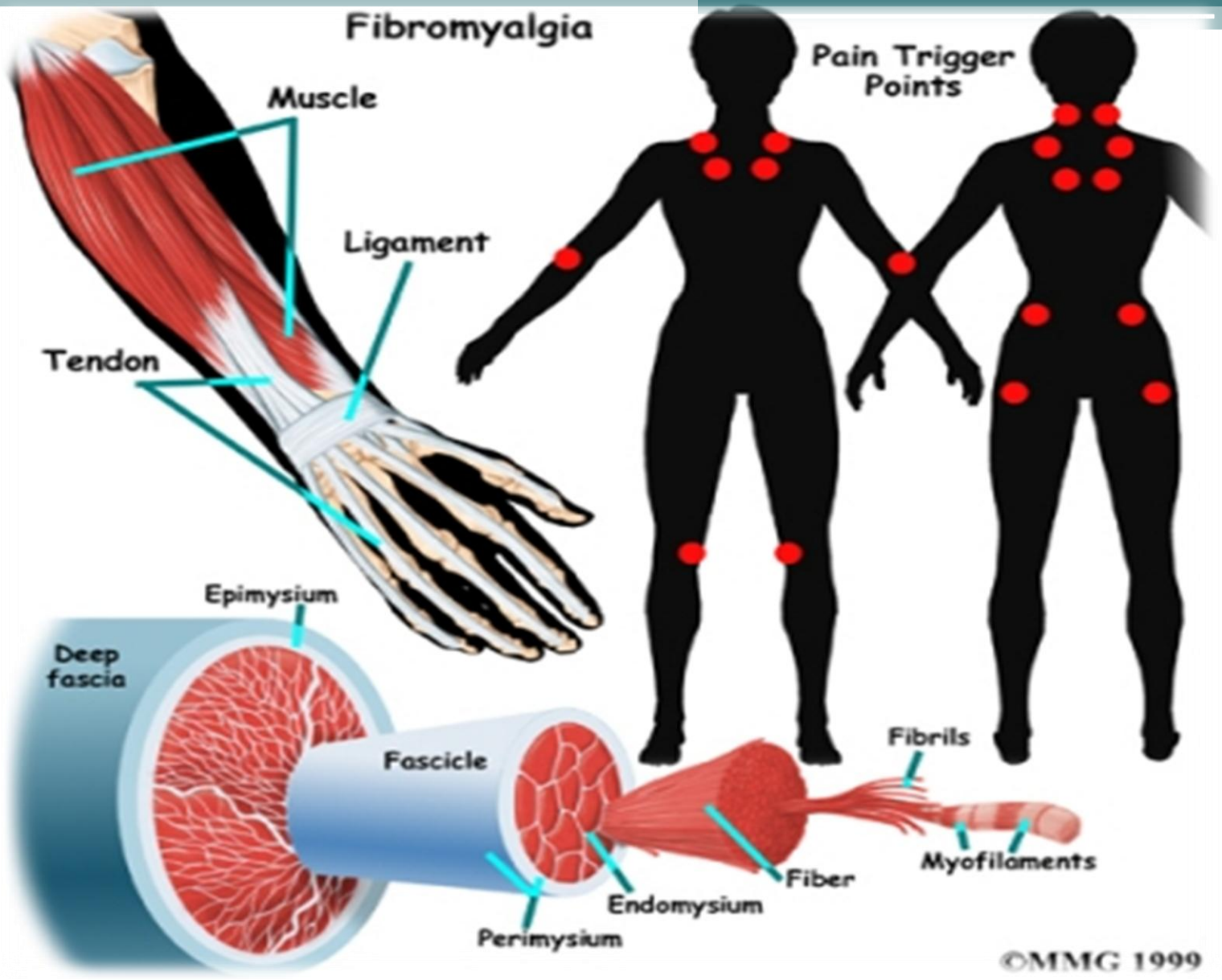
- Lifetime inflammatory auto-immune disorder
- Confined to the colon only
- S & S
  - Severe disorder with bloody diarrhea, cramping, and abdominal pain
  - Fecal urgency 5-10 x per day, with blood & mucus
  - Weight loss, anemia, low-grade fever
- Diagnosis
  - Sigmoidoscopy with mucosal biopsy
- Treatment
  - High fiber diet
  - Imodium
  - Corticosteroids
  - Mesalamine suppositories
- Prognosis
  - High risk of colon cancer



Healthy Colon

Ulcerative Colon

Fibromyalgia
Chronic Fatigue Syndrome


Fibromyalgia
Muscle
Ligament
Tendon
Pain Trigger Points
Epimysium
Deep fascia
Fascicle
Fibrils
Fiber
Myofilaments
Endomysium
Perimysium
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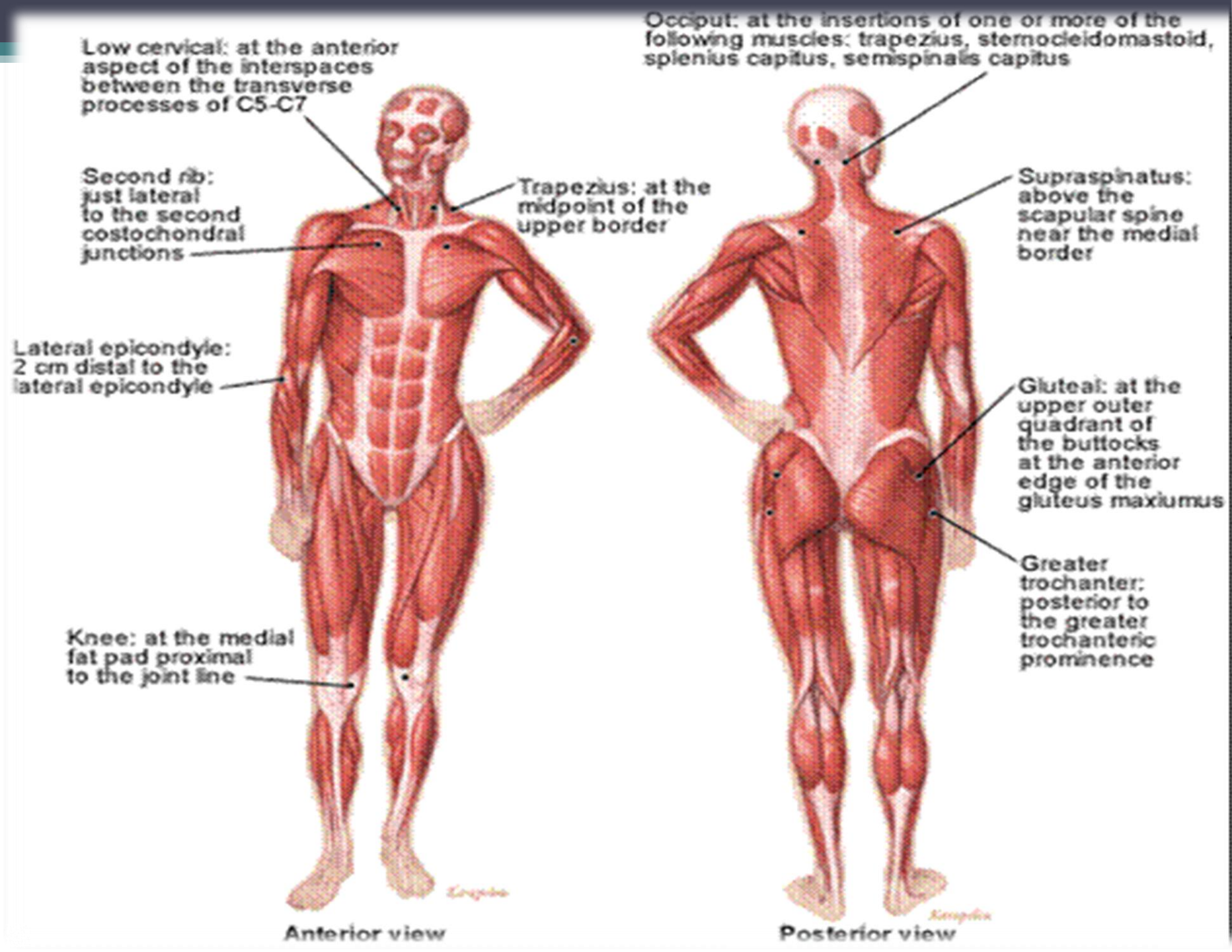
Pathophysiology

- The diagnostic criteria are twofold
  - Widespread pain and tenderness in 11 of 18 defined points
  - PMS Symptoms include non restorative sleep, chronic fatigue, stiffness, and headache, migraine, IBS, TMJ, and mood disorders

- CFS symptoms include
  - Profound fatigue, myalgia, sleep difficulties, low grade fever, pharyngitis, lymphadenopathy


Low cervical: at the anterior aspect of the interspaces between the transverse processes of C5-C7
Second rib: just lateral to the second costochondral junctions
Trapezius: at the midpoint of the upper border
Lateral epicondyle: 2 cm distal to the lateral epicondyle
Knee: at the medial fat pad proximal to the joint line
Anterior view
Occiput: at the insertions of one or more of the following muscles: trapezius, sternocleidomastoid, splenius capitus, semispinalis capitus
Supraspinatus: above the scapular spine near the medial border
Gluteal: at the upper outer quadrant of the buttocks at the anterior edge of the gluteus maximus
Greater trochanter: posterior to the greater trochanteric prominence
Posterior view

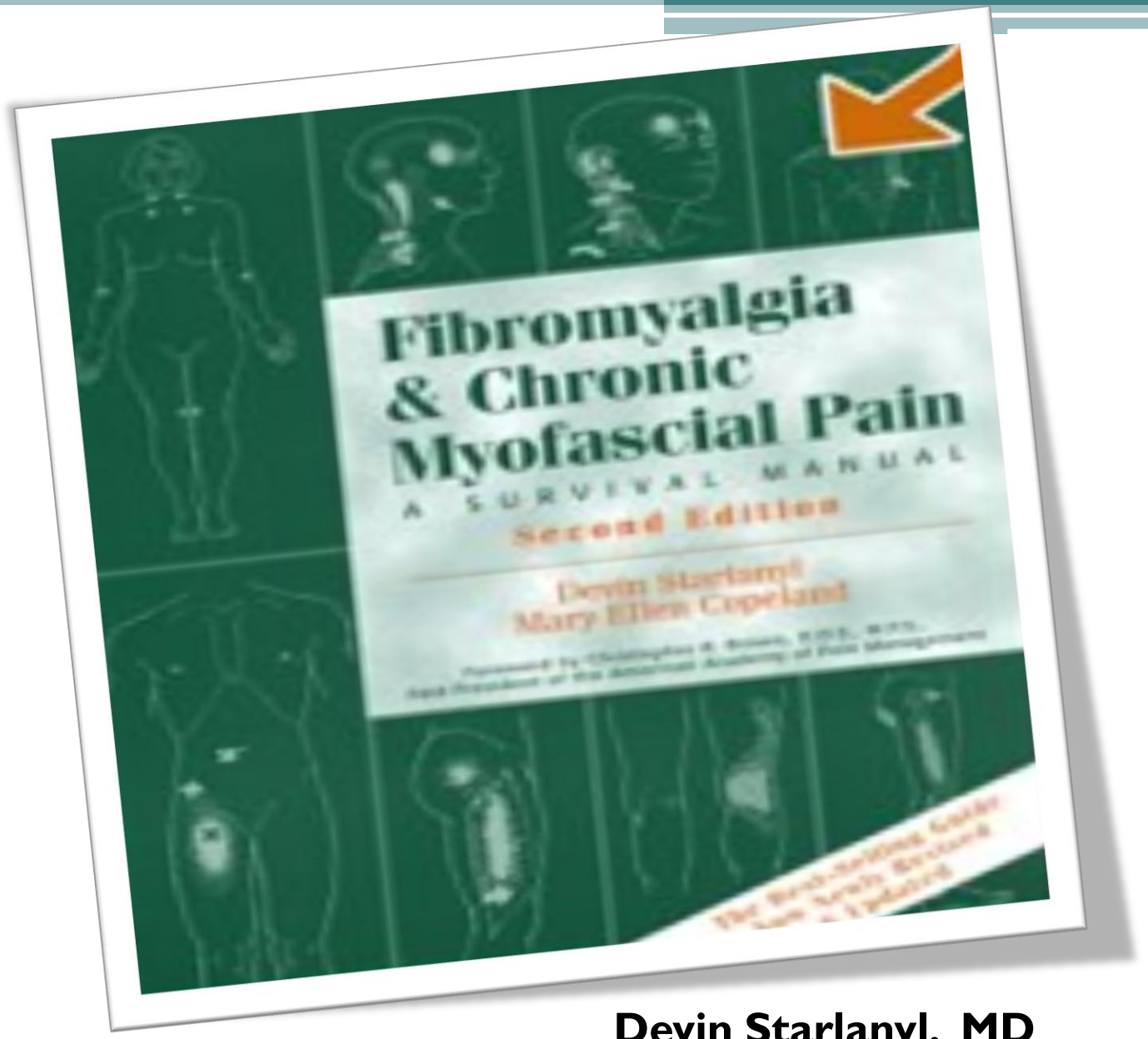
- Exercise decreases symptoms, overuse increases symptoms
- Consider PT with TENS and massage therapy
- Tai chi – ROM Dance

Lifestyle Changes

- Eliminate consumption of coffee, smoking, and alcohol
- Consider aggravating factors of body mechanics at work and home

Fibromyalgia treatment

- In western care, it is best to treat softly and tenderly
- Remember to not aggravate
- Treat with TCM, IHH and CAM is best



Devin Starlanyl, MD

Hyperthyroidism – Grave's Disease

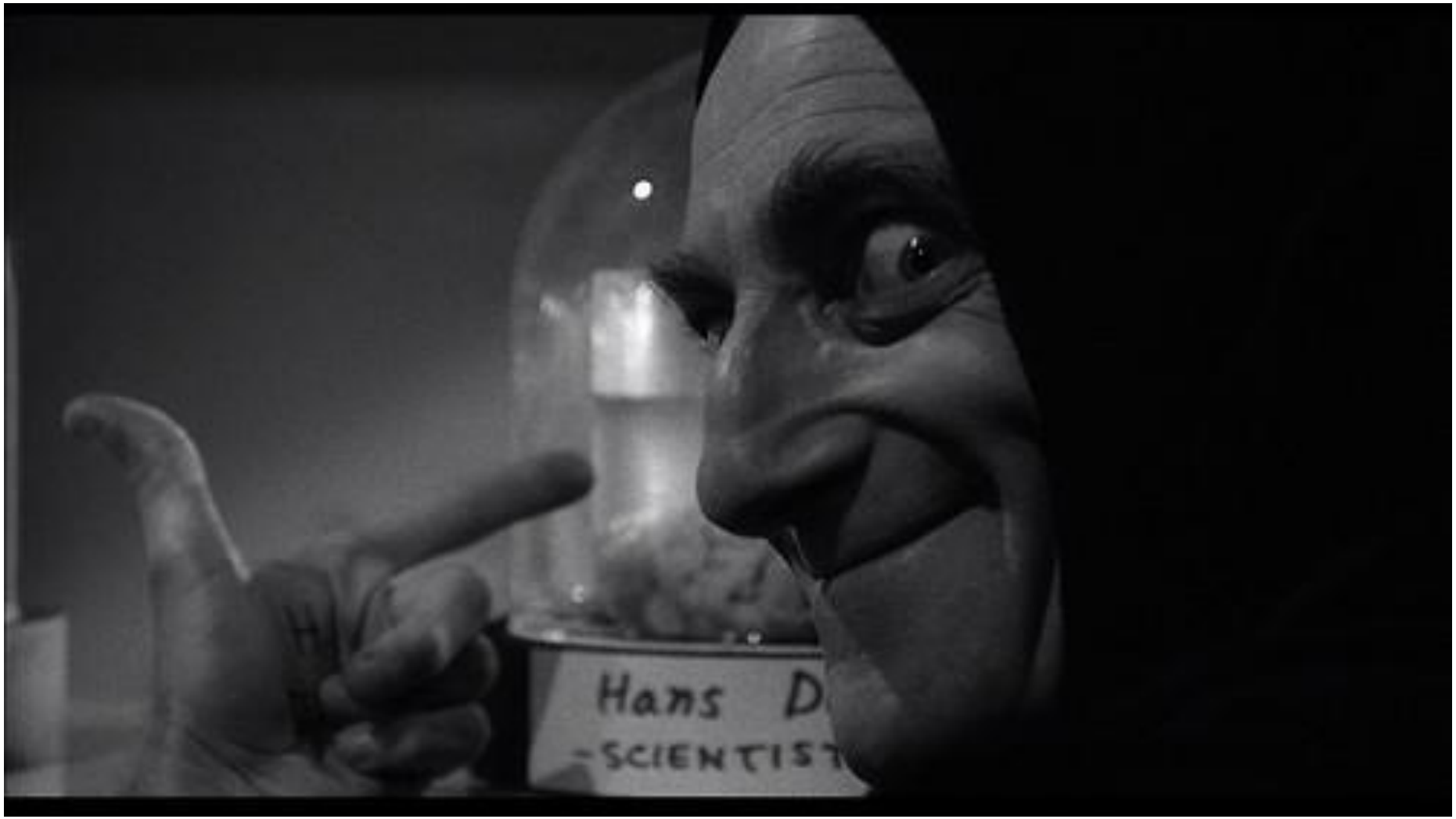
- Thyroid gland produces thyroxine hormone
- An autoimmune disorder
- Significantly accelerates metabolism
  - Sudden weight loss, a rapid or irregular heartbeat, sweating, nervousness or irritability
  - Fatigue, muscle weakness, difficulty sleeping
  - Tremor, sweating
  - Changes in menstrual patterns
  - Increased sensitivity to heat
- 8 times more common in women

- Causes
  - Graves' disease, an autoimmune disorder, is the most common cause of hyperthyroidism
    - Antibodies produced by your immune system stimulate your thyroid to produce too much thyroxine
  - Hyperfunctioning thyroid nodules
  - Thyroiditis
- Diagnosis
  - Radioactive iodine uptake test
  - Thyroid scan
  - Increased T3 & T4
  - Increased ANA titers

- Treatment
  - Beta blockers (atenolol) block increased sympathetic stimulation
  - Thioamides – block production of thyroid enzymes
  - Increased iodine intake
  - Radioactive iodine
  - Lifetime thyroxine replacement if surgery utilized

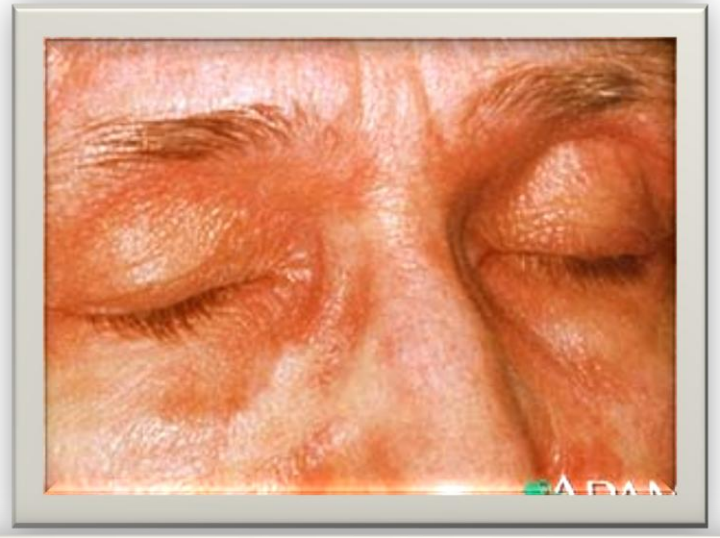
Understanding Graves Disease Video

“Abe Normal” Brain



Polymyositis & Dermatomyositis

- Polymyositis – disabling muscle weakness
- Dermatomyositis – hyper-pigmentation rashes
- Both occur in 40-60 year olds
- S & S
  - Affects large muscles in shoulders and hips
- Diagnosis
  - Muscle weakness of shoulders and hips in middle age is suggestive, characteristic skin rash
  - EMG, muscle biopsy
- Treatment
  - Steroids and immunosuppressive drugs



Vasculitis – Polyarteritis Nodosa

- Inflammation of the walls of blood and lymph vessels
  - Damaged wall, resulting in either
    - aneurysm: thin and weak wall
    - stenosis and occlusion: thickened wall
  - Vasculitis in general
    - there are 20 different types of Vasculitis
    - Vessels can be in any organ; isolated in one (generally the skin) or systemic (multiple organs)
- Pathophysiology
  - AI of blood vessel walls, disrupting blood supply to the organ, starts at 40-50, more in women
  - Often triggered by hepatitis, streptococcus

- S & S
  - Gradual onset often associated with joint and connective tissue inflammation
  - Fever, paresthesias, weakness, weight loss, extremity pain
  - Kidney damage (75%), liver arteries
  - Mesenteric vessels, coronary arteries
  - Peripheral nerves, rashes and ulcers common

- Diagnosis
  - Typical picture with elevated ESR, antibodies (75%)
  - Biopsy of involved vessels and nerves
  - Angiography occlusion
- Treatment
  - Corticosteroids
  - Immunosuppressive drugs
  - BP meds
- Prognosis
  - Very fatal AI
  - Without treatment – 67% die with 1 year, 88% in 5 years
    - Worse if renal involvement
  - With treatment – 5-year survival to 60%

Allergic Diseases

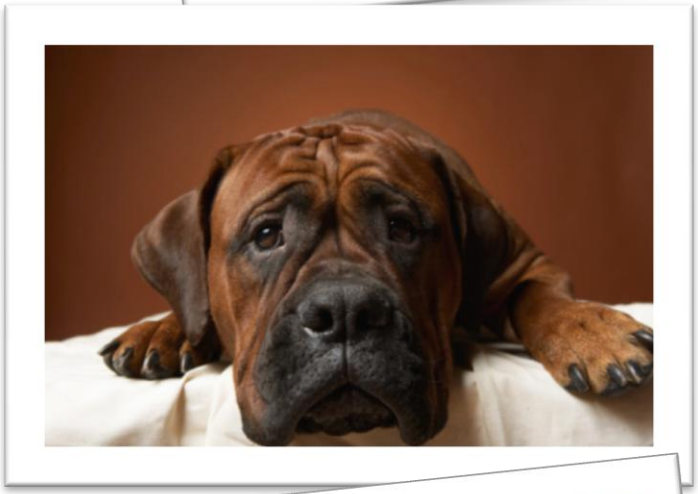
- The immune system is overacting to certain antigens (allergens) that are harmful
- This affects 1/3 of population
- Signs and symptoms
  - Most are mild with EENT complaints and skin changes
  - Some reactions are more severe such as mild to moderate asthma, bronchial constriction or anaphylactic reactions
- Atopy
  - The genetic tendency to develop the classic allergic diseases -- atopic dermatitis, allergic rhinitis (hay fever), and asthma
  - Atopy involves the capacity to produce IgE in response to common environmental proteins such as house dustmite, grass pollen, and food allergens
  - From the Greek atopos meaning out of place

Nearly 1/3 of the Population Has Allergies

- Allergies are an abnormal response of the immune system where the body's defenses react to a usually harmless substance in the environment, such as pollen, animal dander, or food.
- Almost anything can trigger an allergic reaction, which can range from mild and annoying to sudden and life-threatening.

Allergy Triggers

- Pollen
- Animal Dander
- Dust Mites
- Insect Stings
- Molds
- Foods
- Latex
- Medication
- Fragrance
- Cockroaches



Allergy Triggers - Pollen

- Exposure to pollen from trees, grasses, and weeds can trigger hay fever or seasonal allergies.
- Symptoms include sneezing, runny nose, nasal congestion, and itchy, watery eyes.
- Treatments include over-the-counter products, prescription drugs, and allergy shots.
- Prevent symptoms by staying indoors on windy days when pollen counts are high, closing windows, and running the air conditioning.

Allergy Trigger – Animal Dander

- Proteins secreted by oil glands in an animal's skin and present in their saliva can cause allergic reactions for some.
- The allergy can take two or more years to develop and symptoms may not subside until months after ending contact with the animal.
- Make your bedroom a pet-free zone, avoid carpets, and wash the animal regularly. A HEPA filter and frequent vacuuming may also help. Allergy shots may be beneficial.

Allergy Triggers – Dust Mites

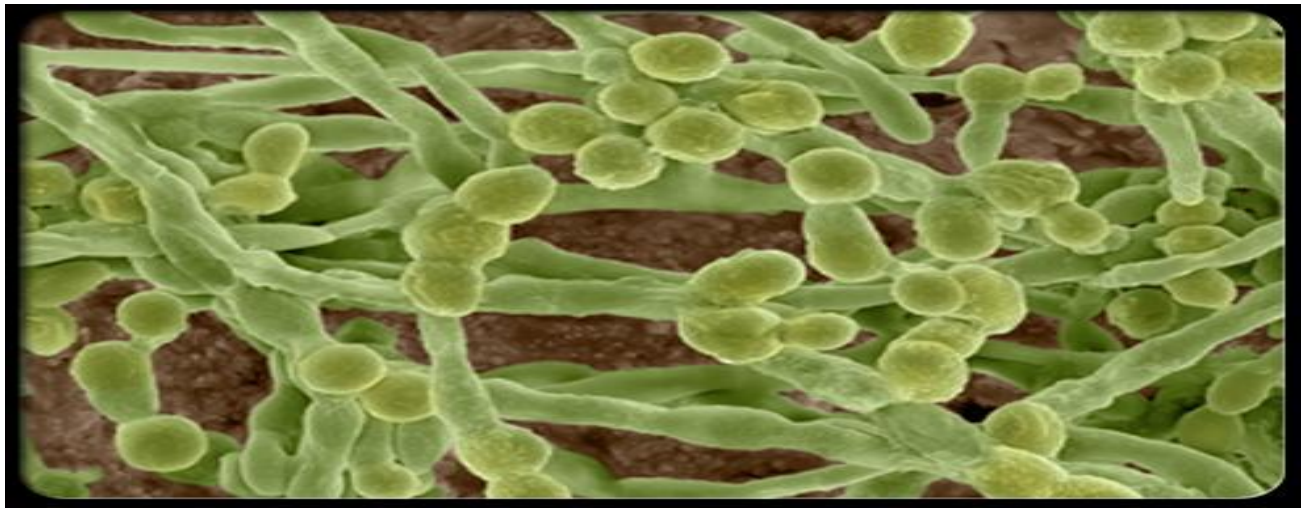
- Dust mites are microscopic organisms that live in house dust.
- They thrive in areas of high humidity and feed on the dead skin cells of humans and their pets, as well as on pollen, bacteria, and fungi.
- Help prevent dust mite allergies by covering mattresses, pillows, and box springs, using hypoallergenic pillows, washing sheets weekly in hot water, and keeping the house free of dust collecting-items such as stuffed animals, curtains, and carpet.

Allergy Triggers – Insect Stings

- Symptoms include extensive swelling and redness from the sting or bite that may last a week or more, nausea, fatigue, and low-grade fever.
- Rarely, insect stings may cause anaphylaxis, with symptoms including difficulty breathing, hives, swelling of the face, throat, or mouth, rapid pulse, dizziness, or a sharp drop in blood pressure.
- For those severely allergic, epinephrine should be administered immediately after a sting; allergy shots are recommended to prevent anaphylaxis with future stings.

Allergy Triggers - Molds

- Molds produce allergens, irritants, and in some cases, potentially toxic substances.
- Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals.
- They can be found in damp areas such as basements or bathrooms, as well as in grass or mulch.



Allergy Triggers - Foods

- Milk, shellfish, nuts and wheat are among the most common foods that cause allergies.
- An allergic reaction usually occurs within minutes of eating the offending food.
- Symptoms, which can include asthma, hives, vomiting, diarrhea, and swelling around the mouth, can be severe.
- Treatment with antihistamines or steroids is recommended. In life-threatening situations, an epinephrine injection is needed.

Allergy Triggers - Latex

- Latex in gloves, condoms, and certain medical devices can trigger latex allergy.
- Symptoms include skin rash, eye irritation, runny nose, sneezing, wheezing, and itching of the skin or nose.
- Allergic reactions can range from skin redness and itching to anaphylaxis, a serious reaction which can cause difficulty breathing, hives, and sudden gastrointestinal problems.

Allergy Triggers - Medication

- Symptoms of allergies to medications, such as penicillin or aspirin, can range from mild to life-threatening and can include hives, itchy eyes, congestion, and swelling in the mouth and throat.
- Treatment with antihistamines or steroids is recommended.
- For coughing and lung congestion, bronchodilators may be prescribed.
- For severe symptoms, epinephrine may be needed.

Allergy Triggers - Fragrance

- Fragrances found in products including perfumes, scented candles, laundry detergent, and cosmetics can have mild to severe health consequences.
- For most people, symptoms abate once the scent is out of range. For some, repeated exposures cause an increase in symptoms that occur more often and last longer.

Allergy Triggers - Cockroaches

- It can be difficult to eradicate cockroaches from your home, especially in a warm climate, or if you live in an apartment building where bugs can pass back and forth to a neighboring unit.

Skin Cancer

- Skin cancer – induced by the ultraviolet rays of the sun
  - most often on the head and neck
  - most common in fair-skinned people and the elderly
  - one of the most common cancers
  - one of the easiest to treat
  - has one of the highest survival rates if detected and treated early
  - three types of skin cancer named for the epidermal cells in which they originate
  - basal cell carcinoma, squamous cell carcinoma, and malignant melanoma

Basal Cell Carcinoma

- most common type
- least dangerous because it seldom metastasizes
- forms from cells in stratum basale
- lesion is small shiny bump with central depression and beaded edges

Basal Cell Carcinoma

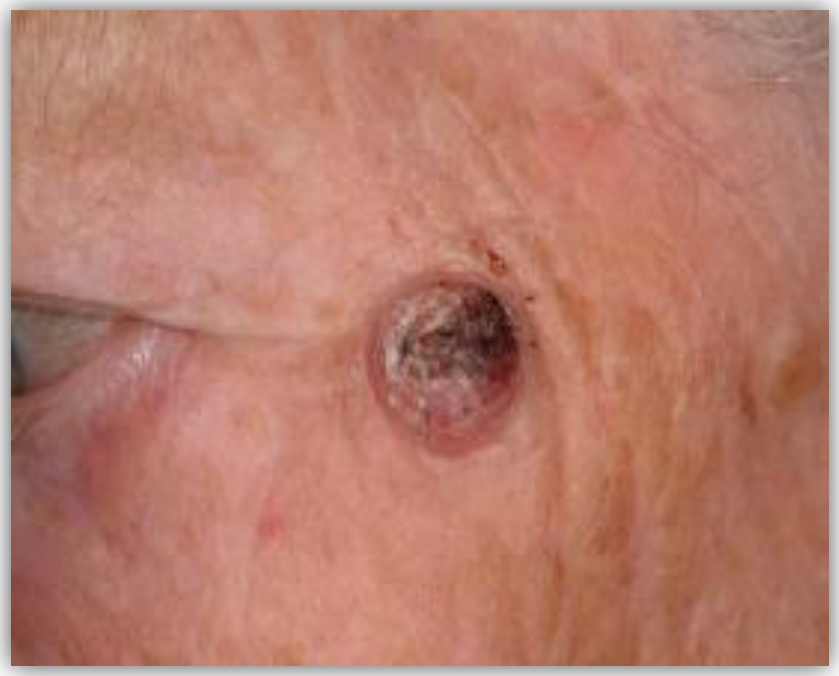
- Most common skin cancer – ¾ of non-melanoma cases
- Basal cell carcinoma

Squamous Cell Carcinoma

- arise from keratinocytes from stratum spinosum
- lesions usually appear on scalp, ears, lower lip, or back of the hand
- have raised, reddened, scaly appearance later forming a concave ulcer
- chance of recovery good with early detection and surgical removal
- tends to metastasize to lymph nodes and may become lethal

Squamous Cell Carcinoma

- ¼ of non-melanoma cases
- Squamous cell carcinoma



Malignant Melanoma

- skin cancer that arises from melanocytes
- often in a preexisting mole
- less than 5% of skin cancers, but most deadly form
- treated surgically if caught early
- metastasizes rapidly - unresponsive to chemotherapy - usually fatal
- person with metastatic melanoma lives only 6 months from diagnosis
- 5% - 14% survive 5 years
- greatest risk factor – familial history of malignant melanoma
- high incidence in men, redheads, people who experience severe sunburn in childhood

- S & S
  - Persistent skin lesion changes
- Treatment
  - Wide surgical excision
  - Radiation
  - Chemotherapy
- Staging and prognosis
  - Based upon the depth of the lesion
  - 85% of stage I and II cured with surgery
  - 40% five year survival with node metastasis
  - 5% five year survival with distant metastasis

YouTube - Olay Skin Cancer Video

Normal Mole	Melanoma	Sign	Characteristic
		Asymmetry	when half of the mole does not match the other half
		Border	when the border (edges) of the mole are ragged or irregular
		Color	when the color of the mole varies throughout
		Diameter	if the mole's diameter is larger than a pencil's eraser

Photographs Used By Permission: National Cancer Institute

UVA, UVB and Sunscreens

- UVA and UVB are improperly called “tanning rays” and “burning rays”
- both thought to initiate skin cancer
- sunscreens protect you from sunburn but unsure if provide protection against cancer
  - chemical in sunscreen damage DNA and generate harmful free radicals

Red Flags – Immunology & Dermatology

- Acute attack of RA – more serious in child
- Acute lupus attack
- Acute onset of Grave's disease
- Giant cell arteritis
- Severe asthma attack
- Anaphlactic reactions
- Generalized whole body dermatitis
- Chemical poisoning or drug reactions
- Spider, snake, scorpion bites
- Jellyfish and stingray bites

Subacute Red Flags

- Suspected or proven HIV
- RA or lupus not prior worked up
- Scleroderma not prior worked up
- Crohn’s disease not being followed
- Polymyositis or dermatomyositis
- Acute rhinitis, uticaria, or atopic dermatitis it conservative care has not been effective
- Asthma
- Severe atopic eczema
- Suspected skin cancer