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Osteomyelitis

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OSTEOMYELITIS

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Session Aims

- Normal physiology of immunity and process of infection
- Normal physiology of bones
- Risk factors for osteomyelitis
- Osteomyelitis – presentation and management
- Case histories

Re thinking the graveyard shift!



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Inspiring

Why start with boring old physiology?

Normal → Abnormal

Predict changes



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Know your enemy!



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Spot a bad 'un



Process of infection

Epidermal attachment →

Colonisation/ critical colonisation →

Infection →

- Tissue damage/
- Host response/
- Disease
- Local or systemic

Physiology – Our defences

2 Main defences:-

- Innate (non-specific)
- Adaptive (specific)

What do these include?



Innate (Non-specific)

- Skin
- Phagocytes
- Inflammatory Response
- Antimicrobial Proteins
- Fever

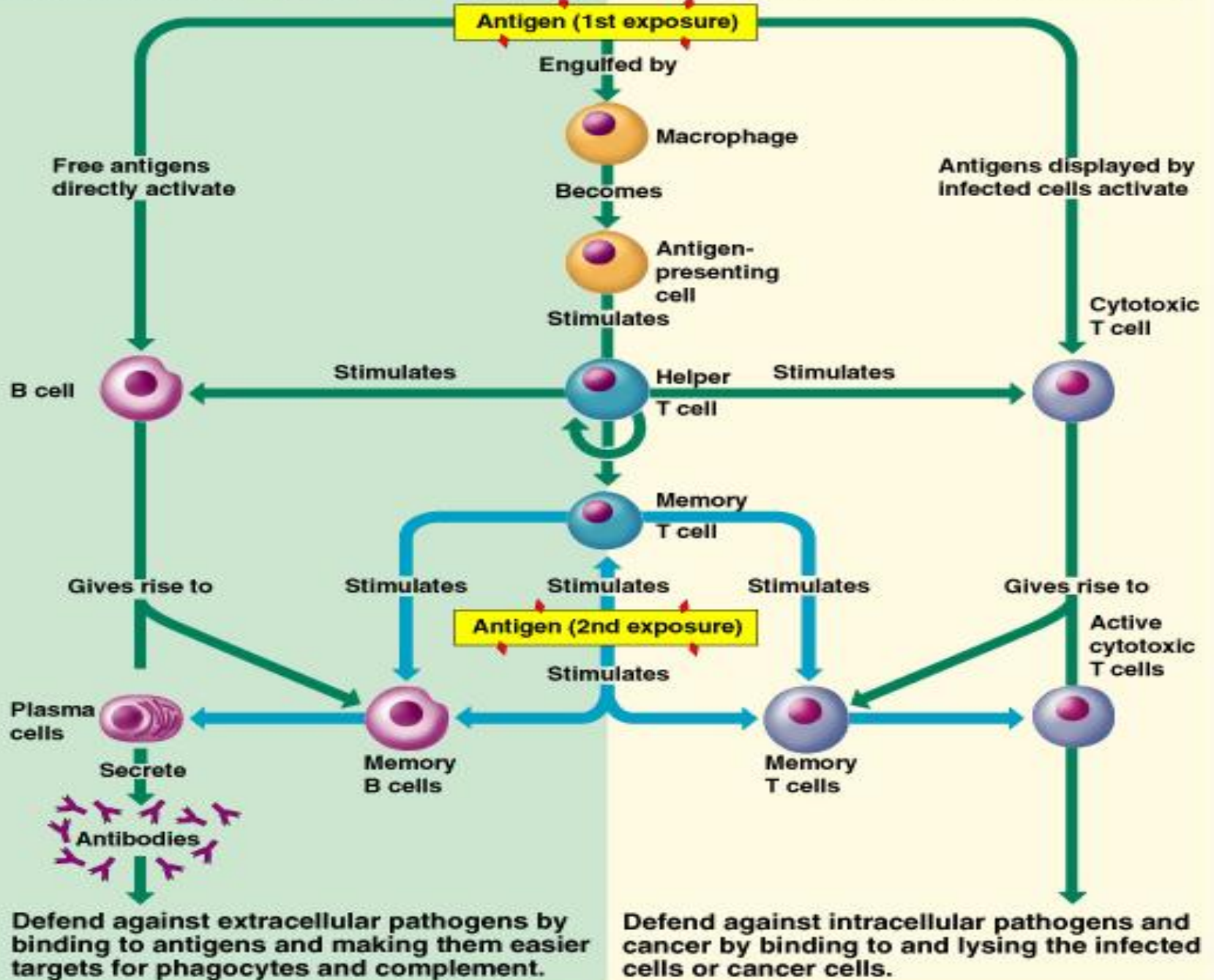
Adaptive (Specific)

- Antigens + Antibodies
- Humoral Immune response
- Cell Mediated Immune response



| Nonspecific defense mechanisms | | Specific defense mechanisms (immune system) |
|---|---|--|
| First line of defense | Second line of defense | Third line of defense |
| <ul style="list-style-type: none">• Skin• Mucous membranes• Secretions of skin and mucous membranes | <ul style="list-style-type: none">• Phagocytic cells• Antimicrobial proteins• The inflammatory response | <ul style="list-style-type: none">• Lymphocytes• Antibodies• Macrophages |

HUMORAL (ANTIBODY-MEDIATED) IMMUNE RESPONSE CELLULAR (CELL-MEDIATED) IMMUNE RESPONSE





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Process of infection

Epidermal attachment →

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Infection →

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What is Osteomyelitis?



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- An infection of bone which can incorporate marrow, cortex and periosteum.
- Infection results in inflammation which destroys bone tissue.
- Necrosis of periosteal bone can occur leading to detachment of “dead” bone (sequestra)
- Contiguous osteomyelitis – direct contact between infected tissue and bone (this is the kind we are most interested in) Particularly where vascular insufficiency and Diabetes are involved

Types of Osteomyelitis

- Haematogenous

Infection stems from bacteria present in the blood from another source.

- Contiguous/ vascular insufficiency

From direct contact with infected tissue such as surgical site/metalwork or from a wound

Osteomyelitis

Non-healing wound →

Wound becomes deeper →

Extends to bone / sinus forms to bone →

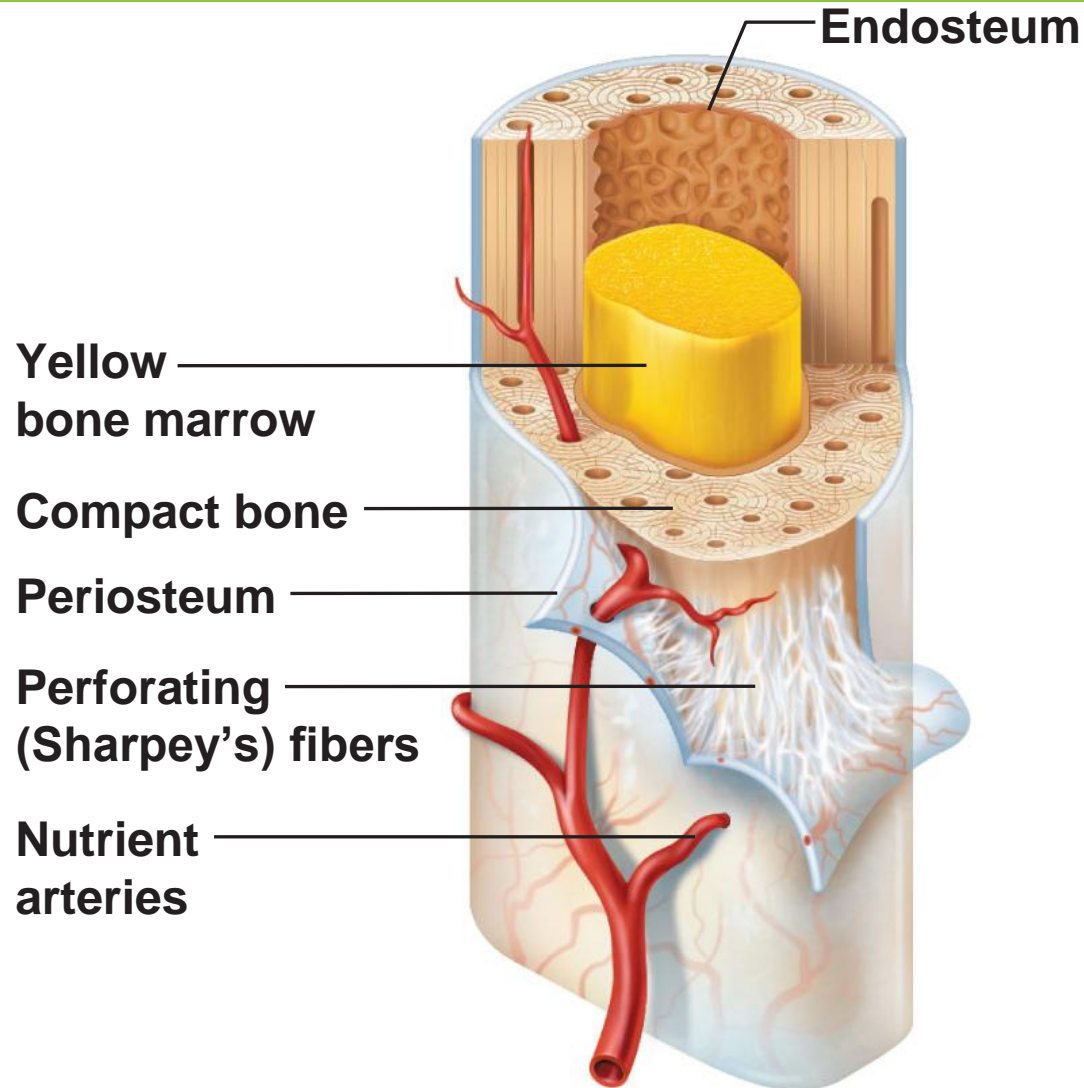
Bone becomes infected →

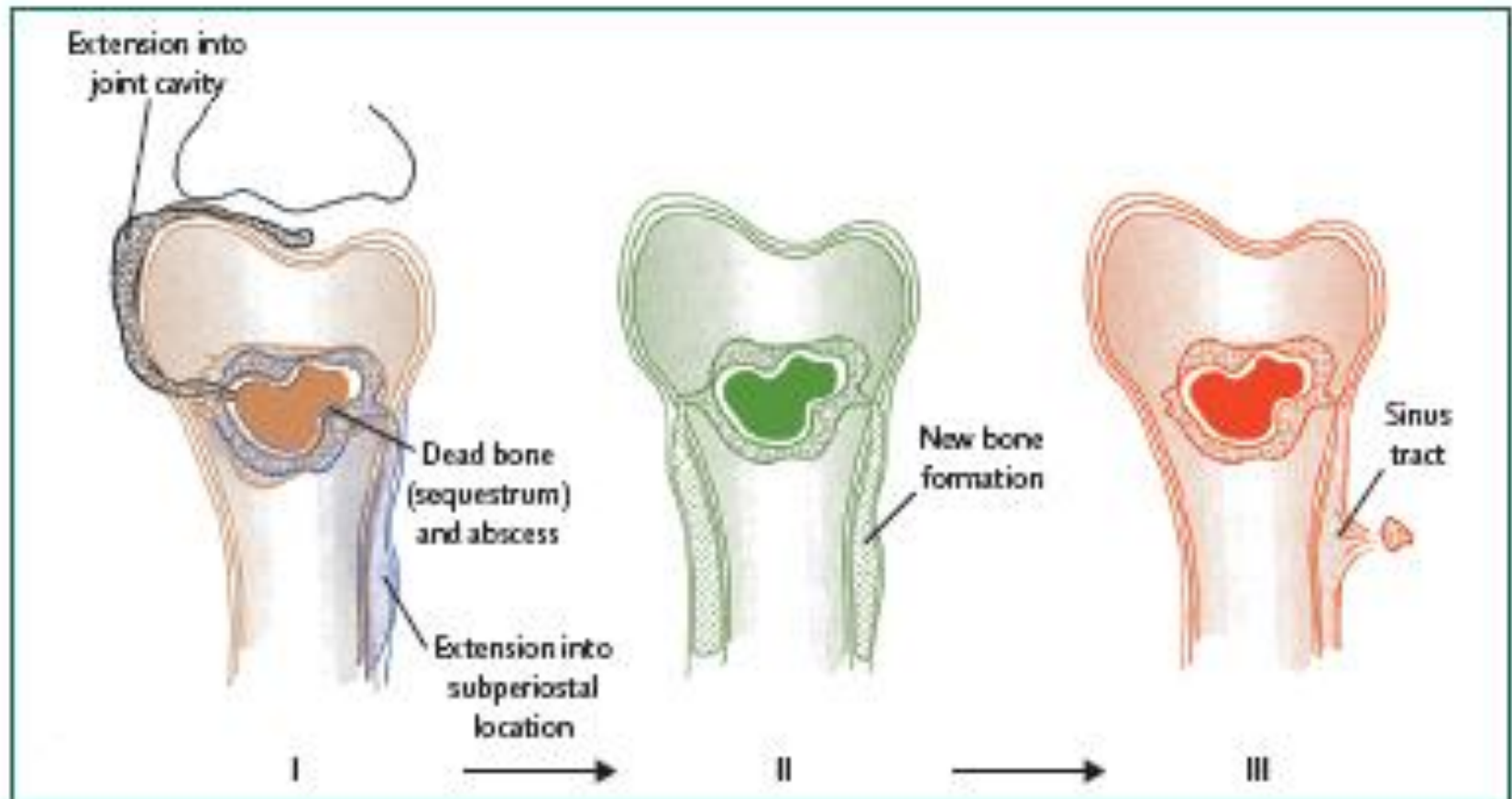
Sequestra impairs healing

Bone



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Who is at risk of developing Osteomyelitis?



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- Immuno-compromised patients
- Peripheral Arterial Disease
- Diabetes
- Patients with ulcers

Osteomyelitis — clinical features/diagnosis

- Pain and tenderness (unless neuropathic)
- Erythema
- Localised oedema
- “Sausage toe” appearance
- Probing to bone
- Fragmentation / loss of integrity on x-ray

- **Blood tests**
 - Full blood count – WBC count
 - ESR
 - C-reactive protein
- **Imaging**
 - X-rays
 - MRI
- **Samples and Swabs**
 - Wound swabs
 - Tissue samples
 - Bone samples

- ABC`S
 - A – Alignment
 - B – Bone density
 - C - Cartilage
 - S – Soft tissue

Osteomyelitis



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ABC`S

- A – Normal
- B – Lucency, interruption of cortex, periosteal reaction.
- C- Narrowing
- S – Inflammation and increased density ?gas.

X-ray imaging of OM



Probing to bone?



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Osteomyelitis in Diabetes

- Foot ulceration
- Peripheral Arterial Disease
- Sensory Neuropathy
- Autonomic Neuropathy
- Motor Neuropathy
- Greater propensity for infection???

- Prevent osteomyelitis by preventing ulceration
 1. Pulse palpation
 2. Sensory assessment
 3. Footwear assessment
 4. Observation of deformity/skin changes

NICE (2004)

Case History One



- Mrs A
- Type 2 Diabetes (poorly controlled)
- Hypertension

- Usually annual visits
- Attends for treatment unaware of this problem.

Case History 2



- Mr B
- Type 2 Diabetes
- Long history of previous neuropathic ulceration
- Presents with this iatrogenic ulcer

Osteomyelitis - Management

Local wound management

- Offloading
- Debridement
- Dressing
- Liaison with MDT

Antibiotics

- IV antibiotics
- Clindamycin 150 – 300mg for extended period 6 weeks to 3 months.

Multi Disciplinary Diabetic Foot Clinics

- Podiatrist
- Orthotist
- Diabetes Specialist Nurse
- Consultant Endocrinologist
- Vascular Surgeon
- Microbiologist
- Pharmacist
- Dietician



Conclusion

- Don't ignore the signs
- Rapid referral essential
- Prevention, prevention, prevention (know your enemy and spot a bad un)



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Thank You!

ANY QUESTIONS?

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