Childhood Infection- Immunological Profile

- Musculoskeletal infections in children
  - Pyomyositis
  - Septic arthritis
  - Osteomyelitis
- They are called “deep seated infections”
- Rare
- Not present in immunocompetent children

Immunoglobulin levels vs. age

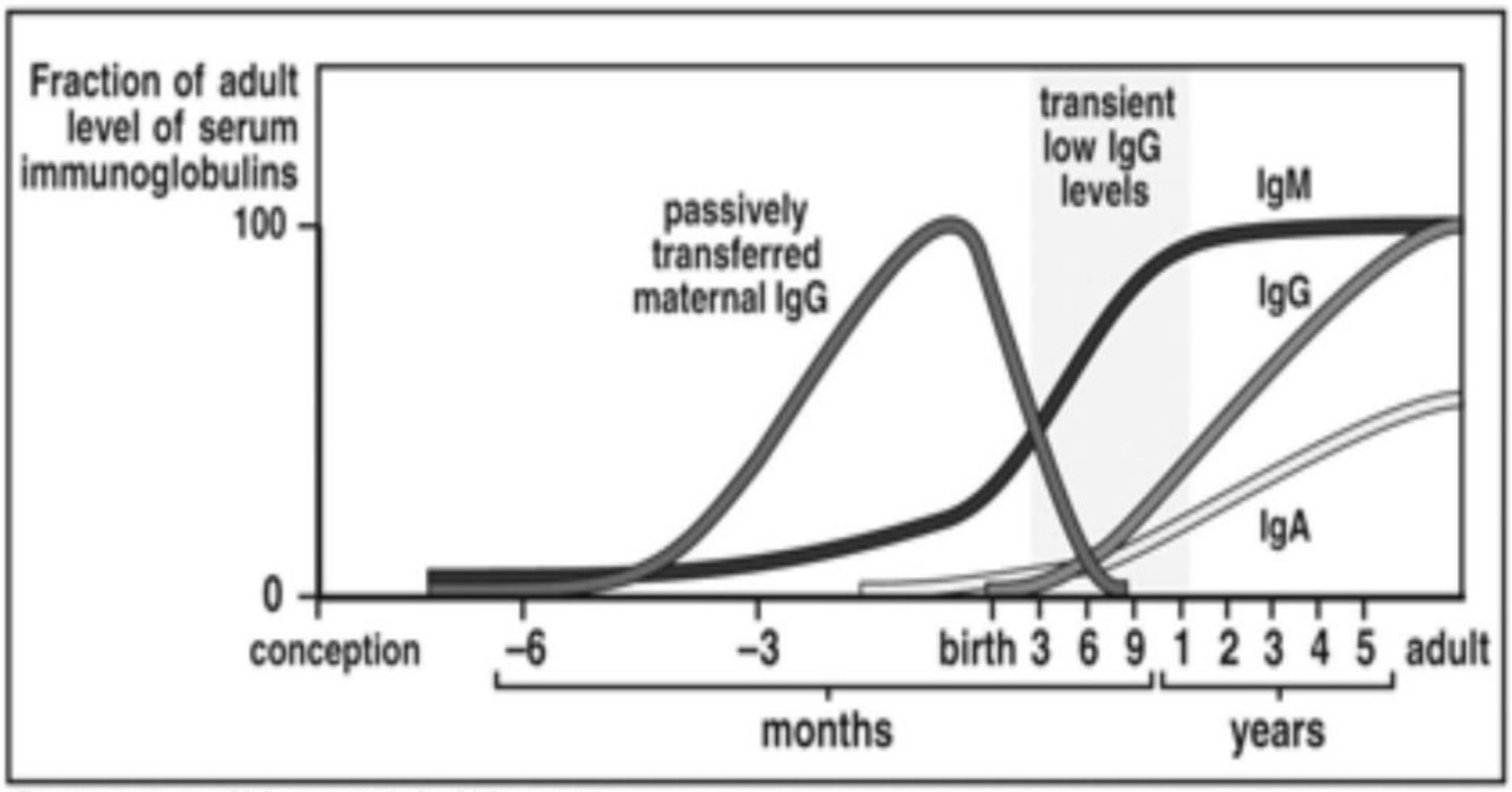
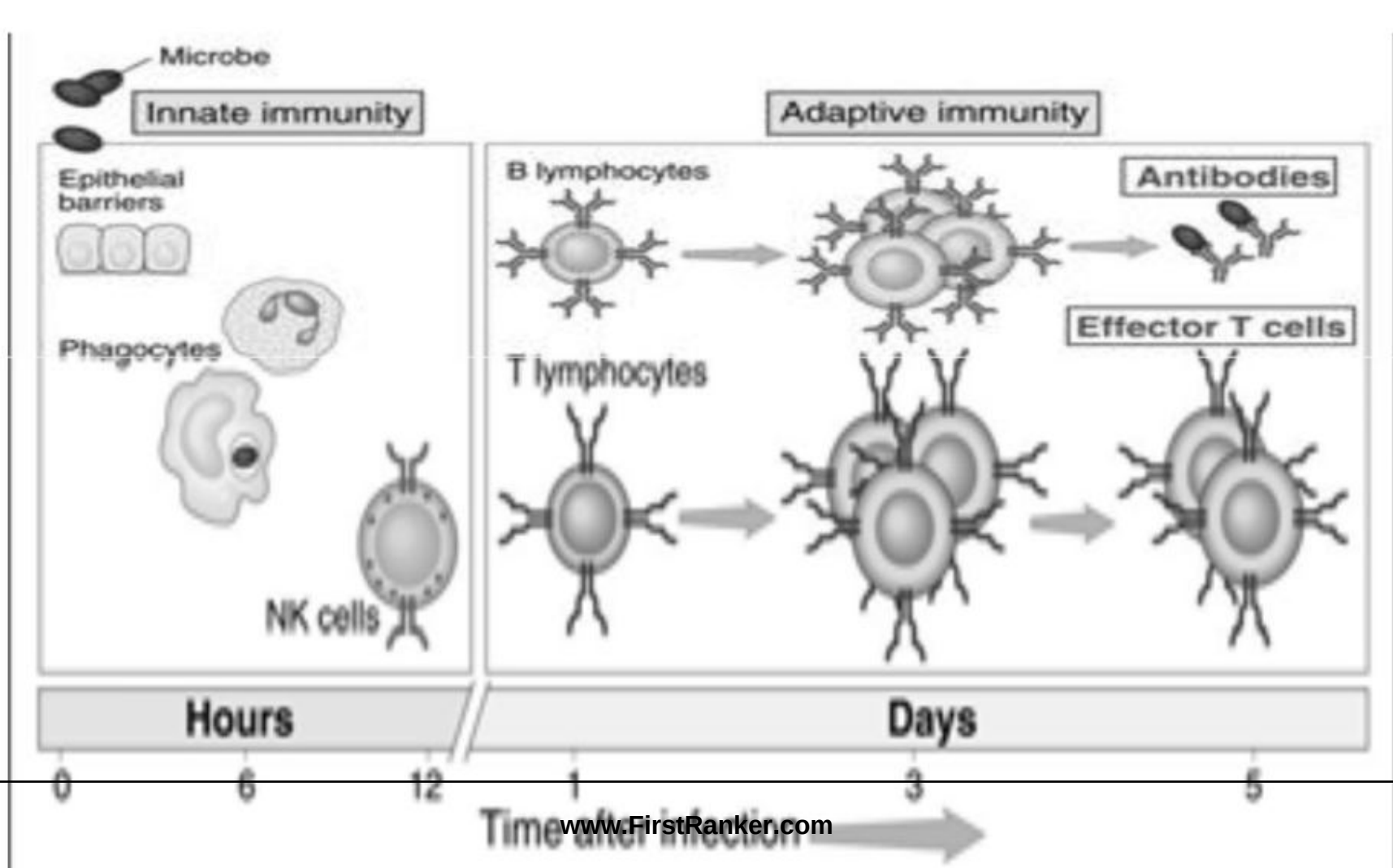
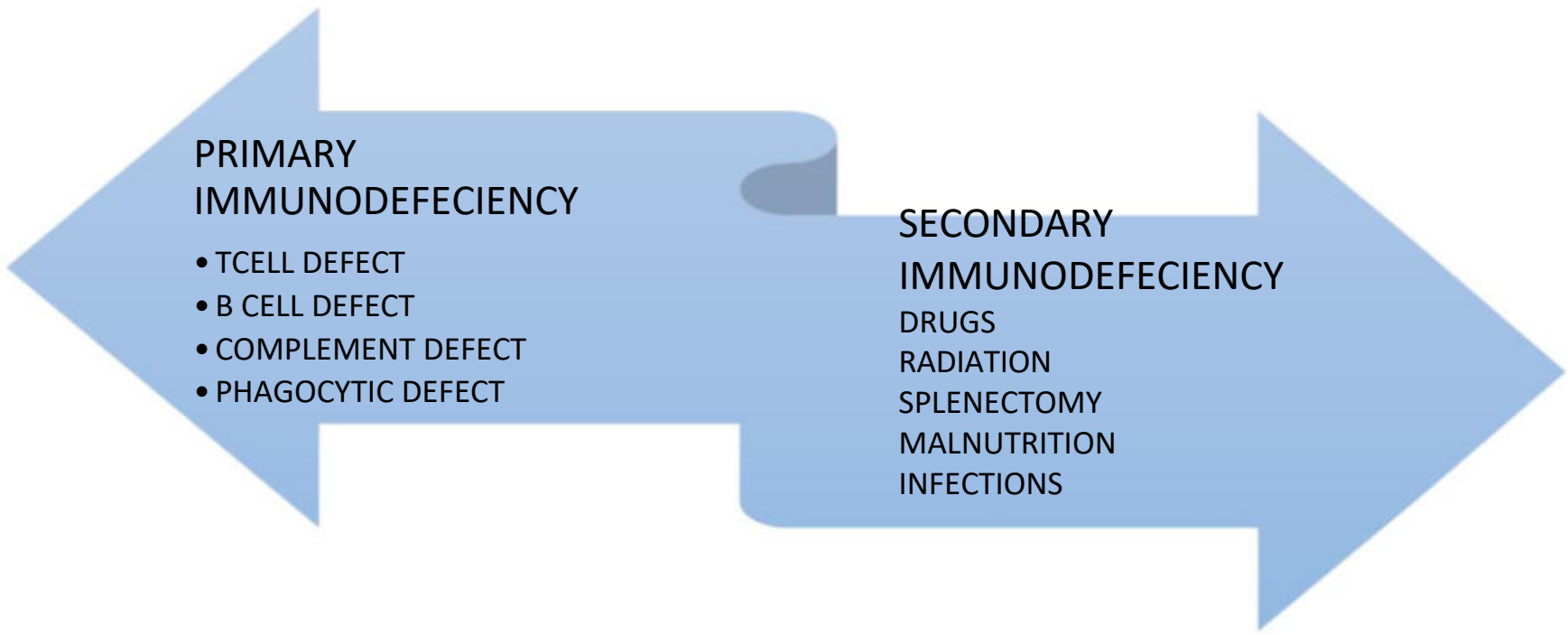


Figure 11-11 Immunobiology, 6/e. (© Garland Science 2005)

Innate and adaptive immunity



Classified as



When to suspect immunodeficiency ?

- In every case of musculoskeletal infection

Specially when….

- ➢Very frequent infections
- ➢Very severe infections
- ➢Family history
- ➢Unusual clinical presentation
- ➢Unusual microorganism
- ➢Longer duration of treatment
- ➢Not responding to treatment

Additional clues..

- >8 ear infections per year
- >2 serious sinus infections per year
- >2 months treatment with poor result
- Requirement of iv antibiotics
- Failure to thrive with or without diarrhea

At Any Age…

- History for secondary immunodeficiency
  - ➢Diet
  - ➢Medication
  - ➢Infections
  - ➢Immunization
  - ➢Splenectomy
  - ➢Radiation
  - ➢Systemic illness

Age of presentation

- Onset before age 6 mo suggests a T-cell defect
- Onset between the age of 6 and 12 mo may suggest combined B- and T-cell defects or a B-cell defect
- Later than 12 mo usually suggests a B-cell defect or secondary immunodeficiency

Detailed history

Upto 6 months

- History of newborn seizures, cardiac anomaly
- Delayed cord detachment, recurrent infection
- Diarrhea, pneumonia, oral thrush, FTT
- Bloody stools, draining ears, eczema

6 months to 5 years

- Persistent thrush, nail dystrophy, endocrinopathies
- Short stature, fine hair, severe varicella
- Oculocutaneous albinism with recurrent infection
- Lymphadenopathy, dermatitis, pneumonia, osteomyelitis

Characterstic features

Predominant T cell	
Early onset (2-6 mnths)	Gram positive and neg bacteria, mycobacteria,CMV, EBV, and fungi – candida

Characterstic features

Predominant B cell	
Onset after 5-7 months of age	Pneumococci,staph, strepto,enteroviruses,giardia

Characterstic features

Phagocytic defect	
Early onset	Staph, pseudomonas, candida, nocardia

Characterstic features

Compliment defect	
Onset at any age	Pneumococci and neiserria

Muscukoskeletal Infection in HIV patients

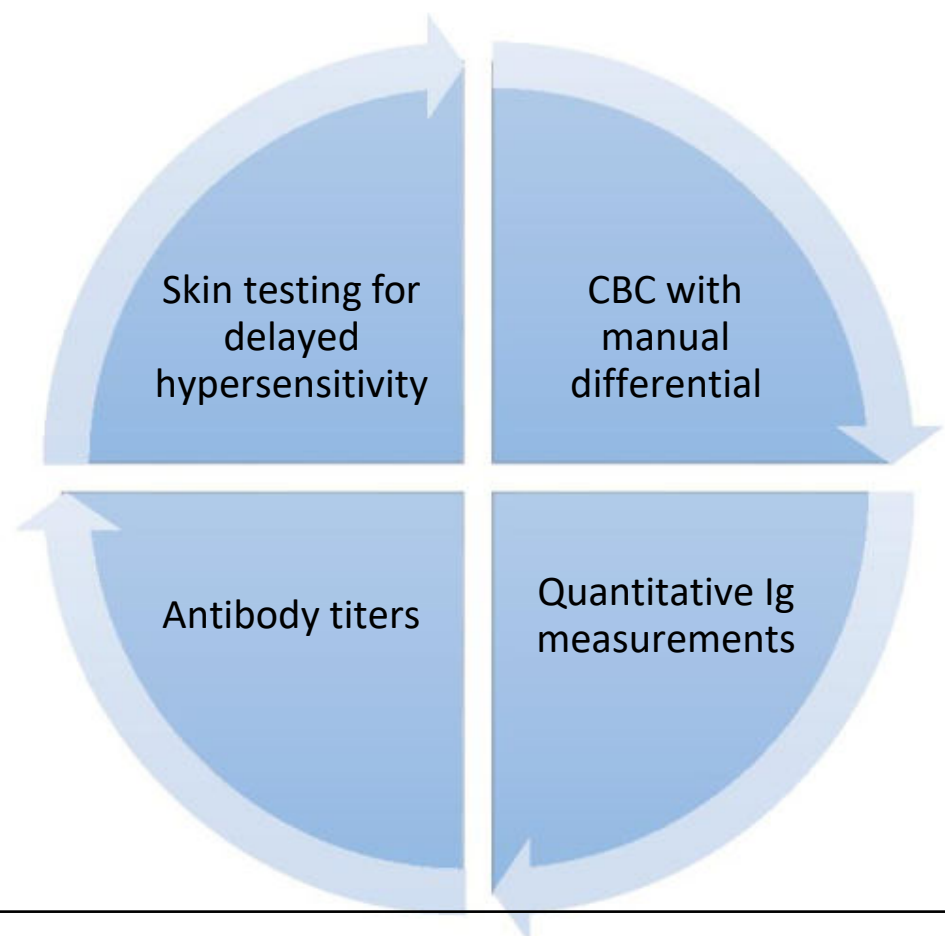
- Arthalgia and myalgia-symptom of acute infection
- Staphylococcus aureus, Streptococcus pyogenes, Mycobacterium tuberculosis, Nocardia and Cryptococcus common organisms
- Myositis common- bacterial infections, opportunistic and direct viral infection
- Tuberculous osteomyelitis common
- Bacillay angiomatosis
- Knee and ankle arthritis common

Examination

Clinically-

- BCG scar absent
- wasted, stunted, malnourished
- Skin eczema present, hypopigmented patches
- Oral thrush, nail fungal infection
- Absence of tonsils and lymph nodes
- Respiratory system-b/l ronchi , wheeze, crepts

Screening tests



Laboratory tests to assess immune function

(1) T cell: Enumeration (flow cytometry), functional assays (mitogen response, DTH skin tests)

(2) B cell: Enumeration, circulating antibody levels

(3) Macrophage: Enumeration, functional assays (nitroblue tetrazolium)

(4) Complement: Direct measurement of complement components, complement hemolysis assay

Key Points

- Done in every child with musculoskeletal infection
- High index of suspicion
- Thorough history and complete physical examination is must
- Begin with screening tests and appropriate additional testing as required
- Early diagnosis and prompt treatment could be life saving

References

- Nelsons textbook of pediatrics 19 th ed
- Diagnostic Approach to Primary Immunodeficiency Disorders; indian pediatrics,june 2013
- Approach to the Patient With Suspected Immunodeficiency: Immunodeficiency Disorders: Merck Manual