University of Basrah
Medical College, Microbiology Dep.

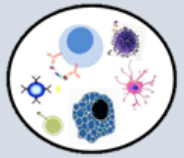
Ministry of Higher Education
& Scientific Researches

Microbiology/ 3rd Year M.B.CH.B. Students
Part V: Basic & Clinical Immunology (17 hours)
Lecture 3
Duration: 1 hour

Immune Responses (Part II)

Assist. Prof. Dr. Nibras Saleam Al-Ammar

References: Roitt's Essential Immunology (Essentials) 13th Edition



For more detailed instruction, any question, cases need help please post to the group of session.

Learning objectives (LOs)

Differences between innate & adaptive immune responses	LO.1
Ab-mediated (Primary & Secondary) immune responses	LO.2
Secondary immune responses of T-lymphocytes	LO.3
Adaptive immunity can be acquired naturally or artificially	LO.4
Major effector branches of adaptive immune responses	LO.5
The two pathways linking innate & adaptive (acquired) immune responses	LO.6

Differences between innate & adaptive immune responses

LO.1

Innate immune response

- Immediate protection
- Fast (within seconds)
- Lack of specificity
- Lack of memory
- No change in intensity

VS

Adaptive (acquired) immune response

- Long lasting protection
- Slow (4-5 days after the innate immune response)
- Specificity
- Immunological memory
- Change in intensity

Ab-mediated (Primary & Secondary) immune responses

LO.2

Primary immune response

- Results after encounter with Ag for the first time.
- Ab is detectable in the serum within days or weeks depending on (nature & dose of Ag) and the route of administration.
- Ab levels continue to rise for several weeks & then decline.
- The first Abs formed are IgM, followed by IgG, IgA, or both. IgM levels decline sooner than IgG levels.

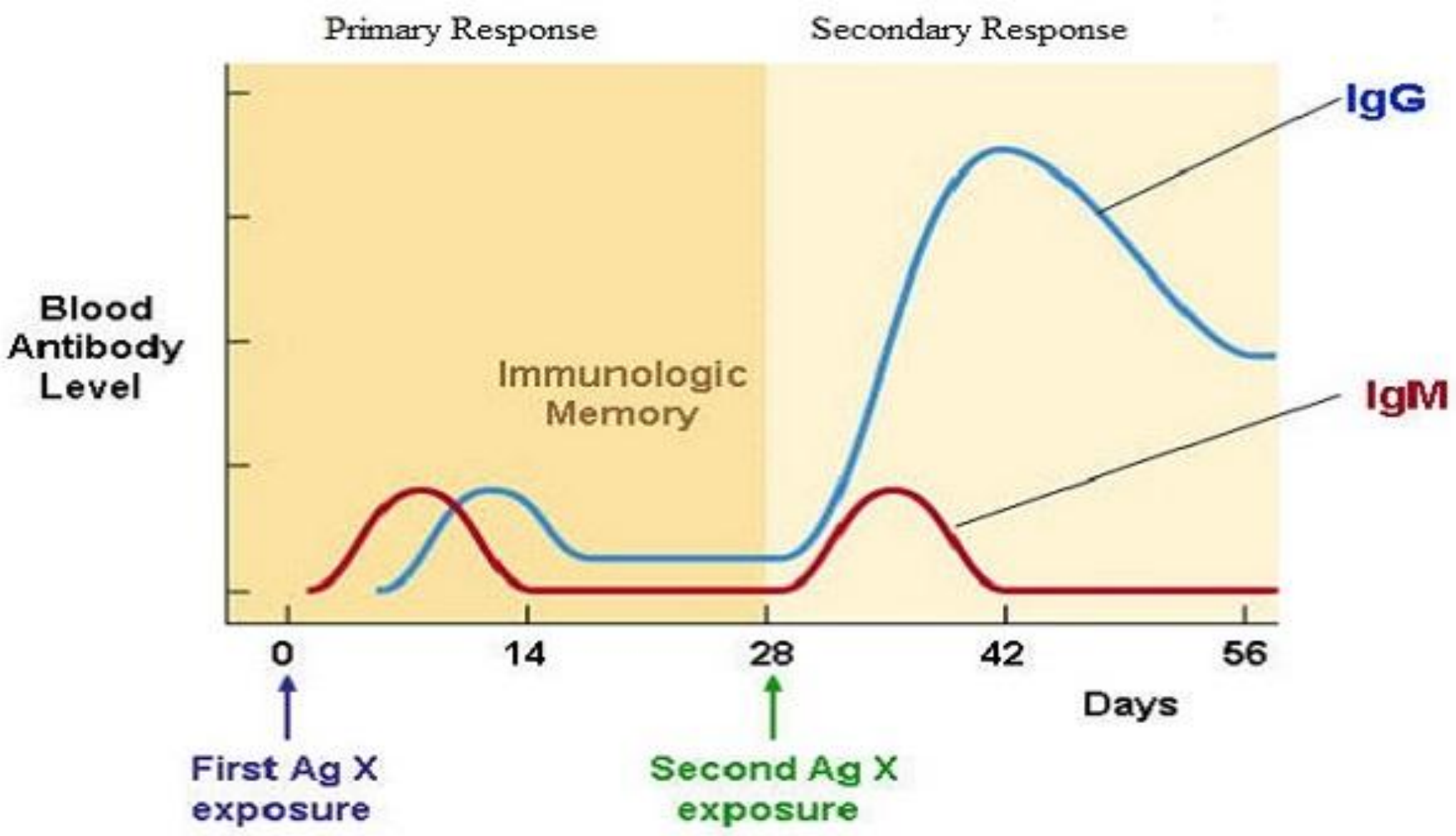
VS

Secondary immune response

- Results after the 2nd encounter with the same Ag.
- Ab response is more rapid & rises to higher levels than during the primary response (due to presence of memory cells).
- IgM amount produced is qualitatively similar to that of the primary response.
- IgG level is higher and persists much longer than the primary response.
- Ab binds to Ag more firmly (higher affinity).

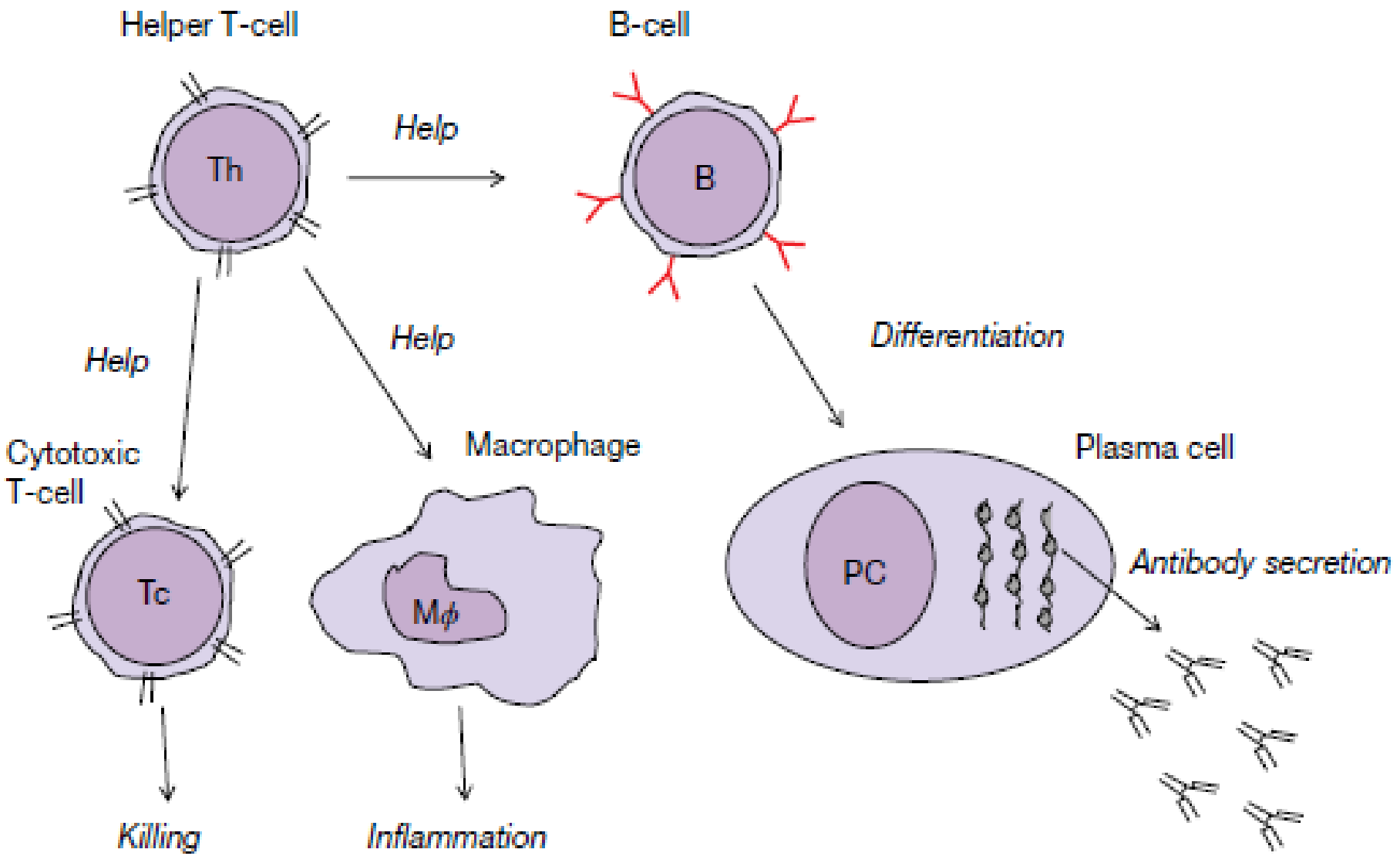
Ab-mediated (Primary & Secondary) immune responses

LO.2



Secondary immune responses of T-lymphocytes

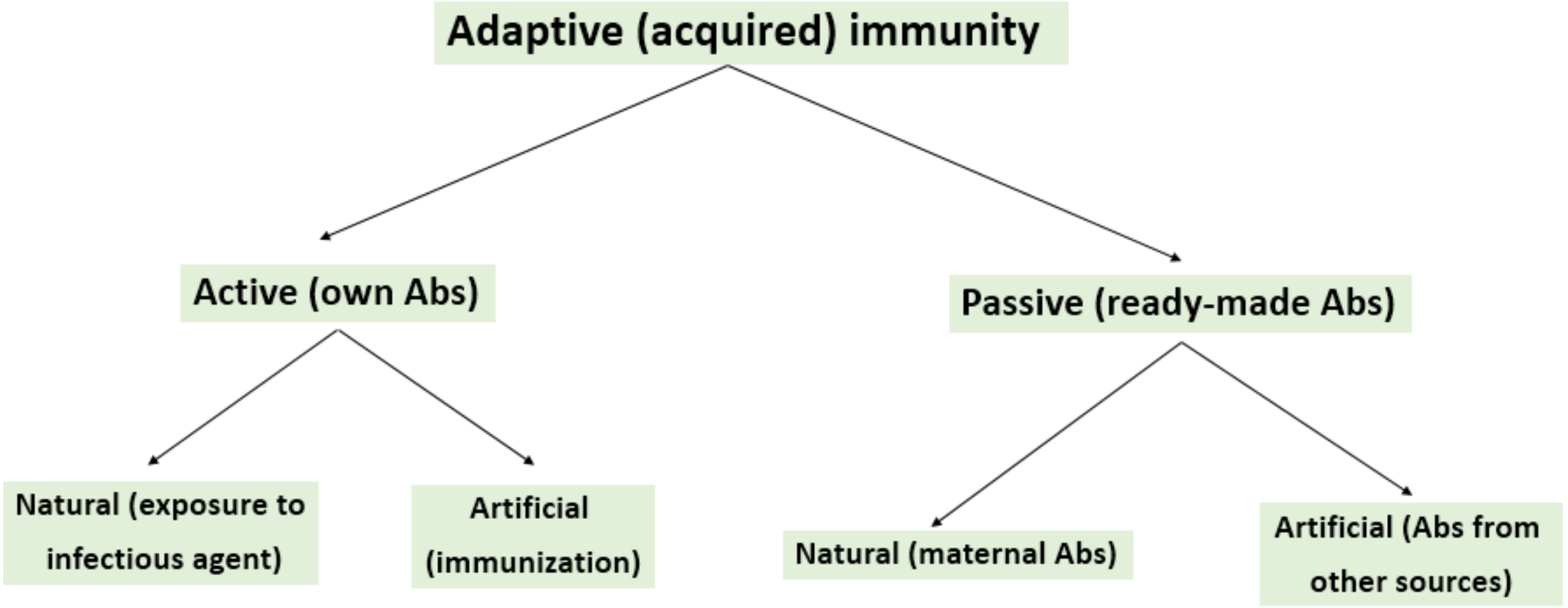
LO.3



T-lymphocytes similarly exhibit enhanced secondary responses, producing cells with improved helper or cytotoxic effector functions.

LO.3

Adaptive immunity can be acquired naturally or artificially



Advantages of active immunity

- Long term resistance
- capacity to respond faster and to a greater extent (after re-exposure to the same Ag).

Disadvantages

- slow onset of resistance
- need for prolonged or repeated contact with the antigen

LO.3

Advantage of passive immunity

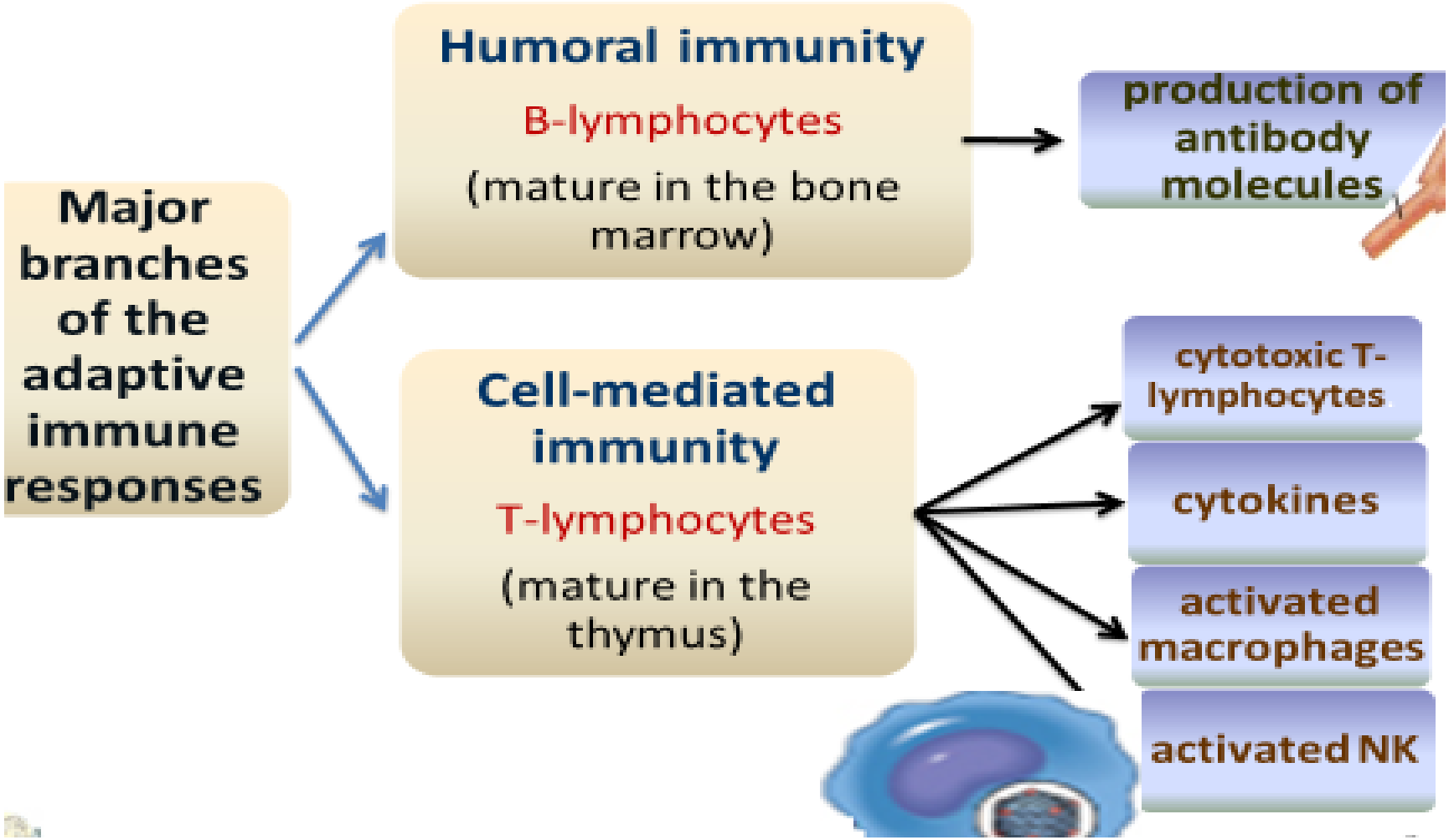
availability of large amounts of antibody.

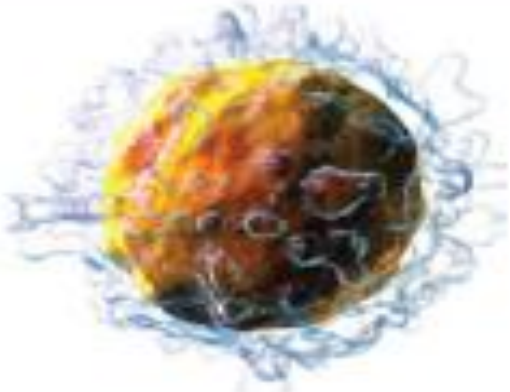
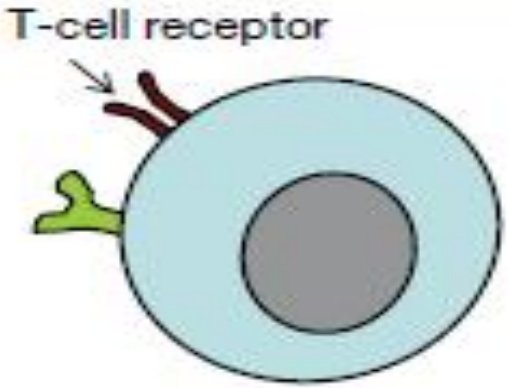
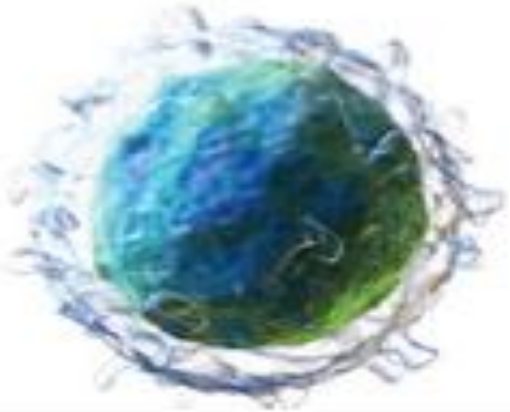
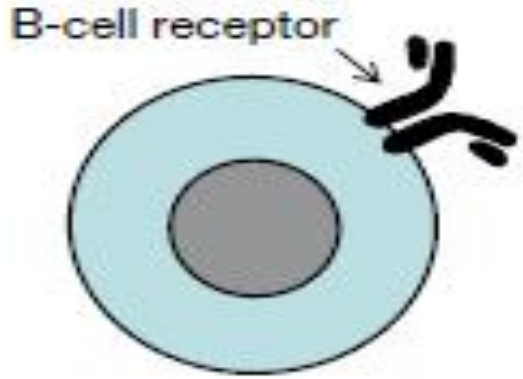
Disadvantages

short life span of these antibodies

possible hypersensitivity Reactions (artificial passive immunity)

Major effector branches of adaptive immune responses



T-cell		Effector function
		Help for antibody production Killing of virus-infected cells Regulatory role
B-cell		
		Antibody production

LO.4

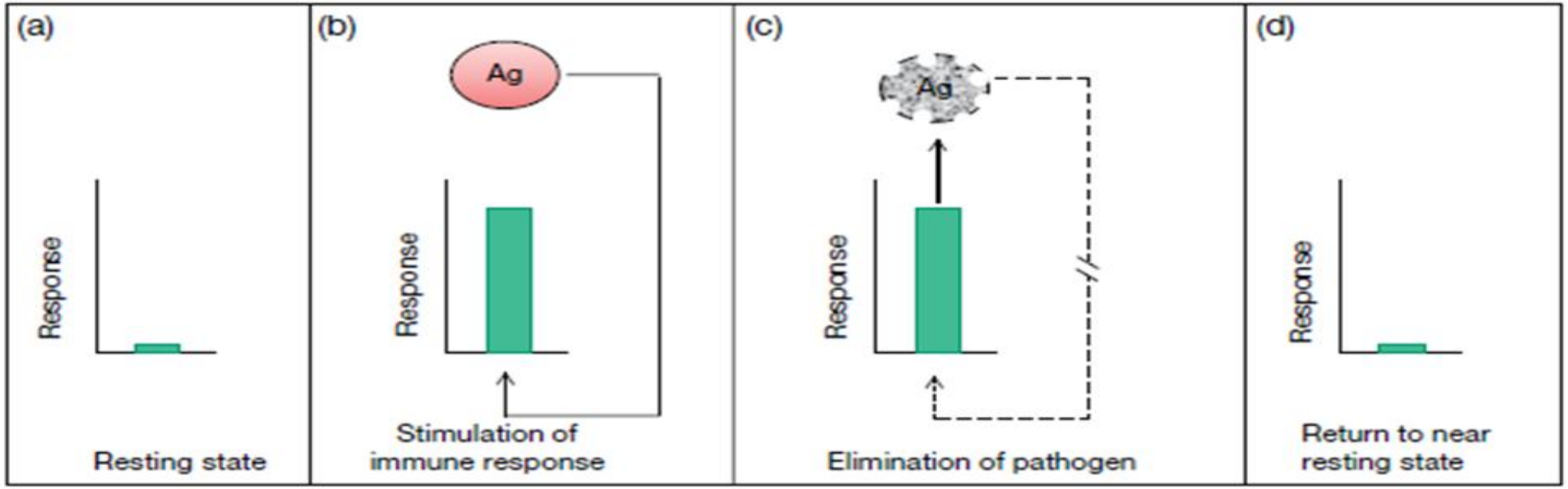
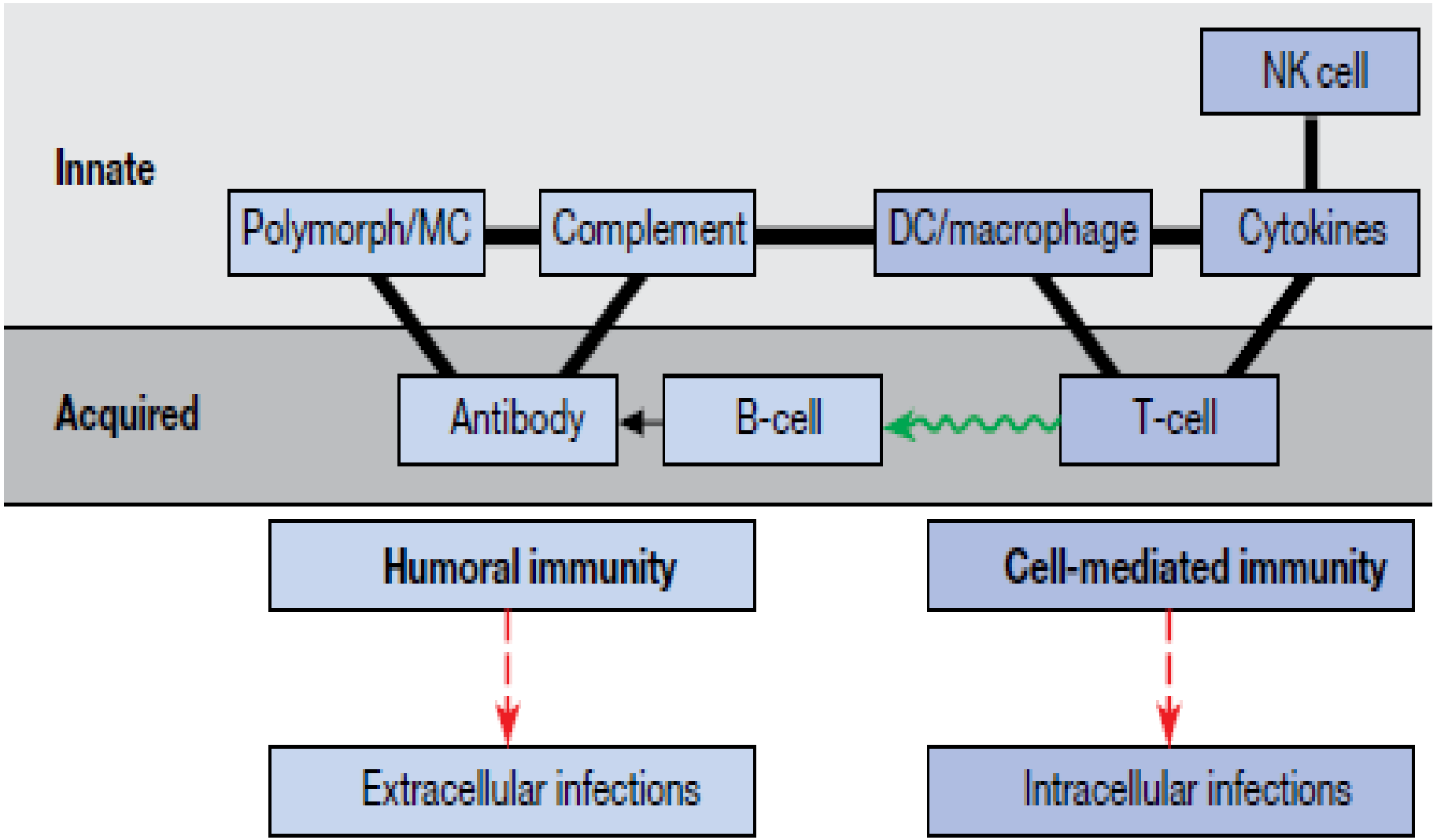


Figure 9.1 Antigen drives the immune response. The immune response is stimulated by antigen. A basal level of immune response is maintained by tissue resident cells of the innate response and by naive (and any preexisting memory) lymphocytes of the acquired response. Upon encounter with antigen an immune response is generated involving the proliferation and differentiation of antigen-specific lymphocytes in secondary lymphoid tissues and the recruitment of both innate and acquired cells to the site of the infection. Upon successful elimination of the pathogen the stimulus disappears and the immune response returns to its near resting state (but now with enhanced memory with respect to the acquired response).

The two pathways linking innate & adaptive (acquired) immune responses

LO.5



The adaptive ☺ immune system is highly dependent on cells of the innate immune system for the purposes of knowing when to respond, how to respond, and for how long.

Thank You