ACEM Primary Examination Vivas > Pathology > Immunity Organised by edvivas.com	
Title	**Page**

B Cells 2003-1

TOPIC: Role of B Cells in immume processes **NUMBER:** ____

OPENING QUESTION	Where are B lymphocytes located	**COMMENTS**
POINTS REQUIRED	1 Bone Marrow	4 of 5 to pass
	2 Circulating	
	3 Lymph nodes	
	4 Spleen	
	5 Peripheral Lymphoid Tissue	
	6	
	7	
PROMPTS		
SECOND QUESTION (if needed)	How do B cells respond to antigenic stimulation	
POINTS REQUIRED	1 Specific Receptor Complex (IgM)	
	2 Transformation to Plasma Cell	
	3 Production of Specific immunoglobulins	
	4	
	5	
	6	
PROMPTS		
THIRD QUESTION (if needed)	How are B cells activated in a graft vs host reaction	
POINTS REQUIRED	1 (CD4+) T helper cells	
	2 Cytokines (Interleukin 4&5)	
	3 B cell stimulated by antigen in presence of cytokines	
	4	
	5	
	6	
PROMPTS		

Host Defences 2009-2

TOPIC	QUESTION	ESSENTIAL KNOWLEDGE	NOTES
Question 2: Host Defences	(a) What are the normal barriers to infection by ingested pathogens in the gastrointestinal tract?	• Acid gastric secretions; • viscous mucosal layer; • lytic pancreatic enzymes; • bile detergents; • secreted IgA antibodies; • competition for nutrients with commensal bacteria; • clearance by defaecation	3/7 to pass
	(b) Describe the barriers to infection that exist within the respiratory tract.	• **Mucociliary blanket** within upper airways for trapping large microbes • **Coughing** (clears microbes from trachea) • **Ciliary action** within trachea and large airways (moves them up to be swallowed) • **Alveolar macrophages** or neutrophils attack and destroy microbes	2/4 to pass
	(c) What processes can disrupt the normal protective mucociliary action?	• Smoking; • cystic fibrosis (viscous secretions); • aspiration of stomach contents; • trauma of intubation; • viral infection; • bacterial infection	3/6 to pass

Lymphocytes 2013-1

Question 2 LOA: 2 The normal immune response	1. What are the major classes of lymphocytes?	1. B lymphocytes CD4+ helper T- Lymphocytes CD8+ Cytotoxic T Lymphocytes Natural Killer (NK) Cells	B&T
	2. What is the role of each class of lymphocytes in the normal immune system? Prompt- What is the role of B-cells? What is the role of T-Cells?	2. Adaptive immunity – circulate widely & rec-circulate esp Ts - respond to foreign substances/Ag. Can become effector or memory cells B cells: recognise Ag via memb IgM/IgD –plasma cell -secretes Ig/Ab = humoral immunity. (B cells also have compl R, FcR, CD40) T cells: Ag specific T cell R - binds to Ag on cells (on MHC molecules on APCs) – activates cell depending on type = cell-mediated immunity CD4/T helper recog class II MHC bound Ag: cytokine release – leads to macrophage activation, inflam, B cell stimulation CD8/ T cytotoxic recog class I MHC bound Ag: infected cell destruction NK Cells- kill inf&tumor cells. No prior exp needed. Healthy cell Class I MHC=>inhibits NK. Can secrete cytokines=>inflame	B-Humoral plus concept T-Cell mediated plus concept

Type 1 Hypersensitivity 2016-2-D

Stem: He has an anaphylactic reaction to the analgesia given. Moving onto Pathology.			
Question 5 Type 1 Hypersensitivity **Subject:** Pathology. LOA: 1	a. Outline the immunological mechanisms leading to anaphylaxis. *Prompt: Start with the initial exposure to a substance.* *Prompt- at tissue level, what are the end organ effects of the anaphylactic response?*	Exposure to **antigen** - presentation of antigen to **T helper cells** by dendritic cells - T helper cells differentiate into T_H2 cells - these release cytokines that act on **B cells to produce IgE** - **IgE** binds to **mast cells** - **repeat exposure to the antigen** - binds to and cross-links IgE antibodies on surface of mast cells - release of **vasoactive amines** and **lipid mediators** (immediate reaction) and cytokines (late phase reaction) from mast cells - **action of mediators on end organs** results in clinical manifestations of anaphylaxis: vasodilation, vascular leakage, smooth muscle spasm).	Antigen, IgE, mast cells + 3 other bold to pass Concept of exposure, antigen processing by cell lines, mast cell priming and release of mediators to pass.
	b. What are the clinical manifestations of systemic anaphylaxis?	Skin, Respiratory (Upper and Lower), GIT, Cardiovascular, Neurological	Two systems described to pass

Type 1 Hypersensitivity 2014-1-B

Stem: An obese 50 year old woman presents to ED with an anaphylactic reaction to penicillin.			
TOPIC	QUESTIONS	KNOWLEDGE (**essential in bold**)	NOTES
The first questions is in regard to pathology:			
Question 1 Type 1 hypersensitivity reaction **Subject:** Path LOA: 1	1.What type of hypersensitivity reaction is involved? 2.What are the sequence of events involved in type I hypersensitivity reactions following re exposure to an allergen?	**Type 1** **Mast cells** armed with pre formed **IgE antibodies** > on re exposure to **specific antigen** > **release of mediators** from mast cells: **1. preformed mediators – e.g histamine/** proteases/ chemotactic factors, 2. lipid mediators e.g leukotrienes C4 and D4/ PG D2/ PAF and 3. Cytokines e.g TNF and chemokines > **immediate and late phase reactions**	**Bold**
	3.What changes occur at the tissue level?	1.Vasodilatation 2.increased vascular permeability 3. smooth muscle spasm/ bronchospasm 4. cellular infiltration 5. epithelial damage	**3 of 5 to pass**

Type 1 Hypersensitivity 2012-2

Q2 Type 1 Hypersensitivity Reaction LOA: 1	1. What is a type I hypersensitivity reaction? 2. What is the immune mechanism that causes it? 3. What pathological effects do the substances released from mast cells have?	1. A **rapid** immunologic reaction due to **antigen and antibody(IgE)** combining. 2. **Previous Ag exposure** results in activation of T_h2 cells results in **IgE Ab production** by B cells. IgE binds to mast cells. **Repeat Ag exposure**, Ag-Ab bind and results in **mast cell degranulation. Vasoactive amines** (Histamine), and lipid mediators (Leukotrienes, PG) released. May have **late phase reaction** (Cytokines) 3. Vascular dilation/ oedema, SM contraction, mucus production	Bold required 3/6 bold with concept 2 to pass

Type 1 Hypersensitivity 2010-2

Question 3.1 Type 1 (Immediate) Hypersensitivity	1. What are the features of Type 1 hypersensitivity? 2. What are the actions of mast cell mediators in Type I Hyeprsensitivity (and give examples) 3. What is the late phase reaction	**1.1. Immediate reaction, , previously sensitised individuals, IgE mediated** 1.2. Mast cell and or basophils involved 1.3. **Mediators** involved include Histamine, other amines, enzymes proteases, proteoglycans, heparin, leukotrienes, C4, PAF, Prostaglandins, Cytokines **2.1 Cellular infiltration** – leukotrienes, chemotaxis, PAF, Cytokines **2.2 Vasoactive effects** – Hist, PAF, Leukotrienes, PG D4 **2.3 Smooth muscle spasm** – leukotrienes, histamine, PG, PAF **3 Ongoing inflammatory reaction without additional exposure to triggering ag**	1. 3/5 bold 2. Histamine + 2 others + reasonable actions 3. Ongoing

Type 1 Hypersensitivity 2009-2

TOPIC	QUESTION	ESSENTIAL KNOWLEDGE	NOTES
Question 1: Type I Hypersensitivity	What is a Type I hypersensitivity reaction?	**Rapid immunologic reaction (minutes)** **Antigen – antibody** **IgE** Mast cells Previously sensitised individual	Bold to pass
Question 2:	What are the Primary mediators within the mast cell granules and their actions.	1. **Biogenic amines/histamine**. The most important vasoactive amine is histamine. **Histamine** causes intense smooth muscle contraction, increased vascular permeability, and increased secretion by nasal, bronchial, and gastric glands. 2. **Enzymes. (named)** These are contained in the granule matrix and include neutral proteases (chymase, tryptase) and several acid hydrolases. The enzymes cause tissue damage and lead to the generation of kinins and activated components of complement (e.g. C3a) by acting on their precursor proteins. 3. **Proteoglycans**. These include heparin, a well-known anticoagulant, and chondroitin sulfate. The proteoglycans serve to package and store the other mediators in the granules.	Pass – 2 out of 3 groups must include biogenic amines and example of each
Question 3: **(if time)** Second, Late-phase Reaction	What characterizes the second, late-phase reaction?	The late phase reaction is characterized by infiltration of the tissues with eosinophils, neutrophils, basophils, monocytes, and CD4+ T cells as well as tissue destruction, typically in the form of mucosal epithelial cell damage. Time course 2-24 hours later without additional exposure – may last for days.	

Type 1 Hypersensitivity 2007-2

TOPIC: Hypersensitivity Type 1 _____ **NUMBER: Q2** _____

OPENING QUESTION	**What is Type 1 Hypersensitivity?**	**COMMENTS**
POINTS REQUIRED	1 It is the acute or immediate potentially life-threatening type of allergic reaction	Mandatory
	2 Typified by anaphylaxis, bronchial asthma (atopic) 3. IGE mediated	
SECOND QUESTION	**Describe the 2 phases that occur**	
POINTS REQUIRED	Phase 1 – initial rapid with vasodilation, vascular leakage, smooth muscle spasm and glandular secretion 5-30 mins subsides 60 mins Mediators –biogenic amines, enzymes, eg proteases, proteoglycans eg heparin, cytokines Phase 2 -2 -24 hours infiltration of basophils, eosinophils, neutrophils, CD4+ with tissue destruction esp mucosal Prompt: what are the mediators	2 with time frame and at least 2 mediator Time frame
Third Question	**List some agents that can cause type 1 hypersensitivity**	Require at least 2

Type 2 Hypersensitivity 2013-1

Question 2 Type 2 Hypersensitivity Reaction LOA: 1	1. What is Type 2 hypersensitivity? 2. Describe the mechanisms involved giving examples for each mechanism.	**1 Hypersensitivity caused by antibodies that react with antigens present on cell surfaces or in the extracellular matrix** Antigens can be intrinsic to the membrane or matrix or extrinsic eg. Drug metabolite **2 a) Opsonisation & phagocytosis: IgG antibodies opsonise cells plus complement activation** generates C3b & C4b recognized by phagocyte Fc & protein receptors resulting in **phagocytosis & destruction of opsonised cells** ADCC- cells coated with Abs killed by monos, neutros, eosinos and NK cells **Examples:** transfusion reaction, erythroblastosis fetalis, autoimmune haemolytic anaemia, agranulocytosis,, thrombocytopaenia, drug reactions when a drug acts as a hapten **b) Complement and Fc receptor mediated inflammation: antibodies bind to fixed tissue** such as basement membranes, extracellular matrix … **activates complement** … generate by-products particularly chemotactic agent C5a … direct PMN migration and C3a and C5a = **increase vascular permeability. PMNs activated** by C3a and Fc receptors… release of pro-inflammatory substances like prostaglandins, production of lysosomal enzymes, reactive O2 species **Examples:** glomerulonephritis, vascular rejection in organ grafts, vasculitis caused by ANCA, Goodpastures c) **Antibody mediated cellular dysfunction:** antibodies directed against cell surface **receptors impair or dysregulate function without causing cell injury or inflammation** **Examples:** myasthenia gravis, Graves's disease, insulin resistant diabetes, pemphigus vulgaris, pernicious anaemia	Bold (concept)_ Bold 2/3 With 1 example in each

Type 2 Hypersensitivity 2010-2

Question 1.2 Antibody Mediated Hypersensitivity	1. What is antibody - mediated hypersensitivity? 2. Describe the mechanisms which mediate the hypersensitivity response 3. List an example or examples for each mechanism	1. **Caused by antibodies that react with antigens present on cell surfaces or in the extracellular matrix** Antigens can be intrinsic to the membrane or matrix or extrinsic eg. Drug metabolite 2. Mechanism of hypersensitivity response 2.1. **Opsonisation and phagocytosis: IgG antibodies opsonise cells plus complement activation** generates C3b and C4b recognized by phagocyte Fc and protein receptors resulting in **phagocytosis and destruction of opsonised cells** **Examples:** transfusion reaction, erythroblastosis fetalis, autoimmune haemolytic anaemia, agranulocytosis, thrombocytopaenia, drug reactions when a drug acts as a hapten 2.2. **Complement and Fc receptor mediated inflammation: antibodies bind to fixed tissue** such as basement membranes, extracellular matrix … **activates complement** … generate by-products particularly chemotactic agent C5a … direct PMN migration and C3a and C5a = **increase vascular permeability. PMNs activated** by C3a and Fc receptors… release of pro- inflammatory substances like prostaglandins, production of lysosomal enzymes, reactive O2 species **Examples:** glomerulonephritis, vascular rejection in organ grafts, vasculitis caused by ANCA, Goodpastures 2.3. **Antibody mediated cellular dysfunction:** antibodies directed against cell surface receptors **impair or dysregulate function without causing cell injury or inflammation** **Examples:** myasthenia gravis, Graves's disease, insulin resistant diabetes, pemphigus vulgaris 2.4. **Antibody dependant cellular cytotoxicity** **Examples:** IgG coats cells, effector cells such as monocytes, neutrophils, eosinophils and NK cells then bind and lyse cells without phagocytosis, role in specific diseases uncertain.	1. Bold 2. Bold 2/4 3. 2/4

Type 2 Hypersensitivity 2010-1

1. What is type 2 hypersensitivity?	"Type 2 hypersensitivity is **mediated by antibodies** directed toward antigens present on the surface of cells or other tissue components"	Antibody mediated One of cell surface & extracellular matrix
2. Describe the different types of type 2 hypersensitivity reactions and give examples of each.	**Three types** **(A) Opsonisation, Complement & Fc Receptor Mediated Phagocytosis** • Ig G,M activate complement, C3b & C4b recognised by phagocytes • activates complement system & membrane attack complex causing lysis of cells • Ig G recognised by phagocytes • Ab dependent cellular cytotoxicity (ADCC) Mono, Macro, Neut, Eosin, NK - transfusion reactions - erythroblastosis foetalis - auto immune haemolytic anaemia; agranulocytosis; thrombocytopaenia - certain drug reactions **(B) Complement and Fc receptor Mediated Inflammation** *C5A (÷C4A & C3A) stimulate Neutrophil and Monocyte attack via Fc receptors releasing enzymes and Oxygen free radicals* *e.g: glomerulonephritis* *Vascular Organ graft rejection* *Goodpastures* **(C) Antibody Mediated Cellular Dysfunction** *Antireceptor antibodies disturb the normal function of receptors without causing cell injury.* e.g. myasthenia gravis (ACh receptor antibodies) Graves Disease - pemphigus vulgaris	2 of 3 types with one example Able to describe complement dependant reaction plus one other with examples

Type 2 Hypersensitivity 2008-2

Question 2: Type 2 (Antibody mediated) hypersensitivity	1. Give some examples of Antibody-mediated (Type 2) hypersensitivity.	**1.Examples**: 1. *Transfusion reaction;2. Erythroblastosis fetalis;3. certain drug reactions; 4. Autoimmune haemolytic anaemia, thrombocytosis & agranulocytosis; 5. Myaesthenia gravis; 6. Grave's Disease; 7. Pemphigus vulgaris; 8. Glomerulonephritis (some forms); 9. vascular rejection in organ grafts*	3 to pass
	2. By what mechanisms is Type 2 hypersensitivity mediated? Prompt: More detail	**2a. Opsonisation & Complement- and Fc Receptor-mediated Phagocytosis:** Cells are coated (*opsonized*) with molecules attractive to phagocytes. *Complement* activation resulting in by-products (C3b and C4b). *Phagocytosis* results *Antibody-dependent cellular cytotoxicity (ADCC)*: no complement activation, leucocyte driven. **2b. Complement- and Fc Receptor-mediated inflammation**: Extracellular tissue inflammation - mainly antibody deposited activation of complement (by-products C5a; lesser C4a and C3a), which recruit neutrophils and monocytes. Fc receptors also bind the antibodies releasing enzymes and oxygen intermediates **2c. Antibody mediated cellular dysfunction**: antibodies against *cell-surface receptors* impair or dysregulate function *without* causing cell injury or inflammation	2 groups to pass

Type 2 Hypersensitivity 2005-2

TOPIC: Type 2 hypersensitivity _____ **NUMBER: 2b** _____

OPENING QUESTION	What are the major mechanisms involved in Type 2 hypersensitivity reactions	**COMMENTS**
POINTS REQUIRED	1a phagocytosis mediated by opsinisation and complement	1st question = 60% of total mark
	1b Membrane attack complex by complement activation	2 of 4 to pass
	2 Antibody Dependent Cell mediated Cytotoxicity (ADCC)	
	3 Inflammation (tissue damage) induced by complement and Fc receptor binding of leucocytes	
	4 antibody mediated cellular dysfunction	
	6	
	7	
PROMPTS	How is complement involved in this process	
SECOND QUESTION (if needed)	How does type 2 hypersensitivity bring about changes in cellular function	
POINTS REQUIRED	1 antibodies directed against cell surface receptors may bind to the receptors and either	
	2 upregulate their function – ie Graves disease	
	3 downregulate ie myesthenia gravis	
	4	
	5	
	6	
PROMPTS	What is their effect on receptors	

Type 3 Hypersensitivity 2017-1-B

Stem: Moving onto Pathology. He represents one week later with fever and a rash.			
Question 5 Type 3 hypersensitivity **Subject**: Pathology LOA: 1	a) What is the pathogenesis of Type III Hypersensitivity?	(Ig G or IgM) **Antibodies bind antigens & then induce inflammation** directly or by activating complement. The recruited leukocytes produce tissue damage by release of lysosomal enzymes and generation of toxic free radicals 3 phases (systemic diseases) a) Formation of **antigen antibody complexes (immune complexes)** in circulation b) Deposition of **immune complexes** in various tissues c**) inflammatory reaction** at the site of deposition, causing tissue injury	Bold to pass
	b) List some examples of diseases caused by Type III Hypersensitivity.	b) Serum sickness, SLE, polyarteritis nodosa, post strep GN, Acute GN, reactive arthritis, arthus reaction.	2 to pass
	c)What symptoms or signs may patients present with?	c) Arthritis, Skin lesions, Vasculitis, Nephritis, fever	2 to pass

Type 3 Hypersensitivity 2013-2-C

One week later he develops serum sickness. We are now moving to Pathology			
Question 4 **PATHOLOGY** **Type 3 Hypersensitivity** LOA: 1 (Robbins pp 204-205)	1. What is the pathogenesis of serum sickness? Prompt (if required): How is the tissue damage caused?	**1. Type 3 hypersensitivity** Phase 1: **Formation** of **Immune complexes.** Protein Ag, 1/52 -> Ab -> blood -> Ag-Ab complexes Phase 2: **Deposition** of immune complexes. Medium size, Ag excess most pathogenic High pressure filtration , glomeruli, joints Phase 3: **Tissue injury** caused by immune complexes **Acute inflam reaction** ~ day 10 IgG & IgM (C' fixing Ab) bind to leukocyte Fc receptors. Leuk recruitment and activation - release proteases/lysozymal enzymes ->damage. Deposition, activation and Consumption of C' and decreased C3 levels -> inflam reaction and tissue damage	Bold 3 Phases
	2. What are some clinical features?	2. Fever, urticaria, arthralgia, LN enlargement, proteinuria	3 of 5
	3. What are some other examples of Type III hypersensitivity?	3. Acute: post strep G-N, reactive arthritis, Arthus reaction Chronic: SLE, PAN, other vasculitides, possibly membranous G-N,	3 examples

Type 3 Hypersensitivity 2008-2

2. Type III immune mediated hypersensitivity	1. What is the pathogenesis of type III hypersensitivity? Prompt: Immune mediated	**Antibodies bind antigens & then induce inflammation** directly or by activating complement. The recruited leukocytes produce tissue damage by release of lysosomal enzymes and generation of toxic free radicals 3 phases (systemic diseases) a) Formation of antigen antibody complexes in circulation b) Deposition of **immune complexes** in various tissues c) **inflammatory reaction** at the site of deposition	Highlighted
	2. What are the common sites for immune complex deposition	Renal glomeruli, joints, skin, heart, serosal surfaces, small blood vessels	3 to pass
	3. Give some examples of diseases caused by Type 3 hypersensitivity	SLE, polyarteritis nodosa, post strep GN, Acute GN, reactive arthritis, serum sickness, arthus reaction	3 to pass

Type 3 Hypersensitivity 2005-2

TOPIC: Type 3 hypersensitivity _____ **NUMBER: 2a** _____

OPENING QUESTION	What are the phases in the pathogenesis of systemic immune complex disease	**COMMENTS**
POINTS REQUIRED	1 Formation of antigen antibody complexes in circulation	2 of 3
	2 Deposition of immune complexes in various tissues	
	3 inflammatory reaction leading to tissue injury	
PROMPTS		
SECOND QUESTION (if needed)	What chemical mediators contribute to immune complex mediated tissue injury	I and 2 to pass with reasonable coverage each
POINTS REQUIRED	1 Complement cascade – classical pathway: opsonins C3b – resulting in phagocytosis Chemotactic factors C5 fragments C5b67 Anaphylotoxins C5a C3a Membrane attack complex C5-9	
	2 Inflammatory mediators liberated from neutrophils and macrophages, Histamine, PAF, protaglandins	
	3 Hageman factor, kinins	
	4 Oxygen free radicals	
	5	
	6	
PROMPTS	What cell types are involved – what factors might they liberate Any other systemic processes	

Type 3 Hypersensitivity 2003-2

2.3 Type 111 hypersensitivity	What is Type 111 hypersensitivity? What kinds of antigens cause it?	**Immune complex disease**, humoral Abs bind Ags and **activate complement**. Complements attract neutrophils which damage tissues by release of lysosomal enzyme and toxic free radicals. Exogenous:- foreign protein (serum sickness), bacteria (endocarditis, Glomerular Nephritis), viruses (Polyarteritis Nodosum), parasites, fungi, drugs. Endogenous:- autoimmune diseases SLE, Rha, GN.	2/ 2/

Type 4 Hypersensitivity 2014-2-D

Stem: Moving on to pathology: Six weeks later ne develops sympathetic ophthalmia, which is a **Type IV** hypersensitivity reaction			
Question 4 Type 4 hypersensitivity reaction (pp 205-208; 1356) **Subject**: Path LOA: 1	1. Describe the sequence of events that lead to this reaction. Prompt: what cells are involved?	Injury **Initiated by antigen** sensitised CD4+ or CD8+ **T cells** Retinal antigens may be transported in the lymphatics of the damaged eye Reaction may occur in both eyes causing a Pan Uveitis. CD4+ predominate in autoimmune disease CD8+ in post infectious (esp viral) reactions **Can be cytokine** (CD4+ Th1 or TH17 cells involved) **or direct cellular** (Cyotoxic lymphocyte) **mediated** tissue injury (either satisfactory).	Requires antigen and either cytokine or direct cellular mechanisms to pass
	2. What tissue changes would occur	Perivascular cellular infiltrates, tissue oedema, granuloma formation, cell destruction.	**(2/4 to pass)**
	3. Name other examples of Type IV hypersensitivity reactions.	Type I diabetes Multiple sclerosis Rh arthritis Inflammatory bowel disease Guillain Barre Contact sensitivity dermatitis Tuberculin reaction Granulomatous diseases Viral hepatitis	**(2 examples to pass)**

Type 4 Hypersensitivity 2011-2

Question 2 LOA: 1	What diseases are caused by Type 4 hypersensitivity?	Type 1 Diabetes Insulin, Glutamic acid decarboxylase Rheumatoid arthritis Joint synovium Multiple sclerosis Myelin basic protein, proteolipid protein, Crohn's disease ? commensal bacteria Periph neropathy (?GBS) protein Ag of periph nerve myelin Contact dermatitis environmental, e.g. poison ivy	**3** examples to pass
	Describe the tuberculin reaction (Prompt for cellular response and timecourse?)	Responses of differentiated effector T cells TH1 -> cytokines, IFNγ, stim and **activate macrophages** _> inflamm TH17 ->Chemokines, cytokines, IL-17, 22, **recruit neutophils & mono, CD4 cells** **Tuberculin reaction** start **8-12 hr**, peak **21-72** hr **Perivasc cuffing**, endothelial hypertrophy, **epithelioid** cells, **granuloma**	Bold, 3/6 (time delayed as in hours)

Type 4 Hypersensitivity 2009-1

Question 2: **Type 4** **Delayed type hypersensitivity**	**What are the cellular events in delayed type hypersensitivity** in a previously sensitised individual?	1. Delayed type hypersensitivity $T_H1$cells are activated and secrete cytokines that are responsible for the delayed type reaction - IL-12, IFN-γ, TNF, lymphotoxin, chemokines. Accumulation of mononuclear cells around small veins and venules, **perivascular cuffing,** increased **microvascular permeability, escape of plasma proteins** and **deposition of fibrin** in interstitium Typical example = tuberculin reaction 2. T cell mediated cytotoxicity Sensitised CD 8+ T cells (cytotoxic T lymphocytes) kill Ag bearing target cells	2/4 bold
	How does it differ in a naïve individual?	In naïve individual, **CD4+T cells** differentiate into T_H 1cells after recognising antigen presented on APCs in association with class II MHC molecules. **$T_H1$cells** can enter the circulation and remain in the **memory** pool of T cells for long periods (years)	

Type 4 Hypersensitivity 2007-2

TOPIC: Hypersensitivity Type 4 **NUMBER: Q2**

OPENING QUESTION	**What is type IV hypersensitivity?**	**COMMENTS**
POINTS REQUIRED	It is a cell mediated type of hypersensitivity initiated by specifically sensitised T lymphocytes. It includes the classic delayed type of hypersensitivity reactions initiated by CD4+ (TH1) cells and direct cell mediated cytotoxicity mediated by CD8+ (CTL) cells.	required
SECOND QUESTION	**What is a delayed type of hypersensitivity reaction?**	
POINTS REQUIRED	Tissue antigen on antigen presenting cell encounters **CD4+** (TH1) secrete specific cytokines – IL12, IFN-γ, IL2 and TNFα. Examples – classic tuberculine reaction, response to fungi, protozoa, parasites, contact skin sensitivity and allograft rejection, diabetes multiple sclerosis & rheumatoid arthritis, GB. 8-12 hours starts peaks at 24- 72 hours and thereafter subsides These cytokines mediate injury by **(additional information for the high performing candidate)** • activating antigen non-specific monocytes and macrophages • Phagocytosis • Secretion of PDGF and TGFβ • Paracrine proliferation of T cells which includes CD4+ T cells • Local vasodilatation • Increased expression of ELAM-1 – increased attachment of passing lymphocytes and monocytes • Secretion of low molecular weight with chemotactic factors – IL8 • Extravasation of lymphocytes and monocytes • With persistent non-degradable antigens nodules of activated epitheloid macrophages form a granuloma with characteristic perivascular (perivenular) cuffing.	Required Prompt: please give an example
THIRD QUESTION	**What is T cell mediated cytotoxicity?**	
POINTS REQUIRED	Principle pattern of response to viral infections, tumour cells and allograft rejection. The **CD8+** - CTLs directly kill tissue cells and antigen presenting cell via perforin – granzyme and Fas-FasL pathways which causes apoptosis.	required