

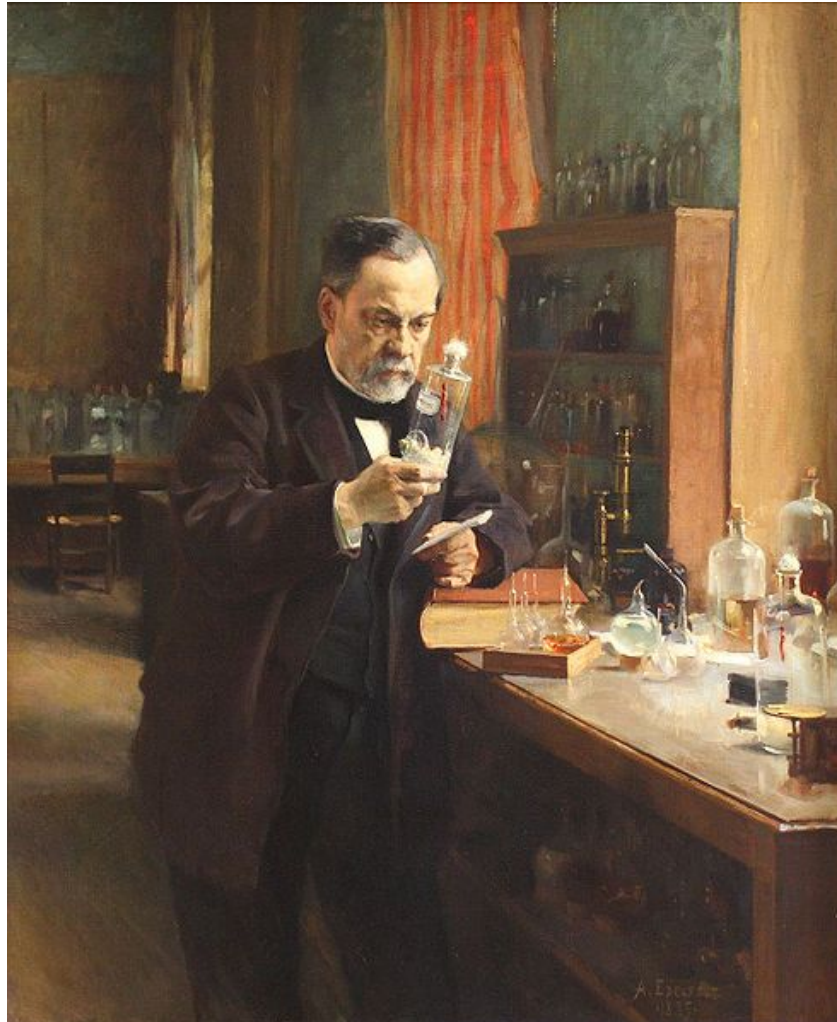
Лимфоидная ткань

1. Открытие приобретенного иммунитета
2. Центральные и периферические органы иммунной системы
3. Гуморальный иммунитет
4. Клеточный иммунитет
4. Кооперация клеток в иммунных реакциях
5. Патология иммунной системы

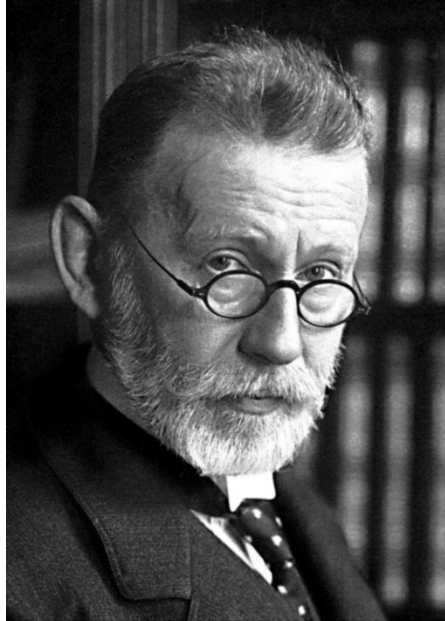
Снимки получены с помощью микроскопа Nikon Eclipse 50i, а также из Интернета (an image search in www.google.com)

Открытие приобретенного иммунитета

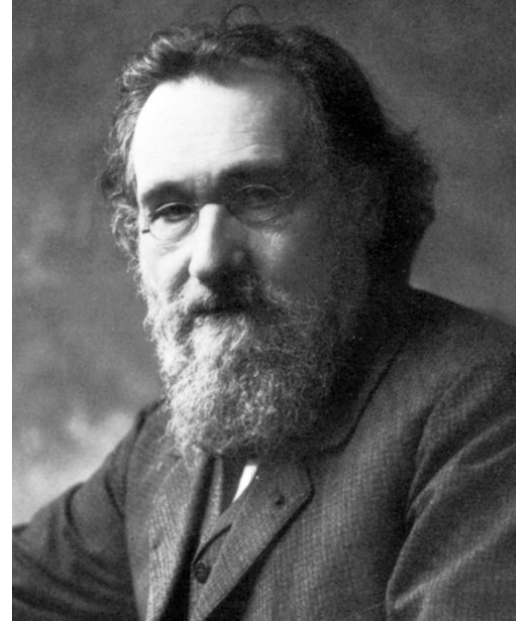
Луи Пастер
(1822-1895)



Гуморальный и клеточный иммунитет (НП-1908)



Пауль Эрлих
(1854-1915)



Илья Ильич Мечников

Неинфекционный иммунитет (НП-1960)



**Питер Медавар
(1822-1895)**

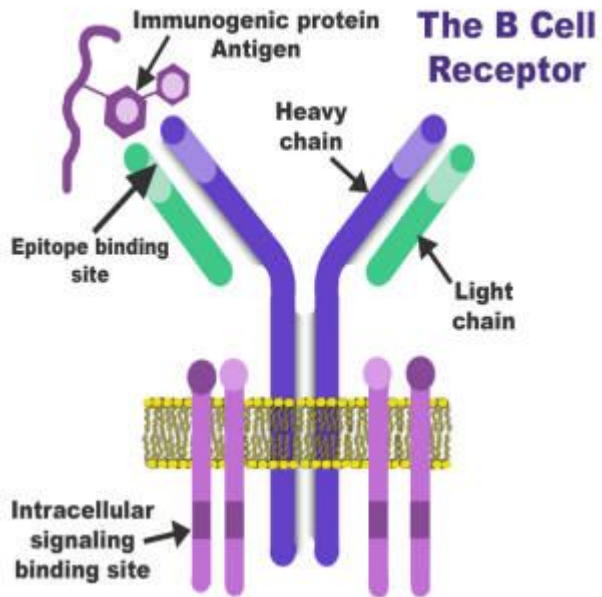


**Фрэнк М. Бернет
(1899-1985)**

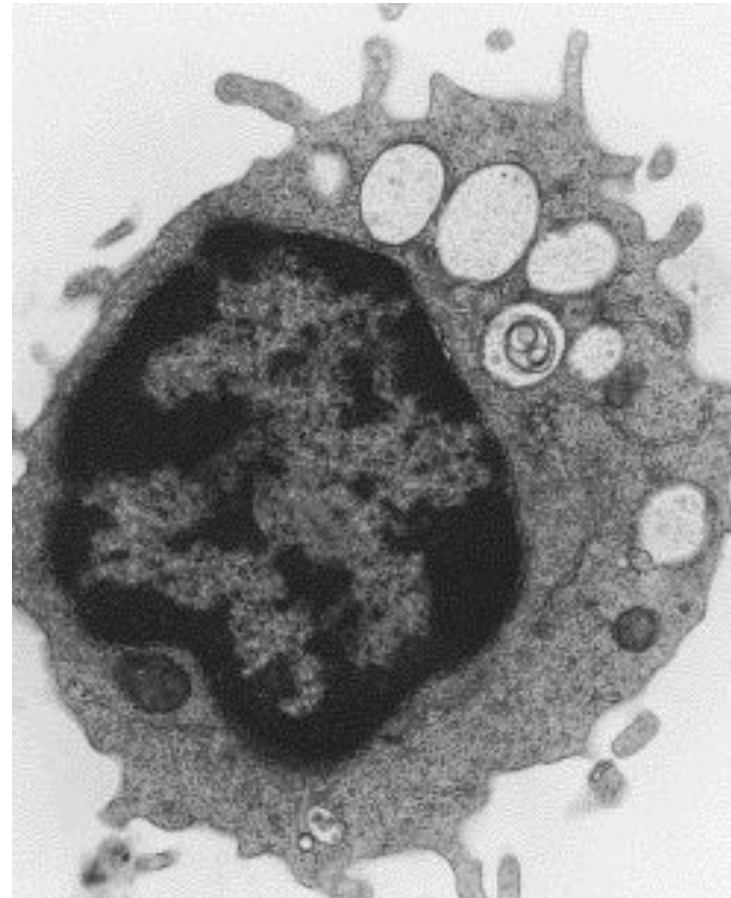
Типы лимфоцитов

Рецептор	IgM/D	ТКР	CD3	CD4	CD8
В-лимфоцит	+				
Т-хелпер		+	+	+	
Т-киллер (супрессор)		+	+		+
ЕК-клетка			+		

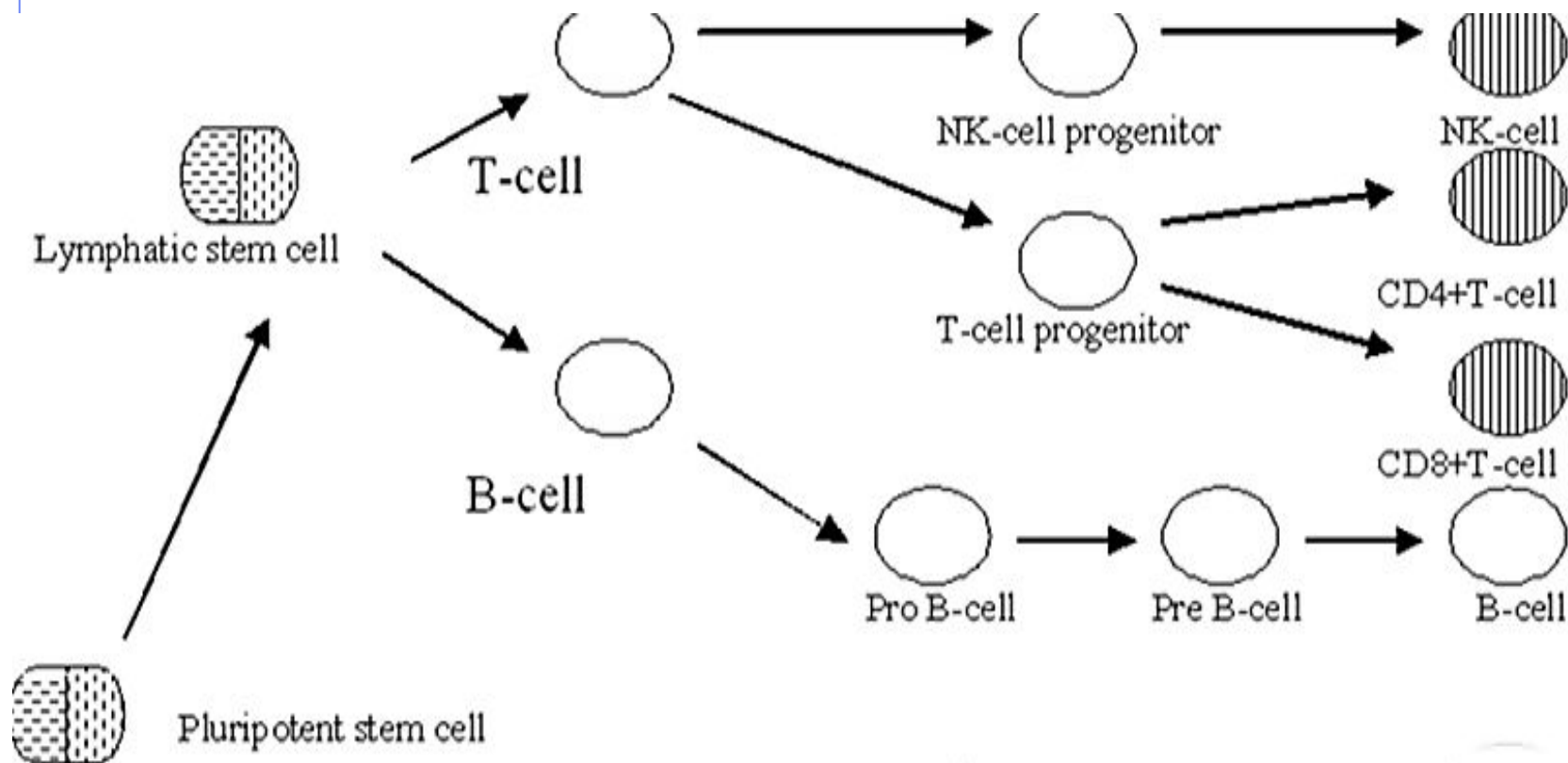
В-лимфоциты



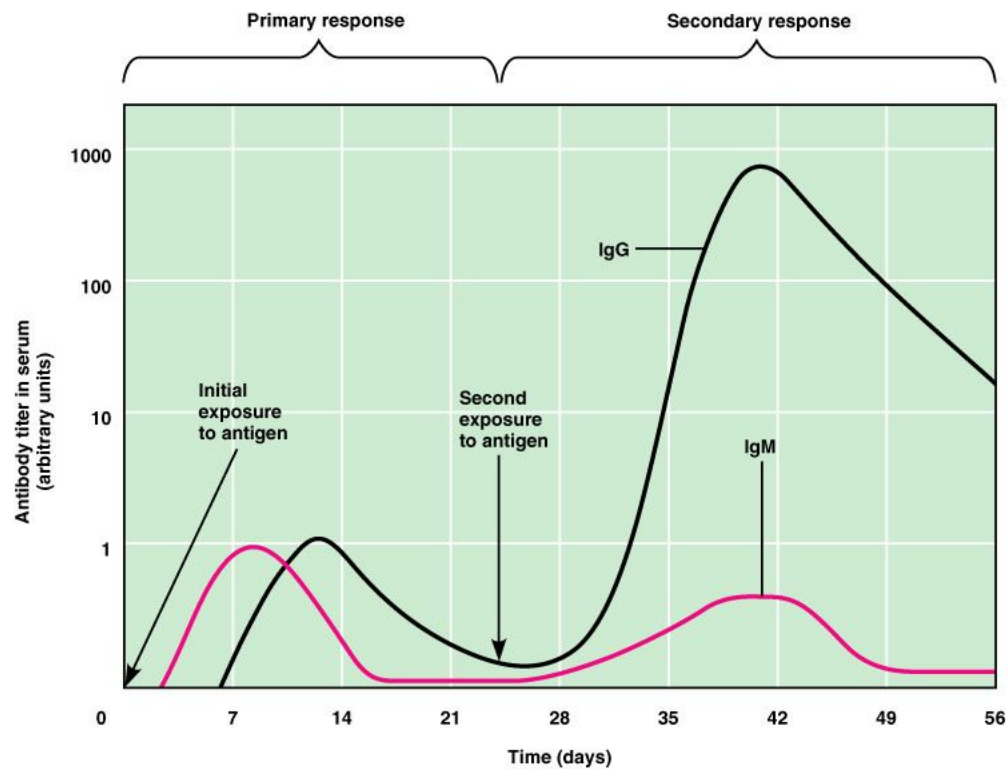
Рецептор В-лимфоцитов



Лимфоцитопозэ

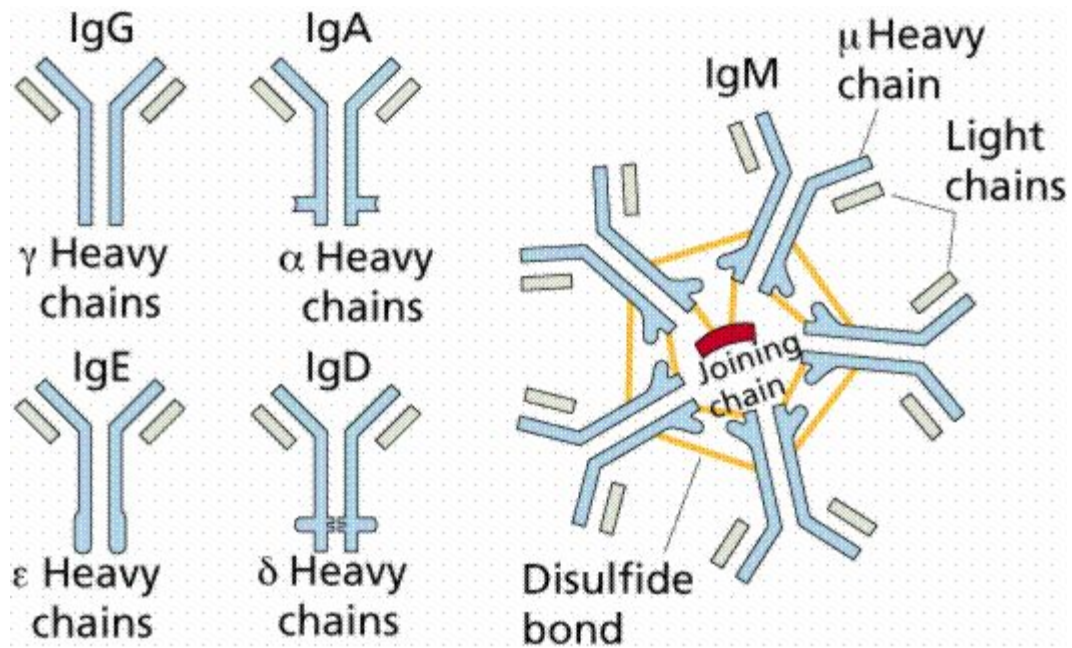


Иммунный ответ

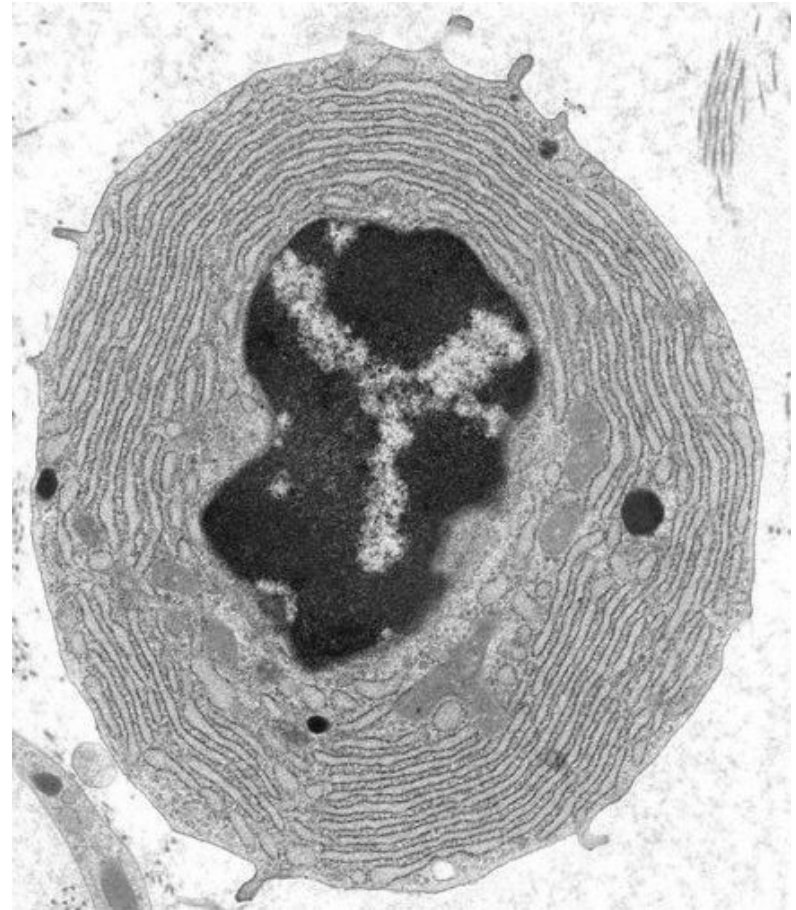
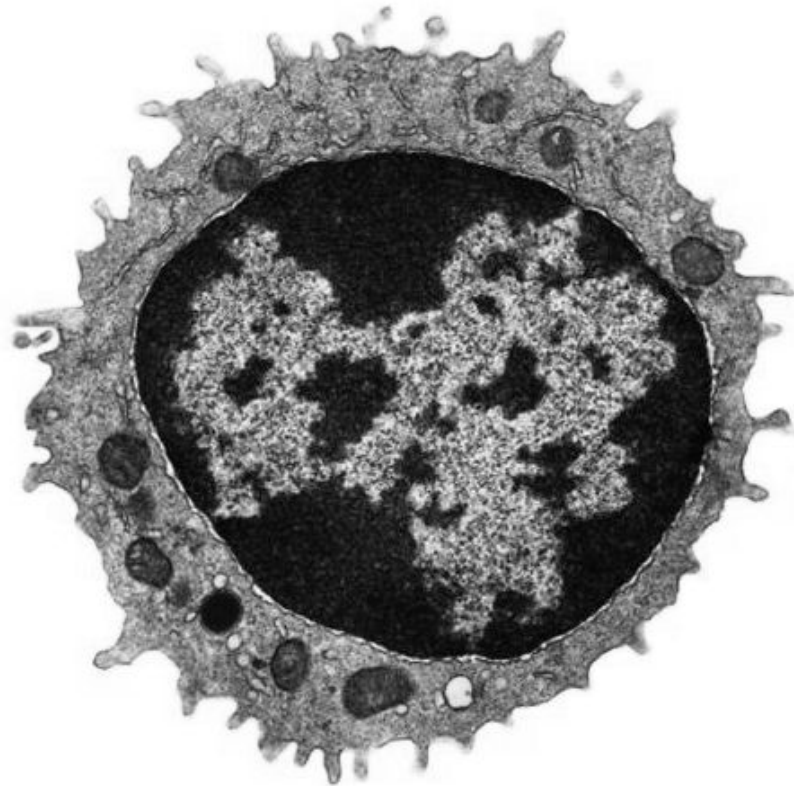


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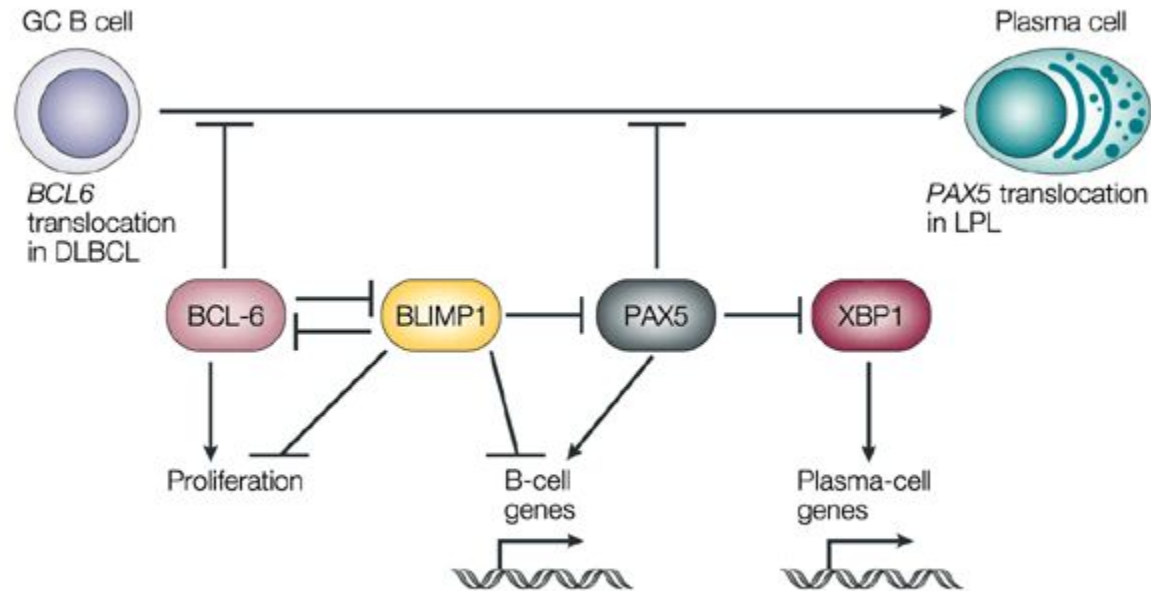
Иммуноглобулины



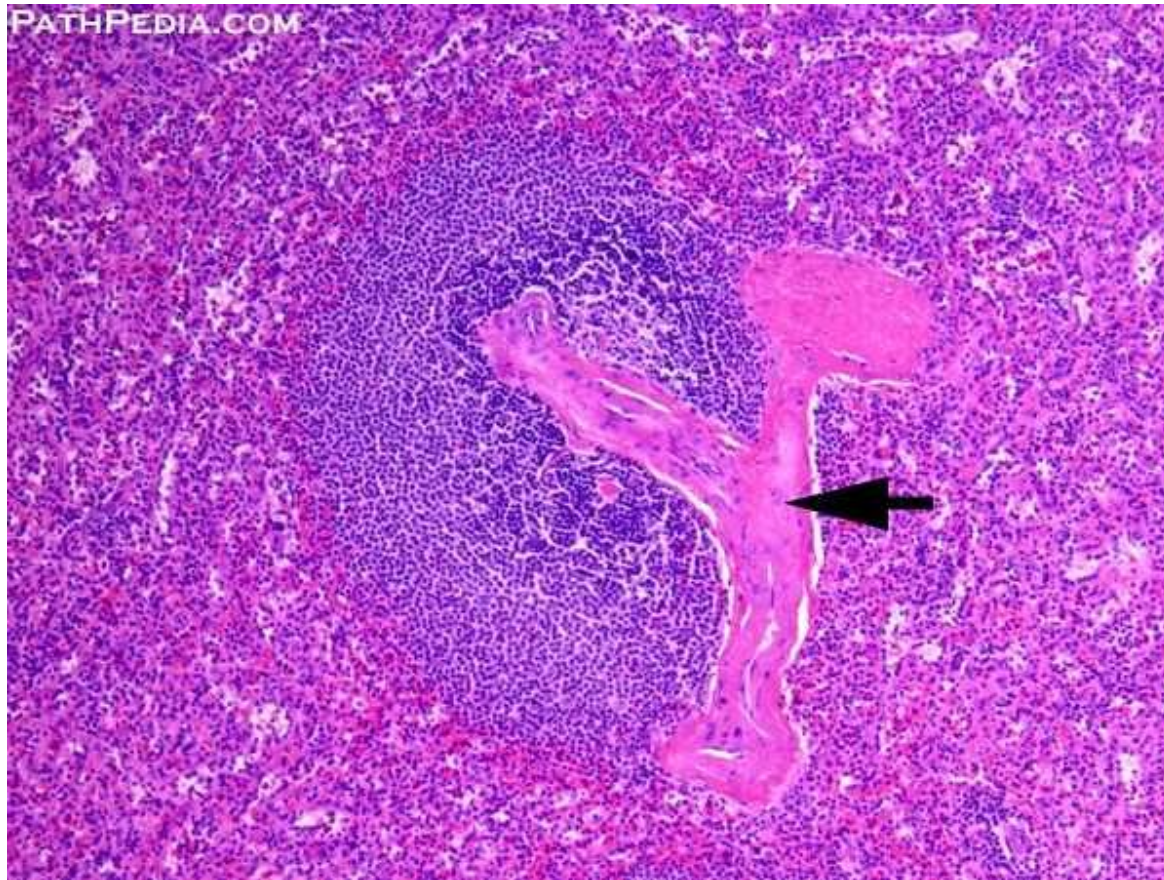
В-лимфоцит и плазматическая клетка



Дифференцировка В-лимфоцитов в плазматические клетки



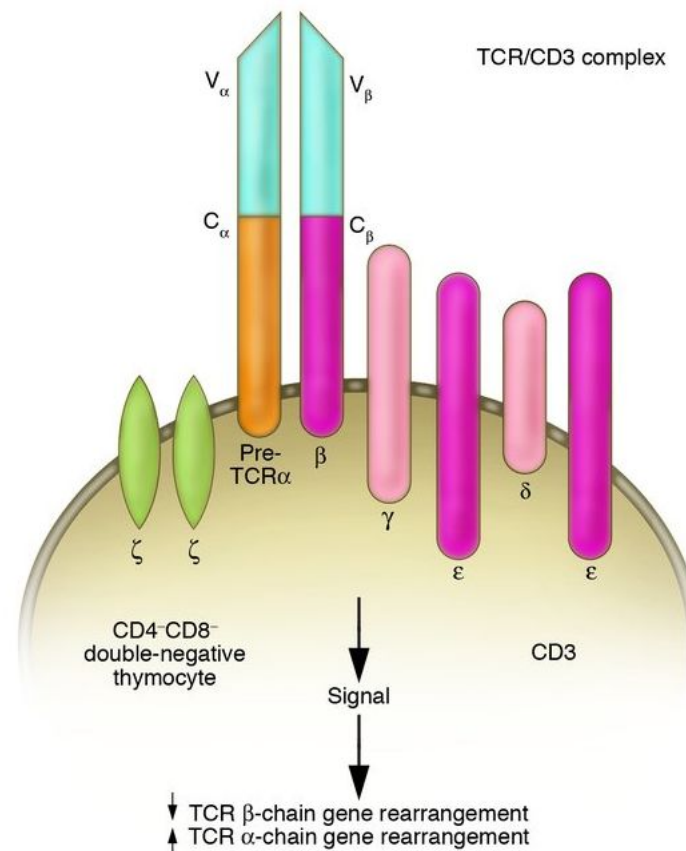
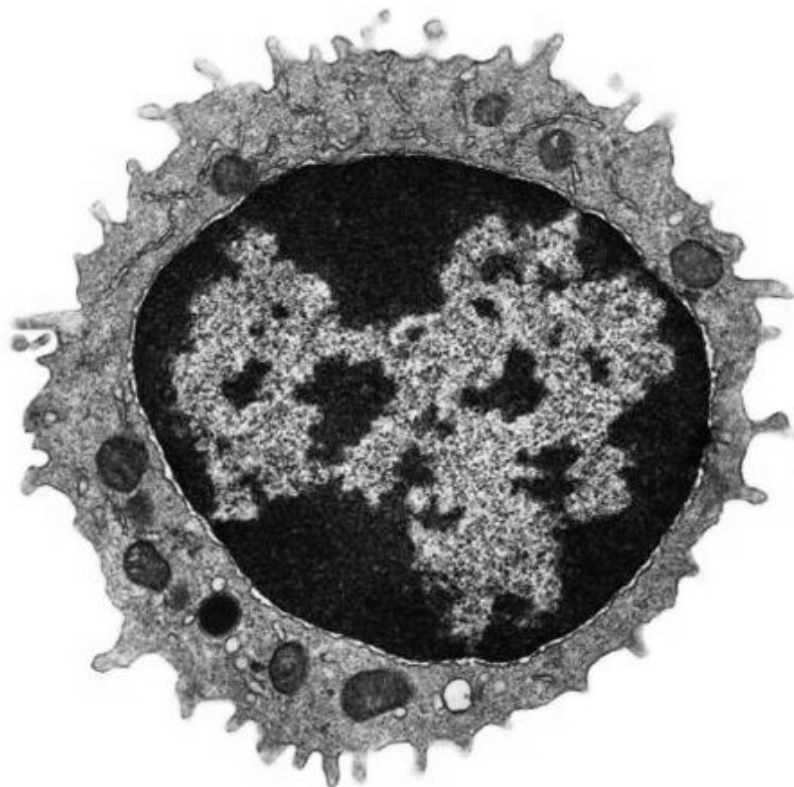
Лимфоидный фолликул селезенки



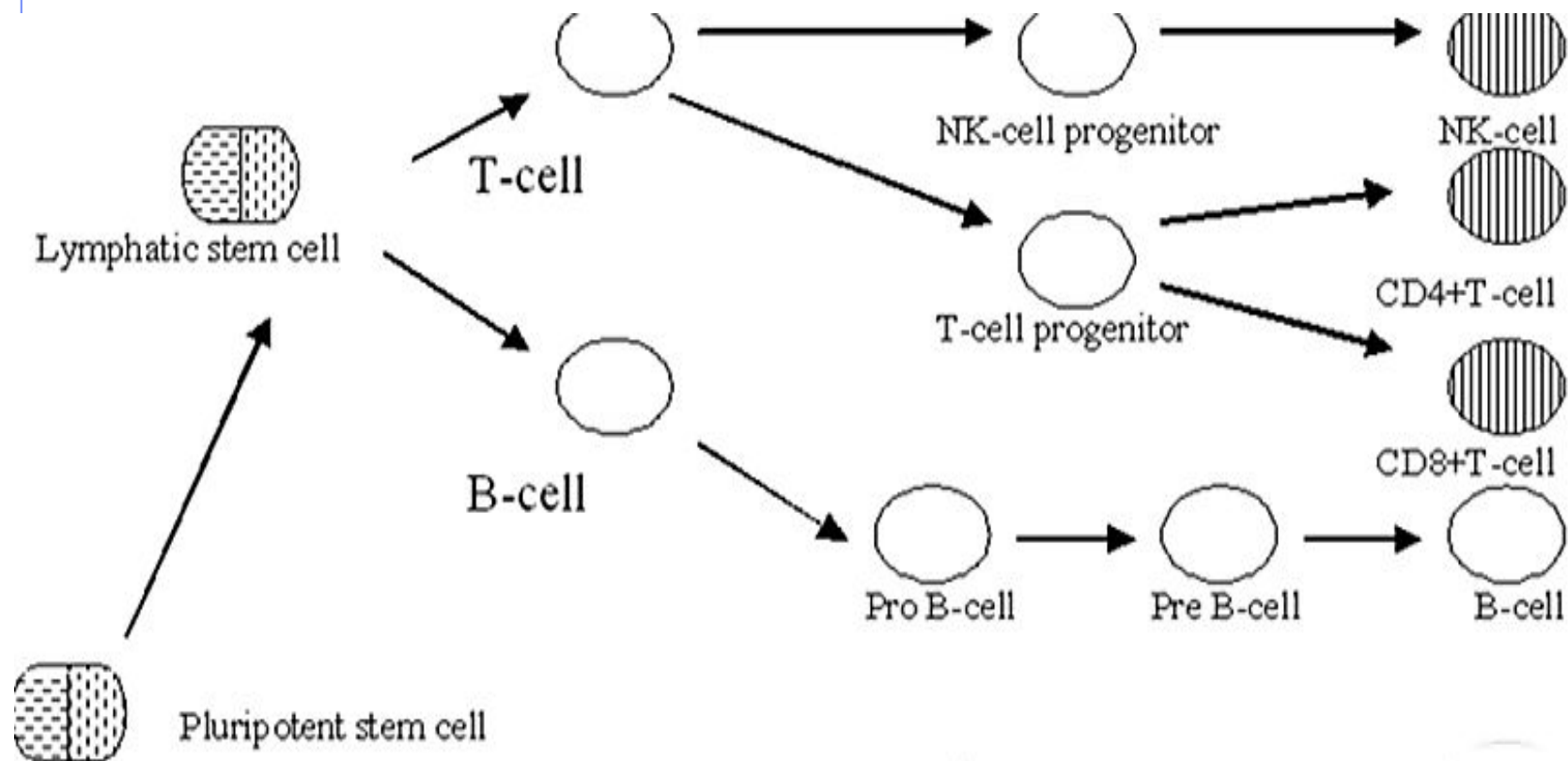
Лимфоидные фолликулы в лимфатическом узле



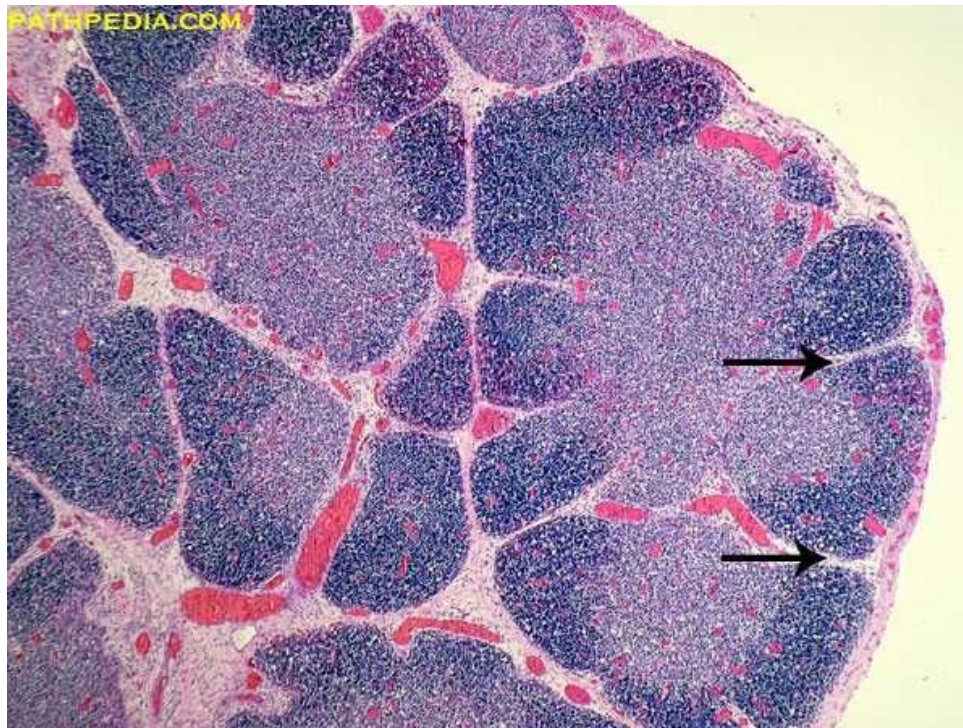
Т-лимфоциты



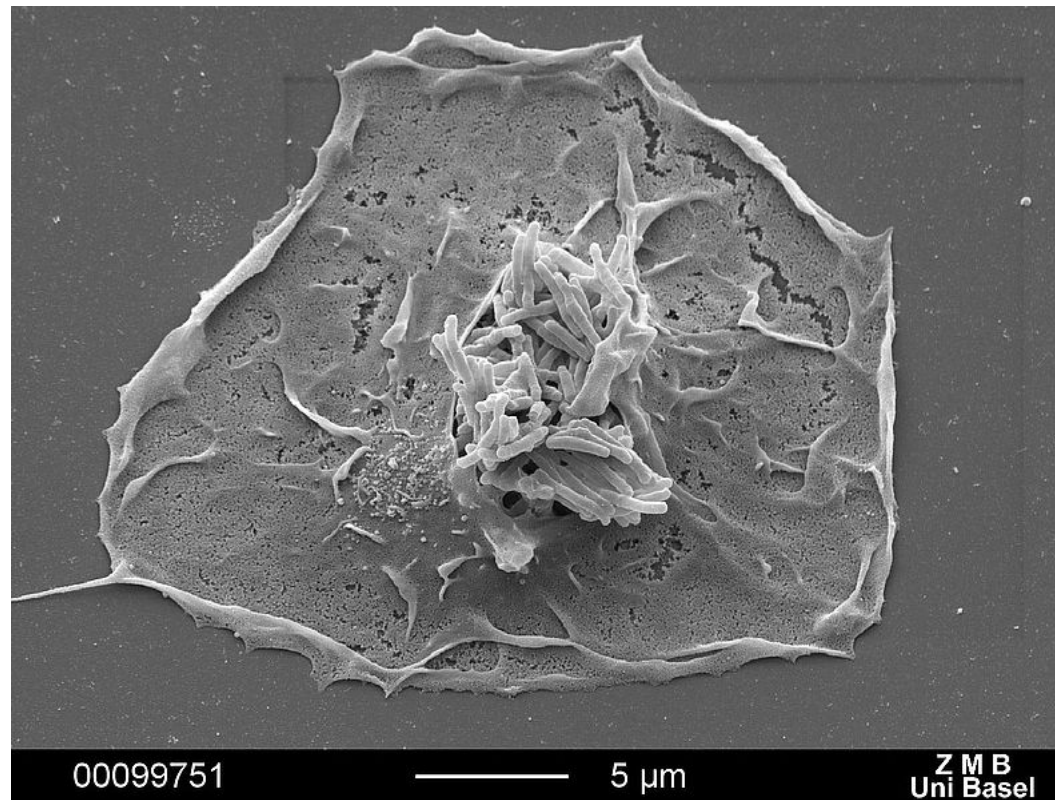
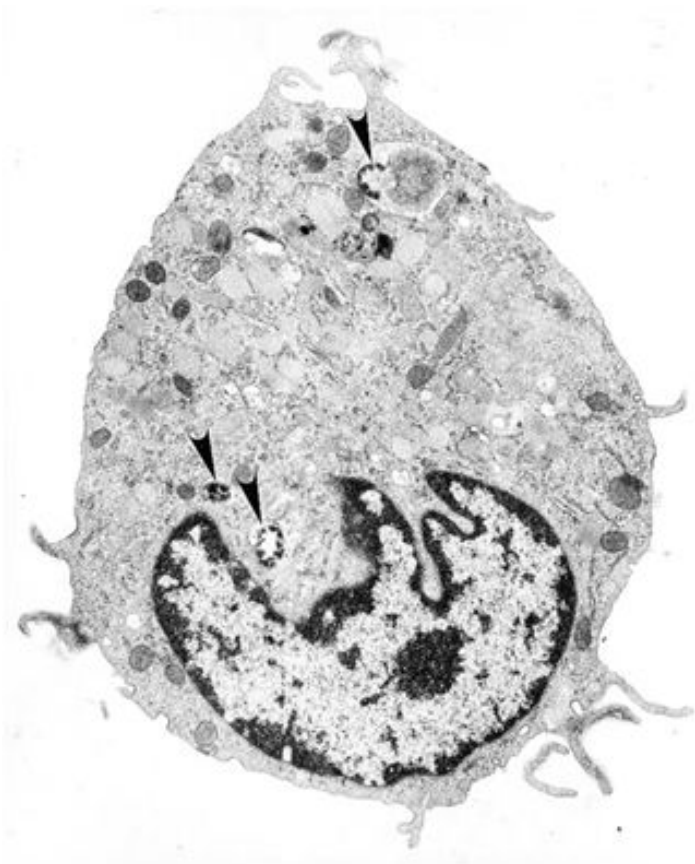
Лимфоцитопозэ



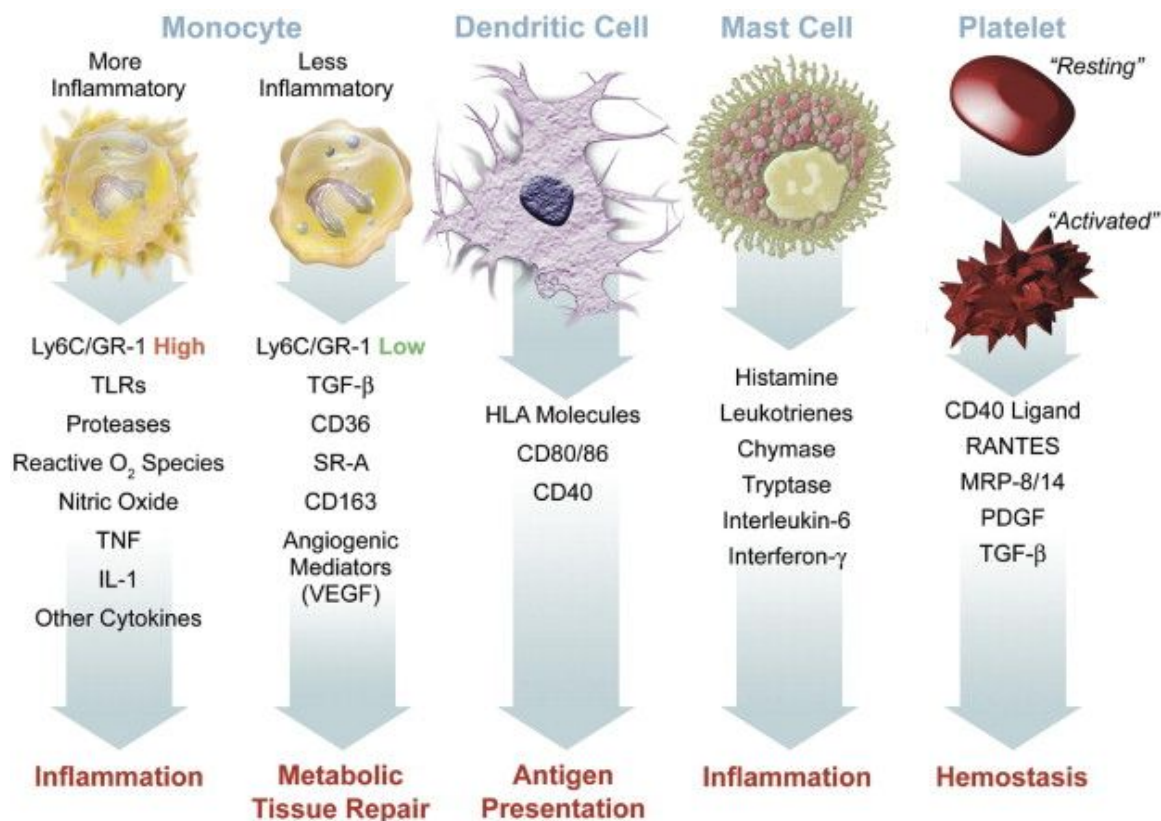
Тимус



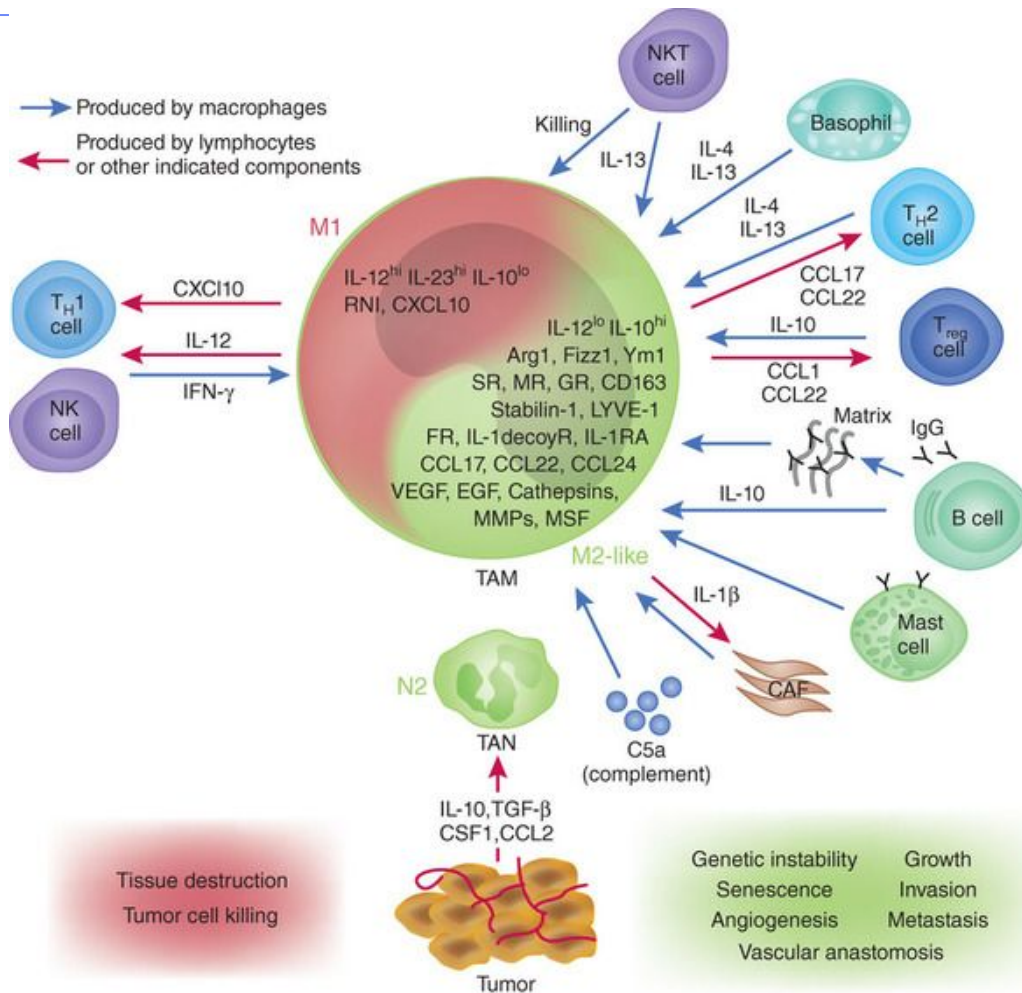
Моноцит-макрофаг



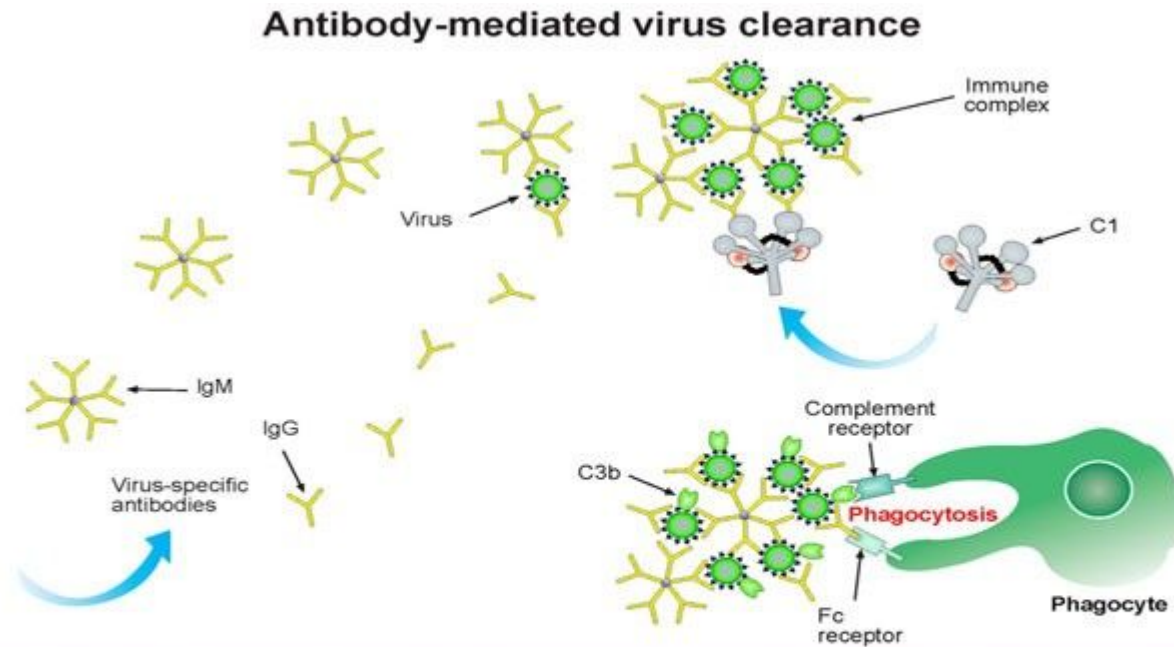
Клетки врожденного иммунитета



Взаимодействие макрофага с другими клетками

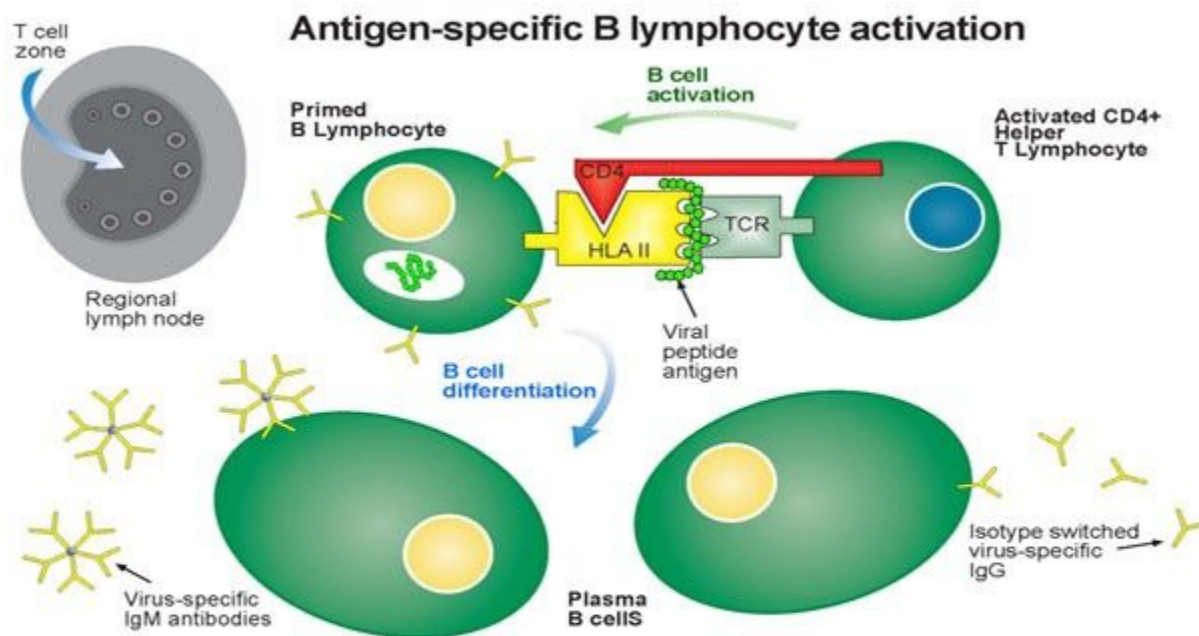


Фагоцитоз связанного антителами вируса



Virus-specific antibodies function to neutralise and opsonise free virus particles. Virus and viral antigens opsonised with antibodies also form immune complexes which can be detected and destroyed by phagocytes expressing Fc receptors. The classical complement cascade can further augment this response by opsonising virus and viral antigens with C3b complement proteins that are detectable by phagocytes expressing complement receptors. Immune complexes are also trapped by complement and Fc receptors on the surface of follicular dendritic cells in the germinal centres of secondary lymphoid tissue (lymph nodes) to further promote B cell responses.

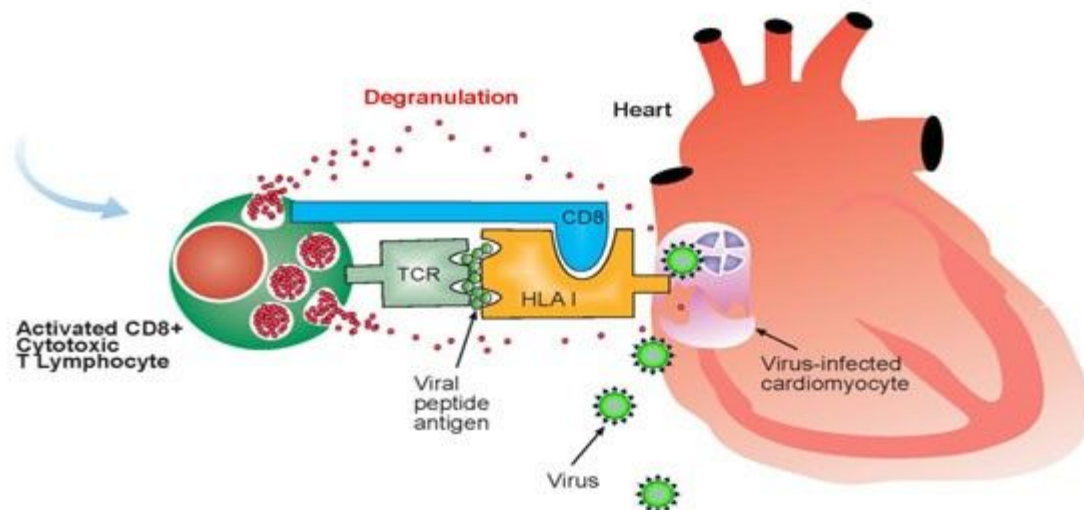
Активация В-лимфоцитов



CD4+ helper T lymphocytes that recognise antigen bound to surface HLA class II receptors on B cells become activated and in turn provide activation signals to primed B cells to differentiate into effector plasma B cells that secrete antibodies and also memory B cells. Naive B cells initially synthesise IgM when they become activated, whereas re-stimulated memory B cells can undergo isotype-switching and affinity maturation which is dependent on the type of activation signals obtained from CD4+ helper T cells.

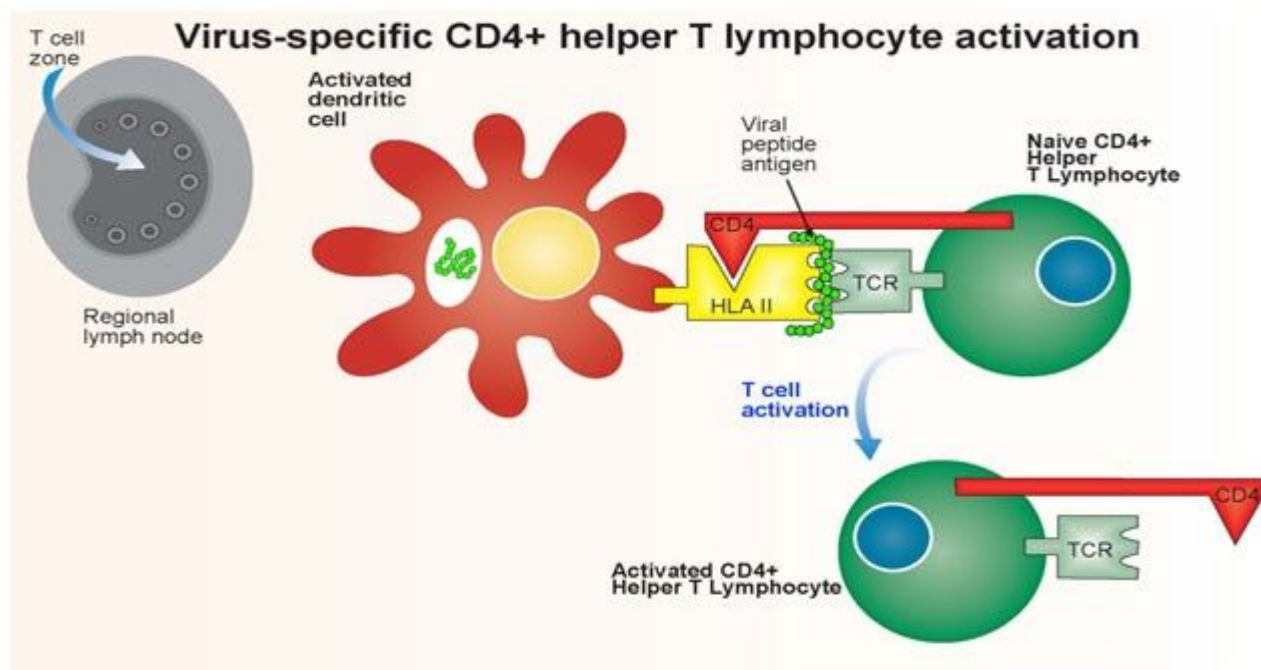
Уничтожение инфицированных вирусом клеток Т-киллерами

CD8+ cytotoxic T lymphocyte-mediated killing of infected cells



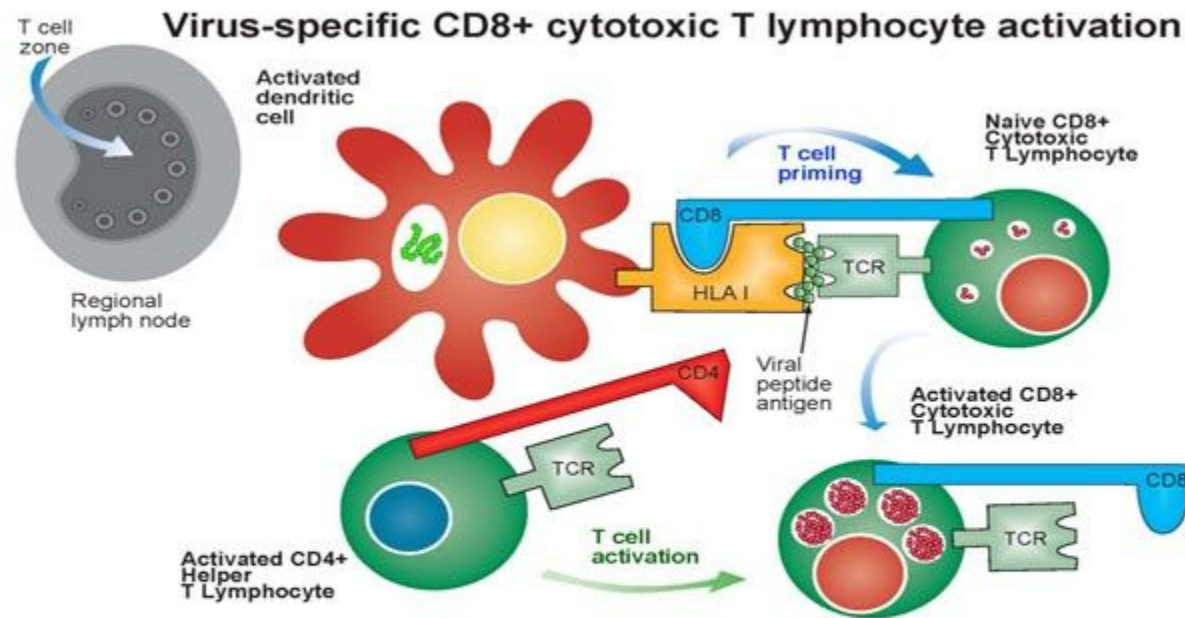
Cardiomyocytes infected with virus express surface HLA class I receptors with bound viral peptide antigens. Effector CD8+ cytotoxic T lymphocytes that express T cell receptors that recognise viral peptide antigens actively kill infected cells by degranulation of vesicles containing perforin and degradative molecules.

Активация Т-хелперов



Dendritic cells present peptide antigens bound to surface HLA class II receptors to naive CD4⁺ helper T lymphocytes in the T cell zone of secondary lymphoid tissue (lymph nodes). CD4⁺ T cells that express T cell receptors that recognise antigen become activated and proliferate into effector and memory CD4⁺ T cell populations. Effector CD4⁺ T cells migrate to inflamed tissue where they further stimulate the immune response.

Активация Т-киллеров



Dendritic cells also present peptide antigens bound to surface HLA class I receptors to naive CD8+ cytotoxic T lymphocytes in the T cell zone of secondary lymphoid tissue (lymph nodes). CD8+ T cells that express T cell receptors that recognise antigen become primed for cell-killing function, however, activation signals from CD4+ helper T lymphocytes are required. Once activated CD8+ T cells differentiate into effector and memory CD8+ cytotoxic T cell populations. Effector CD8+ T cells migrate to inflamed tissue where they are capable of killing host cells bearing viral peptide antigens bound to HLA class I receptors.