

[Test Your Knowledge: Immunology and Transplantation](#)

AJKD recently published a [Core Curriculum by Dr. Donald Hricik](#) on transplant immunology and immunosuppression. The following questions will test your knowledge on this topic.

1. Which of the following immune responses is specific to transplantation?
 - A. Indirect allorecognition
 - B. Direct allorecognition
 - C. Activation of the innate immune response
 - D. Activation of the adaptive immune response

2. Which step is not required for T-cell activation?
 - A. Engagement of the T cell receptor with the MHC complex
 - B. Positive co-stimulation
 - C. Engagement of Toll-like receptors
 - D. IL-2 transcription

3. Which of the following are not effector mechanisms of the immune response?
 - A. Binding of Fas on parenchymal cells with Fas ligand on T cells
 - B. Interferon gamma production by NK cells
 - C. Secretion of perforin and granzyme B by T cells
 - D. Terminal complement

4. All of the following have been used to treat rejection except?
 - A. Rituximab
 - B. Basiliximab
 - C. Rabbit ATG
 - D. Corticosteroids

5. All of the following are true about acute rejection EXCEPT?
 - A. Cellular rejection is more common than antibody-mediated rejection
 - B. Vascular involvement signifies a more severe variant of rejection
 - C. Acute antibody-mediated rejection has a better prognosis than cellular rejection
 - D. Hyperacute rejection occurs from a high titer of pre-formed anti-HLA antibodies

6. Which of the following induction agents is a monoclonal antibody against CD52?
 - A. Alemtuzumab
 - B. Basiliximab

- C. Rabbit ATG
- D. Horse ATG

7. Which of the following induction agents is the most commonly used agent in the United States?

- A. Alemtuzumab
- B. Basiliximab
- C. Rabbit ATG
- D. Horse ATG

8. Which of the following is INCORRECT about desensitization?

- A. High-dose IVIg has been used to facilitate desensitization
- B. Plasmapheresis and low-dose IVIg have been used to facilitate desensitization against pre-formed HLA antibody
- C. Desensitization against anti-HLA antibodies results in better long-term outcome than desensitization against ABO antibodies

9. Early outcomes after kidney transplantation have improved dramatically, while long-term outcomes have improved to a much lesser extent. What is the predominant cause of a lack of improvement in long-term outcome?

- A. Recurrent glomerulonephritis
- B. Calcineurin inhibitor toxicity
- C. Acute cell mediated rejection
- D. Chronic antibody-mediated rejection

Post prepared by Dr. Vinay Nair, AJKD Blog Advisory Board member.

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Solutions to AJKD Blog's [Test Your Knowledge: Immunology and Transplantation](#)

1. B. Direct allorecognition

Direct allorecognition occurs when passenger dendritic cells from donated organ travel to lymphoid tissue in the recipient resulting in lymphocyte activation. This can only take place in the setting of an organ transplant.

2. C. Engagement of Toll-like receptors

Toll-like receptors are important in the innate immune response. Although the innate immune response does interact with the adaptive immune system, engagement of Toll-like receptors are not required for T cell activation.

3. B. Interferon gamma production by NK cells

NK cells are effector cells that induce cell death by production of perforin and granzyme B, similar to CD-8 T cells. Interferon gamma production by NK cells promotes inflammation, but does not cause direct tissue injury.

4. B. Basiliximab

Corticosteroids are commonly used to treat rejection, and rabbit ATG is reserved for severe rejections. Rituximab has been used for antibody mediated rejection with variable success. Basiliximab has no efficacy in treating rejection.

5. C. Acute antibody-mediated rejection has a better prognosis than cellular rejection

Multiple studies reveal antibody-mediated rejection results in chronic rejection, transplant glomerulopathy, and pre-mature graft loss. In general, cellular rejection has a better prognosis.

6. A. Alemtuzumab

Alemtuzumab is a monoclonal antibody directed against CD52 which is found on mature lymphocytes. It is FDA approved to treat chronic lymphocytic leukemia and relapsing multiple sclerosis.

7. C. Rabbit ATG

Although only basiliximab is approved by the FDA for induction in kidney transplantation, rabbit ATG is the most common induction agent in the USA.

8. C. Desensitization against anti-HLA antibodies results in better long-term outcome than desensitization against ABO antibodies

Although desensitization against ABO antigens may result in a high risk for early rejection, several studies have shown long term outcome to be comparable to ABO-compatible kidneys. Desensitization against HLA antibodies, even when successful, often leads to chronic rejection, transplant glomerulopathy, and early graft loss.

9. D. Chronic antibody mediated rejection

Recent studies reveal chronic antibody-mediated rejection to be the major cause of late graft failure.