
# ORTHOCLONE OKT®3

Muromonab-CD3

Francisca Walden

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INTRODUCTION TO IMMUNOLOGY

Monoclonal antibodies have significantly transformed the field of modern medicine, particularly in areas such as immunology and oncology. A noteworthy example is Muromonab-CD3, more commonly known as Orthoclone OKT3. It made history by being the first monoclonal antibody approved for therapeutic use in humans back in 1986 [4]. This medication plays a crucial role in preventing organ transplant rejection, particularly for patients receiving kidney, liver, and heart transplants [5].

Muromonab-CD3 is a medication utilized in the treatment and prevention of acute rejection episodes in organ transplantation. Acute rejection arises when a patient's immune system recognizes the transplanted organ as foreign and initiates a T-cell-mediated response against it. If this reaction is not addressed, it can lead to organ failure [5].

This condition is not hereditary; rather, it results from the body's natural immune response to foreign tissues. Patients who have undergone transplantation typically require lifelong immunosuppressive therapy to minimize the risk of rejection. Muromonab-CD3 is specifically employed when rejection episodes are severe or resistant to standard treatments.

## General Drug Information

- **Generic Name:** Muromonab-CD3
- **Brand Name:** Orthoclone OKT3
- **Developer/Manufacturer:** Ortho Pharmaceutical
- **Year of FDA Approval:** 1986
- **Dosage/Administration:** Typically administered **5 mg/day by intravenous injection for 10–14 days**, depending on the severity of rejection.
- **Type of Antibody: Murine monoclonal antibody** (from mouse origin)
- **Antibody Class: IgG2a** subtype (a subclass of **IgG**)

Muromonab-CD3 is a monoclonal IgG2a antibody, produced using mouse hybridoma technology [2]. This antibody exhibits the characteristic Y-shaped structure, comprising two

heavy chains and two light chains. The Fab regions, which form the arms of the "Y," specifically target CD3, a protein complex present on the surface of T lymphocytes.

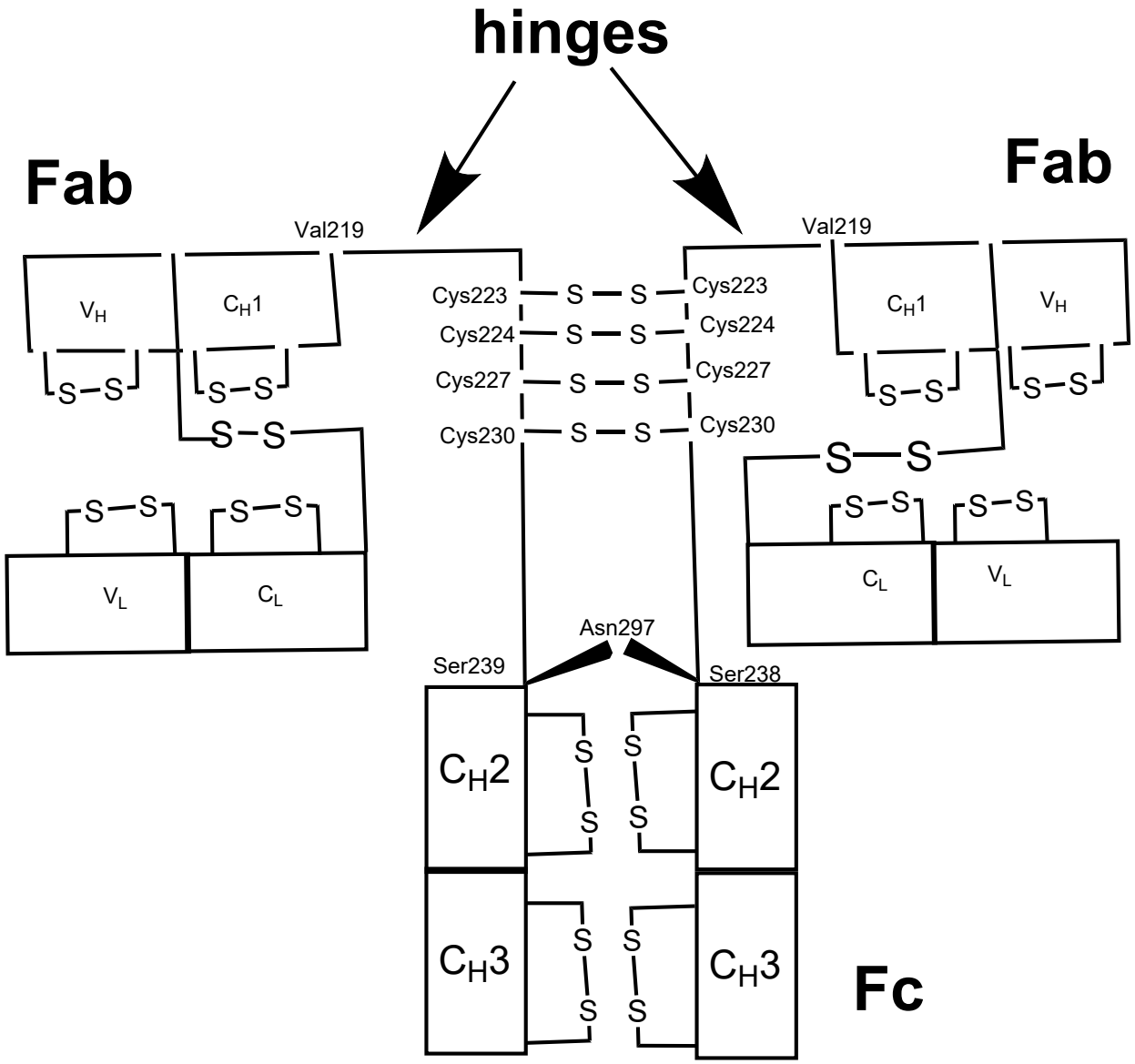


*Figure 1: Immunoglobulin 2*

[2]

Muromonab-CD3 specifically targets the CD3 complex on T-cell receptors (TCRs), which play a crucial role in T-cell activation and the signaling process. When Muromonab attaches to CD3, it

effectively blocks T-cell activation [2]. This interaction triggers the internalization of the CD3 receptor, leading to apoptosis and a decrease in the number of circulating T-cells in the bloodstream. Consequently, this action suppresses the immune response directed at transplanted organs. By either inactivating or depleting T-cells, Muromonab-CD3 assists in preventing or reversing episodes of rejection.

Muromonab-CD3 is a potent medication, but it's important to be aware of its potential side effects:

1. Cytokine Release Syndrome (CRS): This is the most critical adverse effect. It happens when cytokines are rapidly released after T-cell activation and can manifest through symptoms like fever, chills, nausea, low blood pressure, and difficulty breathing [1].
2. Other common issues: Patients may also experience headaches, diarrhea, and joint pain.
3. Infection risk: The medication can lead to increased vulnerability to infections due to its immunosuppressive effects.
4. Anti-mouse antibodies (HAMA): Over time, the development of these antibodies can diminish the effectiveness of the drug or trigger allergic reactions [1].

To help alleviate these side effects, healthcare providers typically give patients premedication with corticosteroids, acetaminophen, and antihistamines.

Muromonab-CD3 marked a significant turning point in medical history. It offered a precise approach to managing acute transplant rejection and set the stage for the advancement of humanized and fully human monoclonal antibodies. However, due to concerns regarding immunogenicity and side effects, its use has diminished as newer options like basiliximab and

alemtuzumab have emerged. Despite this shift, Muromonab-CD3's impact on monoclonal antibody therapy and transplant immunology continues to be a cornerstone in the field.

# References


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