Figure S1

Before rituximab  |  After rituximab  |  Before bortezomib  |  At transplant  |  1 year after transplant

IgM

CD19

CD20

CD27
After transplantation (month)
Before 2nd rituximab + DFPP
Before 2nd rituximab
Before bortezomib
Before 1st rituximab

Anti-blood type A isoagglutinin titer

Patient 1: Anti-A IgM
Patient 1: Anti-A IgG
Patient 3: Anti-A IgM
Patient 3: Anti-A IgG

Figure S2
Figure S3

**Graphs for IgM and IgG Levels**

**Total IgM**
- Before treatment
- After transplantation (0, 1, 3, 6, 12 months)

**Total IgG**
- Before treatment
- After transplantation (0, 1, 3, 6, 12 months)

**Anti-CMV IgG**
- Before treatment
- After transplantation (0, 1, 3, 6, 12 months)

**Anti-VZV IgG**
- Before treatment
- After transplantation (0, 1, 3, 6, 12 months)

- **Legend:**
  - ● Patient 1
  - ○ Patient 2
  - ▲ Patient 3
<table>
<thead>
<tr>
<th>Patient</th>
<th>Before rituximab</th>
<th>After rituximab</th>
<th>Before bortezomib</th>
<th>After Bortezomib</th>
<th>Before transplant</th>
<th>1M After transplant</th>
<th>3M After transplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1</td>
<td><img src="image1.png" alt="Graph 1" /></td>
<td><img src="image2.png" alt="Graph 2" /></td>
<td><img src="image3.png" alt="Graph 3" /></td>
<td><img src="image4.png" alt="Graph 4" /></td>
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<td><img src="image6.png" alt="Graph 6" /></td>
<td><img src="image7.png" alt="Graph 7" /></td>
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<tr>
<td>Patient 2</td>
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<td><img src="image10.png" alt="Graph 10" /></td>
<td><img src="image11.png" alt="Graph 11" /></td>
<td><img src="image12.png" alt="Graph 12" /></td>
<td><img src="image13.png" alt="Graph 13" /></td>
<td><img src="image14.png" alt="Graph 14" /></td>
</tr>
<tr>
<td>Patient 3</td>
<td><img src="image15.png" alt="Graph 15" /></td>
<td><img src="image16.png" alt="Graph 16" /></td>
<td><img src="image17.png" alt="Graph 17" /></td>
<td><img src="image18.png" alt="Graph 18" /></td>
<td><img src="image19.png" alt="Graph 19" /></td>
<td><img src="image20.png" alt="Graph 20" /></td>
<td><img src="image21.png" alt="Graph 21" /></td>
</tr>
</tbody>
</table>

Figure S4
Figure S1. FCM analysis of B cell subsets in the peripheral blood during desensitization
Representative FCM profiles of B cell subsets during desensitization. IgM⁺ CD19⁺ cells represent naïve mature B cells, IgM⁺ CD27⁺ cells represent memory B cells, and IgM⁺ CD5⁺ cells represent the B-1 subset. Even after the reappearance of IgM⁺ CD19⁺ B cells, IgM⁺ CD27⁺ memory B cells remained undetectable in the peripheral blood until kidney transplantation.

Figure S2. Kinetics of anti-blood type isoagglutinin titers after desensitization
Anti-blood type isoagglutinin titers were decreased after a second rituximab administration combined with 3 double-filtration plasmapheresis (DFPP) sessions. Black line, Patient 1 (Anti-A IgM); dotted black line, Patient 1 (Anti-A IgG); gray line, Patient 3 (Anti-A IgM); and dotted gray line; Patient 3 (Anti-A IgG).

Figure S3. Kinetics of total IgG, IgM, and anti-viral IgG after desensitization
Total IgG and IgM values remained constant during the observation period. Antibody titers for cytomegalovirus (CMV) and varicella zoster virus (VZV) also remained above the level of protection. Each line represents a single patient. Black lines, Patient 1; gray lines, Patient 2; and dotted gray lines, Patient 3.

Figure S4. The Luminex profile after desensitization.
The Luminex profile of the patients at baseline, after each therapy phase, and after transplantation. Because the LABScreen Mixed screening test results were negative, LABScreen Single Antigen assays were not performed at 6 and 12 months after transplantation.

Figure S5. Kinetics of the stimulation indexes (SIs) of CD4⁺ and CD8⁺ T cells after
desensitization.

The anti-donor T-cells responses in all three patients were decreased in the CFSE-MLR assay compared with those before desensitization. Black line, Patient 1; gray line, Patient 2; and dotted gray line; Patient 3.