Gene therapy can correct forms of severe combined immunodeficiency

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Severe combined immunodeficiency is defect in the immune system that results in a loss of the adaptive immune cells known as B cells and T cells. Mutations in several different genes can lead to the development of severe combined immunodeficiency, including mutation of the adenosine deaminase (ADA) gene.

Traditional treatment options, such as enzyme replacement therapy, are of limited efficacy, but bone marrow transplant from a compatible donor leads to a better response. A recent clinical trial indicated that gene therapy to insert the correct ADA gene in the patient's own bone marrow cells can also lead to a good response.

However, patients were noted to have defects in B cell tolerance, meaning that some B cells that react to antigens from the body fail to be eliminated, leading to an autoimmune response. Dr. Eric Meffre and colleages at Yale University in New Haven, Connecticut and Alessandro Aiuti in Milan, Italy joined together to better understand why patients developed B cell tolerance problems. They found that loss of the ADA gene directly contributes to B cell tolerance problems and that these defects are mostly corrected after gene therapy.

Their results point to a previously unknown role for ADA in B cell response and support the use of gene therapy as an effective treatment option for ADA-deficient severe combined immunodeficiency patients.

More information: Defective B cell tolerance in adenosine deaminase

deficiency is corrected by gene therapy, *Journal of Clinical Investigation.*