

LETTER TO THE EDITOR

Allergy transfer with hematopoietic cell transplantation from an unrelated donor

Bone Marrow Transplantation advance online publication, 21 June 2010; doi:10.1038/bmt.2010.150

Allergy may be transferred from an allergic donor to a non-allergic recipient of hematopoietic cell transplantation (reviewed by Khan *et al.*¹). It is generally thought that this is due to the adoptive transfer of allergen-specific B cells (differentiating into IgE plasma cells) or allergen-specific T cells (helping allergen-specific B cells to differentiate into IgE plasma cells). This is supported by reports that typically detected the presence of IgE for the same allergen in the donor and in the recipient post transplant.¹ There is also an alternative explanation for the acquisition of allergy through hematopoietic cell transplantation from an allergic donor: transfer of hematolymphatic system prone to support differentiation of B cells into IgE plasma cells in general. In this scenario, the donor and the recipient, post transplant, would not need to be allergic to the same allergen(s). A total of 18 cases have been reported in whom transfer of allergy by hematopoietic cell transplantation was suspected. However, due to missing data (for example, on the allergy status of the recipient before transplant), the transfer was conclusively documented in only five patients.¹ In all the 18 patients, the donor was a sibling. Given that predisposition to allergy is genetically determined,² it can be argued that the post transplant diagnosis of allergy in a pretransplant nonallergic recipient of hematopoietic cell transplantation from an allergic donor does not necessarily imply the transfer of allergy, but rather the development of allergy in a genetically predisposed individual. However, here we present a case of allergy transfer from an unrelated donor.

A 50-year-old man with acute myeloid leukemia in remission underwent filgrastim-mobilized blood SCT from an HLA-A, B, C, DRB1 and DQB1 allele-matched unrelated donor. Conditioning and GVHD prophylaxis included BU, fludarabine, antithymocyte globulin, CYA and MTX.³ There were no major transplant complications. CYA was discontinued at 3 months post transplant. The donor had asthma, which was triggered by exposure to dogs and cats. The asthma was treated with inhaled fluticasone regularly and inhaled albuterol/salbutamol as needed. The donor also had a history of recurrent anaphylactic reactions triggered by eating nuts, including pecans and walnuts, and fish. These required self-injections of epinephrine and emergency room visits. The last emergency room visit was 2 months before the stem cell collection and was for nut-triggered anaphylaxis. The recipient had no history of allergic disease. Allergen-specific IgE in donor serum was positive for peanut, pecan, walnut, codfish, cat and dog but

negative in the recipient (both donor and recipient blood were collected within 1 month pretransplant; Table 1).

Post transplant, the recipient abstained from eating nuts for 19 months, despite negative supervised food challenge at 6 months. He had been eating fish. Given that both allergen-specific IgE and skin prick tests were negative for peanuts, walnuts, hazelnuts, almonds and pecans at 19 months, the patient began to eat nuts without symptoms. The patient was again evaluated at 29 months. Skin tests showed no reaction to peanuts, hazelnuts, almonds and pecans, but a minor reaction to walnuts. However, the patient had been eating nuts without symptoms. The patient had no allergy symptoms after exposure to dogs or cats, despite repeated exposure until approximately 20 months post transplant when he developed swelling, itching and hives on being licked by a dog, and on other occasions developed hives after touching dogs and no symptoms after touching cats. The patient continued eating nuts without symptoms. By 37 months post transplant, the patient developed asthma triggered by exposure to dogs (not cats) and began to use inhaled fluticasone and salmeterol regularly and inhaled albuterol/salbutamol as needed. As shown in Table 1, serum IgE for nuts and fish remained undetectable throughout the follow-up, whereas IgE for dogs and cats became elevated by 29 months post transplant.

This case is important for three reasons: it describes transfer of allergy from an unrelated rather than related donor, suggesting a true transfer rather than development of allergy in a genetically predisposed recipient. This conclusion is moderated by the fact that the recipient was adopted, so it was impossible to ascertain whether his family history was positive for allergy. Another caveat is that the donor was HLA-matched and certain HLA-DR and DQ loci have been associated with allergy. However, HLA genes constitute only a minor fraction of genes associated with allergy.² This case also shows that the recipient does not have to become allergic to the same allergen(s) as the donor. The donor was allergic to peanuts, pecans and codfish, but the recipient post transplant did not become allergic to these, suggesting transfer of hematolymphatic system prone to allergy in general rather than transfer of B/T cells specific for certain allergen(s). This case also shows that the clinical manifestation of allergy may be different in the donor pretransplant vs the recipient post transplant (in this case, anaphylaxis and asthma in the donor vs urticaria and asthma in the recipient).

Conflict of interest

The authors declare no conflict of interest.

Table 1 Manifestations of allergy in the donor pretransplant and the recipient pretransplant and post transplant

Time point	Clinical manifestations	Allergen-specific IgE (kU/L)								
		Peanut	Pecan	Walnut	Codfish	Tuna	Salmon	Trout	Cat	Dog
Donor pretransplant	Anaphylaxis after eating nuts/fish. Asthma related to exposure to dogs and cats.	0.96	1.10	1.40	0.40	<0.35	<0.35	<0.35	10.10	6.30
Recipient pretransplant	None. Eating nuts and fish and being exposed to dogs and cats.	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
3 Months post transplant (May 2007)	None. Eating fish and being exposed to dogs and cats. Avoiding nuts.	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
6 Months post transplant (Aug 2007)	None. Eating fish and being exposed to dogs and cats. Avoiding nuts. Food challenge with nuts ^a negative.	<0.35; SPT neg	ND	<0.35	ND	ND	ND	ND	ND; SPT neg	ND; SPT neg
13 Months post transplant (Mar 2008)	None. Eating fish and being exposed to dogs and cats. Avoiding nuts.	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	5.19
19 Months post transplant (Sep 2008)	None. Eating fish and being exposed to dogs and cats. Avoiding nuts.	ND; SPT neg	ND; SPT neg	ND	ND	ND	ND	ND	ND; SPT neg	ND; SPT neg
29 Months post transplant (Jul 2009)	Urticaria/skin blisters related to exposure to dogs. No symptoms when eating nuts or fish or being exposed to cats.	<0.35; SPT neg	<0.35; SPT neg	<0.35; SPT pos (3 mm wheal)	ND	ND	ND	ND	4.24; SPT pos (7 mm wheal)	28.0; SPT pos (6 mm wheal)
37 Months post transplant (Mar 2010)	Urticaria/skin blisters related to exposure to dogs. Asthma related to exposure to dogs. No symptoms when eating nuts or fish or being exposed to cats.	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	2.01	53.20

Abbreviations: ND = not determined; Neg = negative; Pos = positive; SPT = skin prick test.

^aUsing peanuts, almonds and brazil nuts; cross-reaction among pecans, walnuts, almonds and brazil nuts is common.

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