

# Donor Smoking Increases Kidney Allograft Recipient Mortality in a National Population Cohort Analysis

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## 1. Introduction

- 22% men and 17% women in the UK are smokers and 1/3 are on the organ donor register
- Study conducted in the US from 1994-1999 showed donor smoking to increase recipient mortality and graft failure<sup>1</sup>
- No corroborative study has been conducted to replicate these findings in the contemporary era of immunosuppression and transplantation care

## 2. Aims

1. Assess the effect of a kidney donors history of smoking on recipient outcomes
2. Assess the effect of a kidney donors history of smoking on recipient allograft outcomes

## 3. Methods

- UK Transplant Registry held by National Health Service Blood and Transplant (NHSBT)
- All adult kidney transplant performed in the UK between April 2001 and April 2013 at all 23 adult transplant centres
- Total 21,804 transplants
- 32.4% (n=7068) of donors had a history of smoking
- Univariate and multivariate analyses using SPSS version 22 and STATA version 14

Covariates adjusted for in multivariate model:

- Recipient variables: age, total number of transplants, total waiting time for transplant
- Donor variables: age, sex, ethnicity, living or deceased
- Transplant procedure variables: year of transplant, number of mismatched HLA antigens

## 4. Results – Demographics

Table 1: Baseline Demographics. Median follow up 4.98 years. Kidney donors that smoked were more likely to be younger, male and caucasian

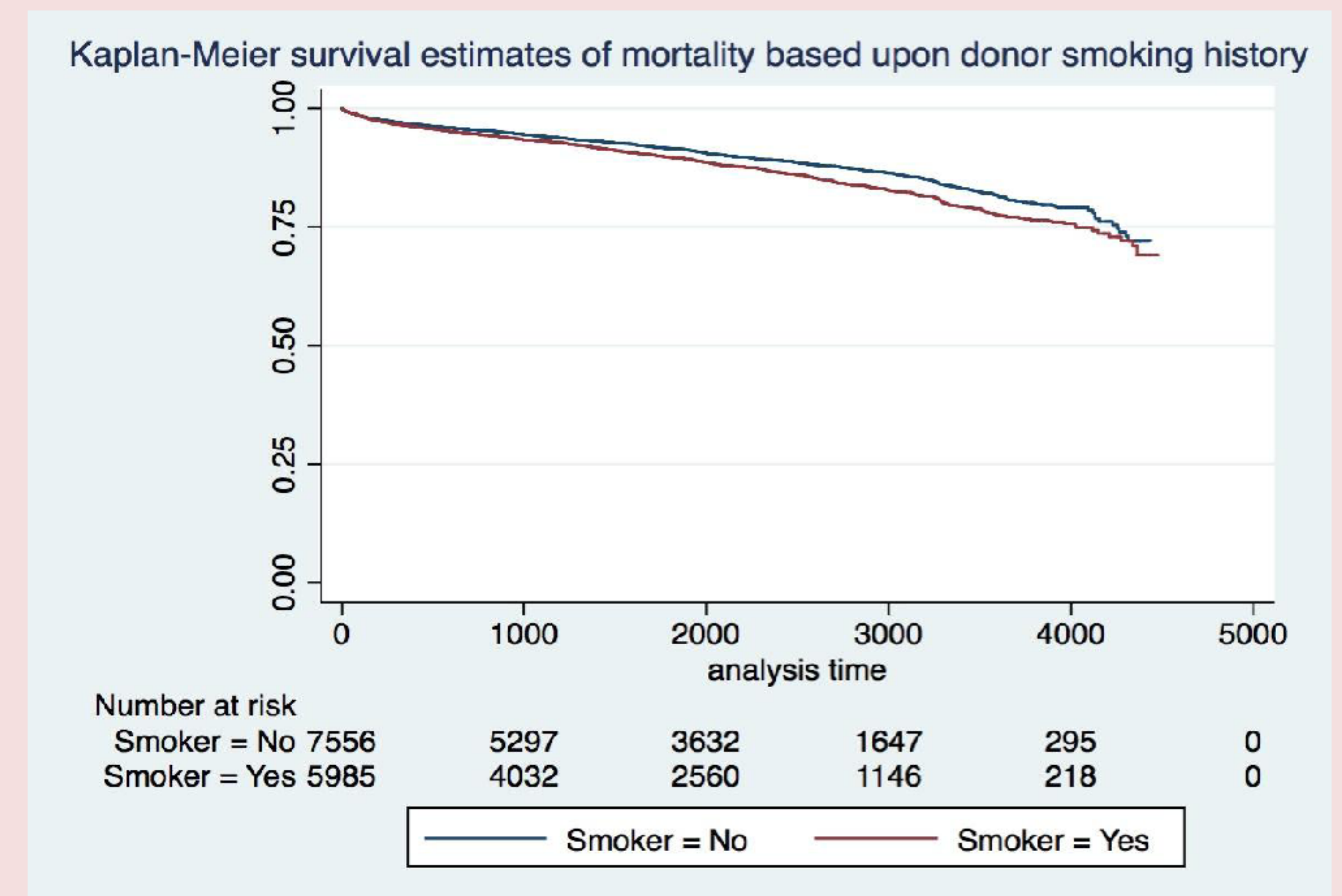
Characteristic	Entire Cohort	Donor Non Smoker	Donor Smoker	P
N	21804	8865	7068 (32.4)	
Follow Up				
Mean (y)	5.37	6.10	5.90	0.2
Median (y)	4.98	6.34	5.99	
Recipient				
Mean Age at Transplant (y)	44.7	44.9	45.5	<0.001
Number of Transplants	1.15	1.16	1.16	0.38
First Transplant (%)	86.6	86.7	86.0	0.14
Primary Glomerulonephritis causing ESRD (%)	26.1	2.60	2.63	0.70
Mean Waiting Time for Deceased Donor Transplant (y)				
Donor				
Age (y)	46.4	46.7	46.3	<0.001
Sex (male %)	50.5	50.2	52.2	0.006
Caucasian	92.4	92.8	96.1	<0.001
Asian	2.3	3.4	1.0	<0.001
Black	1.7	2.0	1.3	0.001
Living	35.6	22.3	12.9	<0.001
Transplant Procedure				
Mean No. Mismatched Antigens	2.45	2.37	2.23	0.027
ABO Incompatible (%)	0.2	0.4	0.01	<0.001
HLA Incompatible (%)	1.4	1.3	1.5	0.29

## 5. Results – Survival

Table 2: Unadjusted survival in recipients of donor smoking or non smoking kidneys. Survival is consistently lower in recipients that receive kidneys from smoking donors

Recipient Survival	Donor Non Smoker	Donor Smoker
1 Year	97%	96%
3 Year	94%	93%
5 Year	92%	90%

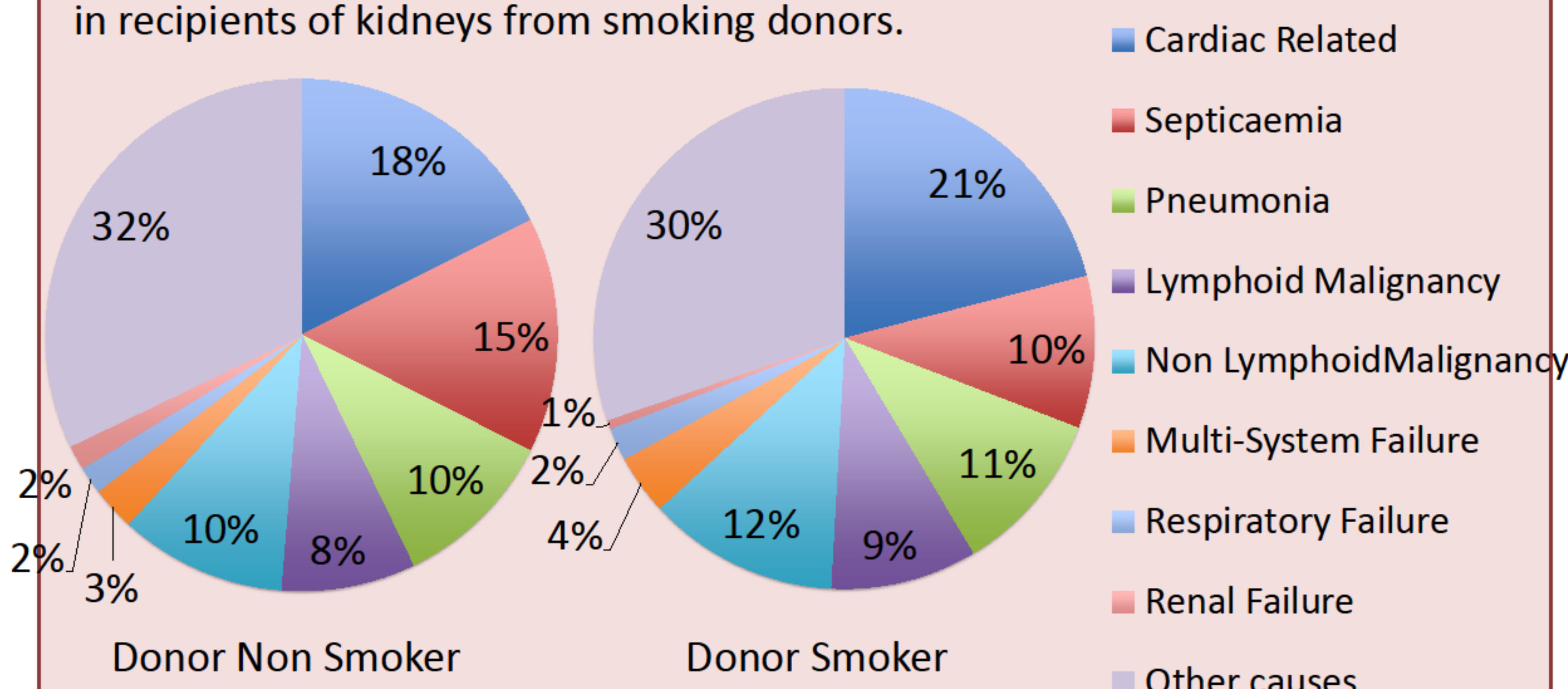
Figure 1: Kaplan Meier Survival curve showing inferior recipient survival when receiving kidneys from smoking donor (**P<0.001**). On multivariate analysis this retained significance (**HR 1.11, 95% CI 1.00-1.24, P=0.047**)



On Kaplan Meier univariate analysis (**P=0.122**) and multivariate analysis (**HR 1.06, 95% CI 0.98-1.15, P=0.17**), donor smoking did not significantly impact on recipient graft survival

## 6. Results – Recipient Cause of Death

Figure 2: The most common cause of recipient death following kidneys from smokers and non smokers as cardiac related. is a trend towards more cardiac related deaths (**P=0.089**) and significantly fewer deaths from sepsis (**P=0.008**) in recipients of kidneys from smoking donors.



## 7. Conclusions

- First UK study to corroborate previous literature on the relationship between donor smoking and recipient outcomes
- Donor smoking increases recipient mortality but not necessarily graft failure
- Trend toward increase in cardiac related deaths
- Further translational research into the pathophysiology is needed, potentially related to endothelial dysfunction
- Utilisation of donor kidneys from smokers should be risk stratified for the use in high risk recipients such as diabetics and those with a history of cardiovascular disease
- Still likely to have superior outcomes to remaining on dialysis

<sup>1</sup>Lin S-j. Effect of donors' intravenous drug use, cigarette smoking, and alcohol dependence on kidney transplant outcome." Transplantation. 2005;80(4):482-6.

