

Research Questions

- Are men's preferences for women's body odours modulated by
- the number of shared HLA alleles between men and women?
 - HLA heterozygosity?
 - the frequency of rare HLA alleles?

Conclusions

- Men can differentiate between attractive and unattractive body odours but preferences are not related to HLA similarity, heterozygosity, or rareness of alleles

INTRODUCTION

- Olfaction plays an important role in mate choice of both human and non-human species ⁽¹⁾
- Body odours reportedly portray information about an individual's genotype at the major histocompatibility complex (MHC, or human leucocyte antigen system, HLA, in humans) ⁽²⁾
- While there is strong experimental support for MHC-associated mating behaviour in animals, the situation in humans is more complex ⁽³⁾
- We investigated men's HLA-associated preferences for women's body odours
- Odours were gathered at peak fertility when any HLA-associated odour preferences should be strongest

PARTICIPANTS

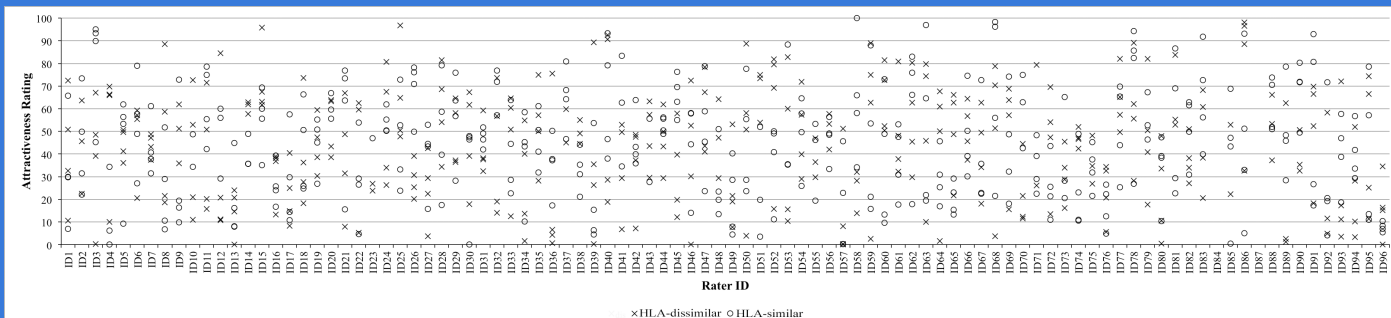
Odour donors: 49 Caucasian women (mean age = 23.27, *SD* = 3.80), non-smoker, no hormonal contraception, regular menstrual cycle, not pregnant or breastfeeding

Odour raters: 94 Caucasian men (mean age = 23.41, *SD* = 3.71), non-smoker

ODOUR RATING PROCEDURE

Axillary pads were placed in 500 ml opaque glass jars. Odour raters were asked to refrain from eating and drinking caffeinated or alcoholic beverages for 1 h prior to testing. Every rater rated attractiveness of 8 body odours (4 HLA-similar and 4 HLA-dissimilar) on a visual analogue scale (0-100)

RESULTS



Men did not find odours of women with dissimilar HLA genotypes ($M = 43.35$, $SD = 13.36$) more attractive than odours of women with more similar HLA genotypes ($M = 43.78$, $SD = 15$, $t_{93} = -0.23$, $p = .813$).

Ratings of women's odour attractiveness were not associated with the rareness of their alleles ($r > .01$, $p > .948$)

Men did not rate the odour of heterozygous women as being more attractive ($t_{40} = -.33$, $p = .746$)

DISCUSSION

Previous studies investigating effects of HLA on body odour preferences in humans have yielded contradictory findings. The present results indicate that HLA does not affect men's preferences for women's body odours. Because of the rigorous methodology used (e.g., targeting odour collection to take place during high fertility, large sample sizes), the present study is perhaps the most conclusive to suggest that HLA plays an insignificant role in men's preferences for women's body odours.

HLA-TYPING

Blood samples were genotyped for

- HLA-class I (HLA-A, HLA-B, HLA-C)
 - class II (HLA-DRB1, HLA-DQA1, HLA-DQB1)
- using LinkSēq™ test kits (Linkage Biosystems™)

Table 1: List of typed alleles and frequency in the EU population.

HLA-A	HLA-B	HLA-C	HLA-DRB1	HLA-DQA1	HLA-DQB1
01 (14.3)	07 (11.3)	01 (1.3)	01 (10.2)	01 (0.4)	02 (1.3)
02 (28.5)	08 (9.0)	02 (5.7)	03 (10.2)	02 (12.1)	03 (35.9)
03 (14.1)	13 (3.9)	03 (11.9)	04 (11.7)	03 (13.1)	04 (2.8)
11 (5.1)	14 (2.5)	04 (12.9)	07 (2.6)	04 (3.2)	05 (19.0)
23 (2.3)	15 (7.0)	05 (5.9)	08 (3.2)	05 (30.3)	06 (20.0)
24 (10.2)	16 (8.0)	06 (10.2)	10 (1.2)	06 (0.5)	
25 (2.8)	27 (4.7)	07 (28.9)	11 (15.5)		
26 (4.1)	35 (11.0)	08 (2.7)	12 (1.9)		
32 (2.4)	37 (1.3)	12 (8.8)	13 (2.9)		
30 (2.4)	38 (2.9)	14 (1.6)	14 (3.8)		
51 (2.4)	39 (2.0)	15 (3.4)	15 (11.9)		
32 (3.6)	40 (5.8)	16 (3.1)	16 (4.3)		
33 (1.5)	41 (1.3)	17 (1.2)			
36 (4.1)	44 (15.5)				
	45 (1.7)				
	46 (1.3)				
	48 (1.7)				
	50 (1.3)				
	51 (17.0)				
	52 (1.3)				
	53 (0.4)				
	55 (1.6)				
	56 (0.9)				
	57 (3.2)				
	58 (1.0)				
	78 (0.1)				

ODOUR COLLECTION PROCEDURE

- OvaCUE fertility monitors ⁽⁴⁾ were used to predict high fertility days
- Ovulation was verified using LH tests.
- One day before predicted ovulation, participants collected body odour using cotton axillary pads
- Body odour was collected on three consecutive nights
- Odour donors followed a strict schedule of dietary and behavioural restrictions while collecting their body odour
- Odours were collected from ampits using axillary pads (100% cotton)

References

- Roberts, S. C., Gosling, L. M., Carter, V., & Petrie, M. (2008). *Proceedings of the Royal Society B-Biological Sciences*
- Havlicek, J., & Roberts, S. C. (2009). *Psychoneuroendocrinology*
- Wintemitz, J., Abbate, J. L., Huchard, E., Havlicek, J., & Garamszegi, L. Z. (2016). *Molecular Ecology*
- Fehring, R. J. (1996). *Journal of the American Academy of Nurse Practitioners*