

Lupus anti-coagulants	Case 1		Case 2		Case 3	
	Attack-free period	Days after crisis	Attack-free period	Days after crisis	Attack-free period	Days after crisis
PTT-LA	<12	D7: 23,1 D17: 22,4	<12	D0: 18,6 D3: 9,62	<12	D1: 17,02
Rosner index N<12						
TTI-1:500 dilution	<1,20	F7: 2,28 D17: 1,80	<1,20	D0: 1,16 D3: 1,15	<1,20	D1: 1,11
Schleider index N<1,20						
CRP N<5 mg per litre	8	D7: 12 D17: 8	Not done	D0: 150 D3, 52	15	D1: 55

PTT-LA: Diluted phospholipid activated partial thromboplastin time. TTI: Tissue thromboplastin inhibition assay. Rosner index = $\frac{[(A-B):C]}{A} \times 100$. (A=clotting time of the mixture; B=clotting time of normal plasma; C=clotting time of patient's plasma.) Schleider index = $\frac{A-B}{A}$. (A=clotting time of the mixture; B=clotting time of normal plasma). CRP = C-reactive protein.

Table: Lupus anticoagulant LA in three patients with FMF

during attack-free periods. However, prospective searches for LA were positive in our three successive cases during or immediately after crises and LA rapidly disappeared during attack-free periods (table). This activity was confirmed in case 1 during a second crisis. None of the patients had anticardiolipin antibodies or false-positive tests for syphilis.

Transient occurrence of LA during and/or immediately after FMF crisis is an interesting finding. Coexistence of APLS and FMF has recently been reported in one patient who developed bilateral iliofemoral venous thrombosis and thrombocytopenia during pregnancy without lupus criteria.³ As in our patients, APLS rapidly disappeared after normal delivery. Such transient LA have only been reported in some infectious processes such as Q fever or viral infections. Our cases suggest that occurrence of LA during or immediately after an FMF crisis is probably not an exceptional event. The appearance of LA could be the first useful marker for an FMF crisis.⁴

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- 1 Rosenbaum M, Rosner I. Familial Mediterranean fever is not associated with the antiphospholipid syndrome. *Clin Exp Rheumatol* 1993; **11**: 578-79.
- 2 Working Group on Hemostasis of the Société Française de Biologie Clinique. Comparison of a standardized procedure with current laboratory practices for the detection of lupus anticoagulant in France. *Thromb Haemostas* 1993; **70**: 781-86.
- 3 Halabe-Cherem J, Nellen-Hummel H, Flores-Padilla G, Mercado-Atri M, Pizutto-Chavez J. Familial Mediterranean fever and primary antiphospholipid syndrome, a rare association. *Angiology* 1995; **46**: 859-61.
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On human odour, malaria mosquitoes, and Limburger cheese

SIR—Wouldn't it be something, having a simple mosquito trap in one's bedroom baited with a scent that best be described as synthetic human? No buzzing, no sleepless nights, and, more importantly, a new tool to interrupt the transmission of important vector-borne diseases such as malaria. Keystone¹ briefly described what entomologists refer to as odour-mediated, host-seeking behaviour of haematophagous insects. It was correctly pointed out that carbon dioxide, exhaled by all potential blood hosts, seems to be a key component used by most blood-feeding insects while host-seeking. Other, more host-specific, odours used in

this process remain largely unknown. Whatever their nature, different insect species will use different odours, depending on such factors as the broadness of their host spectrum and geographical distribution. This is where Keystone should have interpreted existing examples with more care. The fact that Thompson,² in Cameroon, attracted blackflies belonging to the *Simulium damnosum* species complex with trousers that have been worn, does not imply that Canadian blackfly species will also use apocrine sweat gland secretions from the groin region to track down a human host.

We have shown that three different *Anopheles* mosquito species prefer to bite different parts of a naked motionless volunteer and that this behaviour is influenced by odours from those body regions.³ Africa's principal malaria vector, *Anopheles gambiae*, bit the ankles and feet, and we subsequently managed to attract them to the odour of Limburger cheese in a windtunnel bioassay. The smell of Limburger cheese is strongly reminiscent of foot odour. The secret lies in the microorganism used in the production of this cheese, *Brevibacterium linens*, belonging to the same genus as *B epidermidis*, a coryneform bacteria residing between the toes on human feet. Ripening of Limburger cheese occurs at 32–34°C in a humid environment resembling the micro-habitat of the toe cleft, and microbial action probably results in identical odours. Gaschromatographic analyses of toe-nail scrapings and Limburger cheese odour have shown a strong similarity in their carboxylic fatty acid composition, and synthetic blends of these acids are attractive to host-seeking *A gambiae sensu stricto*.⁴ Foot odour is a typical human smell, and the occurrence of fatty acids, which are metabolised from triglycerides in human sebum by the skin microflora, provide a source of odour which enables this mosquito to identify *Homo sapiens*, its preferred host, who also turns out to be the only primate that produces fatty acids on the skin. At present, in Tanzania, research focuses on the developing of a simple trap, baited with fatty acids, which may in future be applied to control mosquito numbers and hence reduce the transmission of *Plasmodium malaria* parasites between human beings.

I have been informed that medical entomologists are now buying Limburger cheese and taking it to mosquito-infested areas around the globe. Whether or not they will manage to attract another mosquito species with Limburger cheese remains to be seen (if not they can always eat it). The point is that its use as a mosquito attractant may only apply as a result of the evolution of the intricate relationship between the African malaria mosquito *A gambiae ss* and the odour of human feet. Maybe Lucy, in the cradle of mankind, suffered from smelly feet.

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- 1 Keystone JS. Of bites and body odour. *Lancet* 1996; **347**: 1423.
- 2 Thompson BH. Studies on the attraction of *Simulium damnosum* to its hosts: the nature of substances of the human skin responsible for attractant olfactory stimuli. *Tropenmed Parasitol* 1976; **27**: 83-90.
- 3 De Jong R, Knols BGJ. Selection of biting sites on man by two malaria mosquito species. *Experientia* 1995; **51**: 80-84.
- 4 Knols BGJ, Van Loon JJA, Cork A, et al. Behavioural and electrophysiological responses of the female malaria mosquito *Anopheles gambiae* s.s. Giles (Diptera: Culicidae) to Limburger cheese volatiles. *Bull Entomol Res* (in press).

DEPARTMENT OF ERROR

Accuracy of near patient tests for Helicobacter pylori (August 31, p 617)—In this article by A Duggan and colleagues the table should have had "specificity" commencing the second bottom line.