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AN *IN VITRO* FIELD TEST OF ANTIMYCOBACTERIAL IMMUNITY PREDICTS *IN VIVO* TB RISK FACTORS

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BACKGROUND: We simplified an assay of human anti-mycobacterial immunity and compared results with known TB risk factors.

METHODS: 730 whole-blood and 714 plasma samples from 515 healthy adults were mixed with luminescent mycobacteria. After 4-days incubation, a portable luminometer was used to estimate mycobacterial growth/killing that was compared with TB risk factors.

RESULTS: In whole-blood, mycobacterial luminescence increased by mean 0.58 log light units (95% confidence intervals 0.54-0.63), compared with 0.00044 log light units growth in plasma from the same individuals (95% confidence intervals -0.034-0.035). Mycobacteria grew more in blood from participants who had TB risk factors i.e. who had not received the BCG vaccine and had anthropometric evidence of under-nutrition (all $P<0.005$). In plasma, the mycobacterial growth was not associated with nutritional status ($P>0.1$) but was associated with lack of BCG vaccination ($P<0.009$). Assay results were not confounded by the interval from venepuncture to laboratory testing, haematocrit or the mycobacterial infecting dose.

CONCLUSIONS: This simple, inexpensive blood test predicted known determinants of TB susceptibility and suggested that BCG vaccination influenced humoral as well as cellular anti-mycobacterial immunity.