Woven material for bed encasement prevents mite penetration

To the Editor:

Bed encasement with a mite-proof cover is one way of controlling house dust mites by preventing exposure to beddings, thereby reducing mite antigen exposure.[1-3] Various types of materials used for house dust mite barriers include plastic, polyurethane-coated, tight-woven, and nonwoven fabrics.[4] The plastic- and polyurethane-coated covers provide the best protection but are the least comfortable because of air flow limitation. Both woven and nonwoven encasement materials have been widely used and highly recommended to patients who have dust mite allergy. It was previously recommended that a woven cover with a pore size of 2 to 10 μm, allowing air flow, can prevent the passage of house dust mites (HDM).[5] Nonwoven fabrics are usually made from spunbonded polypropylene or polyethylene fibers and are claimed to be an HDM barrier, which is less expensive, still effective after long-term use, light in weight, and comfortable.[6,7] Currently, the commercially available encasing materials vary in their properties to block the passage of HDM and their allergens. In one study, we found a number of mites (248 live mites of which 103 were *Dermatophagoides pteronyssinus* and the remainder were unidentified) on the outer surface as well as penetrating deep within a nonwoven pillow cover obtained from a patient allergic to mites after 4 months of use (unpublished data). Based on these observations, we investigated the ability of HDM to colonize within the surface of both woven and nonwoven covers in vitro.

Two brands of nonwoven (A and B) and one brand of tightly woven covers (C) were cut into 2-cm^2 strips, marked for inner and outer surfaces, and placed within a specially constructed Siriraj chamber. This chamber effectively located and restricted mites to the fabrics throughout the course of the study. It consisted of a $5 \times 5 \times 3$-cm acrylic box with a $4.5 \times 4.5 \times 0.3$-cm plastic sheet inserted at the top and a 1-cm–diameter aperture in the middle for ventilation. The hole was first covered by a 2×2-cm piece of the encasing material being evaluated, followed by an acrylic ring. Ten adult stages of *D pteronyssinus* were randomly picked from a laboratory culture and placed in the middle of the ring. The ring was covered by the chamber lid and locked on three sides to prevent mites from escaping. The chambers were heated with 60-Watt light bulbs positioned 10 cm above the chamber for 20 minutes to force the mite internally. The locale of mite placement was on the uppermost part of either surfaces (X or Y) of each sample, so that in one chamber, X was placed on the outer surface, whereas in another chamber, Y was on the outer surface. This meant alternating the outer exposed surfaces in 9 different Siriraj chambers. Room temperature was initiated and mite behavior was observed every day for 1 week under a stereomicroscope.

A scanning electron microscope was used to evaluate the surfaces of all samples. Fig 1 (*upper left and right panels*, labeled covers A and B) shows that HDM can