feel justified in continuing to use the term IL-4 for this factor.

With the current burgeoning of interest in lymphokine research, this problem is likely to occur again. We therefore suggest that the IUIS should take appropriate steps to provide nomenclature guidelines for these molecules.

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Overburdened African women

SIR—Within the context of the energetics of load carrying by African women[1,2], I wish to point to a condition which is known as Kikuyu bursa[3,4]. This condition may provide a clue for some of the questions raised. As indicated in the article, Kikuyu women carry loads behind their backs supported by a strap. Compression of skin and subcutis between load and vertebral column and the horizontal–longitudinal vibrations of load during each step induces an anatomical structure in the subcutaneous tissue of the low-back area. This structure has the features of a classical bursa. This Kikuyu bursa partially absorbs the vibration forces related to load carrying.

The bursa, the histological structures of which cannot be distinguished from the prepatellar bursa (also known as housemaid's knee), may become enlarged and painful, and is often surgically removed. Extensive calcification may be present in the wall of this chronically inflamed bursa.

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Scientific Correspondence
Scientific Correspondence is intended to provide a forum in which readers may raise points of a rather technical character which are not provoked by articles or letters previously published.

Discrepancies in length of myosin head

SIR—Mendelson[1] recently discussed discrepancies between various measurements of the length of the myosin head, this being an important parameter in any detailed description of the structural changes that cause muscle contraction. He criticized the view[2,3] that recent data from crystals of myosin subfragment-1 (S1, equivalent to the myosin head) support the length of about 19 nm measured by electron microscopy[4–7], as opposed to the 12 nm value inferred from X-ray scattering measurements[8]. We contend that, on the contrary, the bulk of data, including those from S1 crystals, do indeed show the head to be about 19 nm long, and that there is evidence of insensitivity in the X-ray scattering method that could account for its lower estimate.

The myosin head is roughly the shape of an elongated comma, with the actin binding site located near its bulbous end[9] and the tail part of the myosin molecule attached to its narrower (neck) end. The neck region of the head includes the regulatory light chain, and electron microscopy of shadowed myosin and S1 shows that intact heads (that is, containing the light chain) are approximately 19 nm long[4,5] but apparently become shorter (the neck disappears) if the light chain is removed[5]. Most three-dimensional reconstructions of the actin–S1 complex have used S1 lacking this light chain, and they concur with the images of single molecules in showing a roughly 12 nm length[7,9,10]. When the light chain is present, a longer length (at least 17.5 nm) is found, similar to the length of the intact head[7].

In contrast with this picture, X-ray scattering data have been interpreted to show a length (maximum chord) of 12 nm (ref. 8), which does not change when the light chain is removed[11]. The discrepancy between electron microscope and X-ray measurements is too great to be explained simply by the fact that the longer lengths quoted from electron microscopy are often contour lengths (as suggested by Mendelson[1]). For example, even the maximum chord of S1 with the regulatory light chain present (measured by electron microscopy) is at least 15–16 nm (refs 7,12), 3–4 nm greater than the X-ray scattering value. Taken alone, the failure of X-ray scattering to detect any change in length when the light chain is removed suggests that the light chain is located a distance from the centre of mass of the molecule equal to the measured radius of gyration (R_g), 3.5 nm (ref. 11). Such a conclusion is incompatible with the electron microscopy results, which show most of the light chain to be a long way from the centre of mass. A further inconsistency in the X-ray results is that R_g is unchanged when the head is attached to a substantial length of the myosin tail[12]. As Mendelson himself points out[12], this suggests that the region of the X-ray scattering spectrum that is examined to determine R_g could similarly be insensitive to the presence of an extended neck on the head, especially if the neck were flexible, with the result that the true length would be underestimated.

Crystalline S1 (ref. 3) contains the regulatory light chain and has an extended neck as judged by the barbed arrowheads formed when it binds to actin[13,14]. Winkelmann *et al.*[3] state that the length of the head is greater than 16 nm. The data from crystals are therefore consistent with the longer length seen in the electron microscope and do not agree with the short length.

Thus, measurements by all four different electron microscope approaches[3–7] give striking agreement in their estimates of a head length of at least 16 nm. The shorter of these lengths are probably underestimates (because of averaging procedures and of difficulties in determining molecular boundaries — see refs 3, 7) and the true value is likely to be close to 19 nm, as measured in images of individual myosin molecules, where the length can be measured unambiguously from the tip of the head to its junction with the myosin tail. In our view, the disagreement between the conclusions from the electron microscope and the X-ray data point to a weakness in the X-ray scattering method in that it may fail to detect thin, probably flexible[14], portions of protein molecules.

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