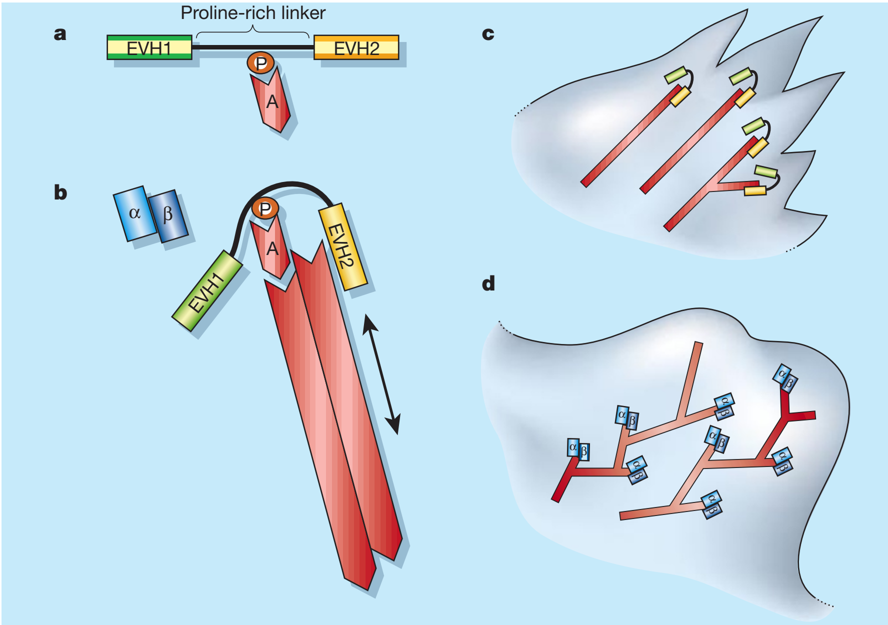

Figure 2 **Model for movement. Bear *et al.*[1] find that Mena/VASP proteins promote the assembly of unbranched actin networks, leading to dynamic protrusions (lamellipods).** a, **A Mena/VASP protein, showing its various structural regions (domains). The EVH2 domain can interact with actin filaments. The proline-rich linker can interact with complexes of profilin (orange) and monomeric actin (red).** b, **Possible arrangement of Mena/VASP, bound to profilin–actin, near the barbed (quickly growing) end of an actin filament. The EVH2 domain might bind to the sides of actin filaments and slide along (double arrow) until it reaches the barbed end, where it would compete with capping protein (blue).** c, **Bear *et al.* show that Mena/VASP seems to block actin branching and capping in favour of rapid elongation, resulting in lamellipods that are highly dynamic, are shaped like sharks' teeth, and often lift off the surface, retract and change shape.** d, **In the absence of Mena/VASP, capping protein can bind to filament barbed ends, prohibiting further elongation. This leads to highly branched actin networks and dune-shaped lamellipods that are more conducive to cell movement than the sharks' teeth.**

required for Mena/VASP to localize to the leading edges of lamellipods *in vivo*. This might explain how these proteins can reside in focal adhesions (complexes that link a cell's cytoskeletal filaments, such as actin, to its extracellular environment, and aid in movement) as well as at leading edges[5] (Fig. 1). In any case, this and other evidence points to a model in which Mena/VASP is recruited to newly formed filaments at the leading edge, where it competes for filament barbed ends with 'capping' proteins (Fig. 2). If so, then filament dynamics might depend on the ratio of capping proteins to Mena/VASP. Capping proteins prevent filament elongation and so would promote shorter filaments. Mena/VASP would facilitate a longer growth phase, possibly through its ability to bind to profilin — an actin-monomer-binding protein that brings actin to uncapped barbed ends.

And how does Mena/VASP alter actin-filament branching? It is not yet clear why there are fewer branches in Mena/VASP-rich cells. There are many variables that affect the frequency, distribution and length of branches, and we are only just beginning to understand them. They include the possibility that the Arp2/3 complex competes with Mena/VASP for binding at or near barbed ends[9,10], and that filaments might in fact elongate more rapidly (so increasing the spacing between branches) in the presence of Mena/VASP proteins than in their absence. Although there is only preliminary evidence for cellular factors that promote more rapid filament elongation[11], this has been a topic of speculation for many years. Future experiments should reveal the mechanism for the reduction in branching.

This clarification of the role of Mena/VASP proteins[1] has added more fine detail to our picture of how cells change shape and move. We now need to consider that the underlying architecture of actin-based protrusions is likely to be subtly different among superficially similar structures. In retrospect, it seems rather obvious that different cell types, facing diverse environmental challenges, will respond with slightly varied shape changes and protrusions. Looking ahead, however, it may seem daunting that cells appear to have many ways to take a walk — or even a tentative first step. ■

Laura M. Machesky is in the School of Biosciences, Division of Molecular Cell Biology, University of Birmingham, Birmingham B15 2TT, UK.
e-mail: l.m.machesky@bham.ac.uk

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100 YEARS AGO

Having regard to the wide reputation which the Malays have earned for themselves as a maritime people in Eastern seas, it is at first sight not a little remarkable that, so far as the Malay Peninsula is concerned, they have developed no really able type of sea-going boat. Three main factors have been at work influencing the development of boats, and tending to produce the characteristic shallow draft, lack of beam, and a consequent want of stability and weather lines. (1) The rivers are protected by very shallow bars of sand or mud, which make it impossible for a deep-bodied boat to obtain shelter within them. (2) The variable character of the light breezes prevailing in the Straits of Malacca. (3) The great strength of the tides. The lot of the sailing vessel is thus precarious; racing tides and baffling winds and calms make progress very slow. Hence propulsion by oars or paddles was the first necessity of the old-time Malay seaman in the Straits; sails were merely an occasional convenience.

From *Nature* 29 May 1902.

50 YEARS AGO

It has been established by earlier investigators that acetic acid has a destructive effect on the ascorbic acid in raw cabbage. This effect is somewhat surprising, since the lower the pH in the medium, the more stable is the ascorbic acid and, therefore, one would expect the acetic acid to have a preservative effect on the ascorbic acid in the cabbage. However, in experiments carried out in the early months of 1951, we found that, in many fruits and vegetables, the ascorbic acid is to a remarkable degree oxidized into dehydroascorbic acid if slices are sprinkled with 5 per cent acetic acid and allowed to stand for two hours … in cabbage, cucumber, horse-radish, carrot, potato, lettuce, dill, leek, apple, pear and banana, 60–90 per cent of the ascorbic acid is oxidized. In parsley, spinach, cauliflower and tomato, the corresponding values are 20–50 per cent, and in orange and onion, only 0–10 per cent. We conceive the effect to be similar to that caused by mechanical damage to the cells. The acid penetrates into the cells and the hydrogen ions bring about a disturbance of the balance between the oxidizing and the reducing enzyme systems of the cell.

From *Nature* 31 May 1952.