of transglutaminase[7]. Given that membrane phospholipid scrambling and transglutaminase activation are prominent features of apoptotic cells, it seems highly probable that mechanisms mediating release of LPC from apoptotic cells will be similar to those mediating release of PAF during neutrophil activation. Thus, one could hypothesize that the release of LPC from dying cells requires membrane phospholipid trans-bilayer movement, leading to the prediction that those cells which failed to scramble their membranes would fail to release LPC. Such a failure would be easy to test using cell lines that fail to express phosphatidylserine during apoptosis.

In some ways, these results represent a conundrum. In general, apoptotic cells are thought to be anti-inflammatory by virtue of their ability to repress production of pro-inflammatory mediators by macrophages. In fact, addition of apoptotic cells to an ongoing inflammatory lesion was shown to enhance its resolution[8]. The presence of macrophages, therefore, is not necessarily equivalent to inflammation. But in addition to its chemotactic properties, LPC has several pro-inflammatory activities and has been implicated in the inflammation associated with atherosclerotic plaques[9]. By binding to its receptor, the immunoregulatory receptor G2A[10], it can activate pro-inflammatory transcription factors such as NF-κB and signalling cascades involving the mitogen-activated protein kinases (MAPKs). This stimulates the release of pro-inflammatory mediators from macrophages, resulting in induction of apoptosis and/or necrosis in selected cell types, upregulation of adhesion molecules on endothelial cells, and attraction of lymphocytes and monocyte/macrophages. Thus, LPC has several potential mechanisms by which it stimulates inflammation and atherogenesis. Although there are some published exceptions in which apoptotic cells appear to cause inflammation[11], it is conspicuous by its absence in most tissues where apoptosis occurs (for example, involuting mammary gland, developing thymus and developing limb bud). The sirens sing their enticing songs to attract the macrophages to the death site, but like Odysseus and his sailors, phagocytes have learned ways to avoid destruction of themselves and the tissues in which they find themselves. Understanding how the phagocyte shuts down the pro-inflammatory signal derived from LPC should identify some interesting hypotheses for why this shutdown fails in atherosclerosis and other chronic inflammatory diseases.

Two other groups of investigators have reported the discovery of protein-derived chemotactic factors released from cells dying by apoptosis; as well as attracting phagocytes, these factors are also pro-inflammatory[12,13]. Understanding when and how chemotactic factors are released from dying cells *in vivo* and how their pro-inflammatory signals are quenched should provide many new possibilities for therapeutic interventions in chronic inflammatory disorders. □

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CELL OF THE MONTH

A plant hair cell on a leaf primordium of *Arabidopsis thaliana*

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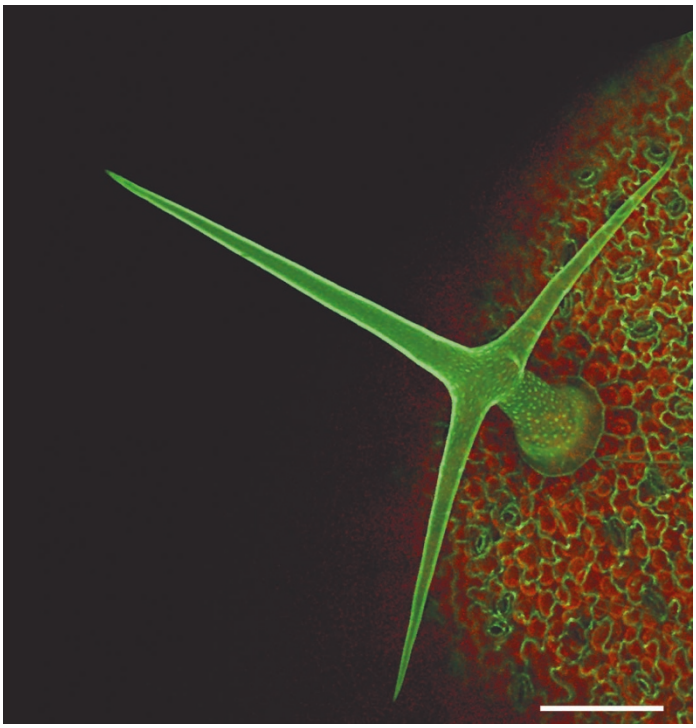

Green fluorescence represents a green fluorescent protein (GFP)-tagged thaumatin-like protein that is expressed in plant cell walls. Chlorophyll autofluorescence is shown in red. The image was acquired using a confocal microscope (TCS SP, Leica). Scale bar represents 100 μm. The contributor acknowledges the help of Christopher Wilkins (University of Cambridge, UK).

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