Journal club

BLEBBING: MOTILITY RESEARCH MOVES IN A NEW DIRECTION

Blebbing cells were a mysterious, and underrated, curiosity until recently. Although some isolated studies from the past 30 years had suggested that blebbing is important for cell motility, blebbing was generally associated with apoptosis. Consequently, the role of blebbing in motility was overlooked, and dogma held that primarily the extension of lamellipodia, through actin polymerization, drove cells forwards. This changed, however, when in 2006 Blaser *et al.* showed that cells can exclusively use myosin-based blebbing motility to migrate directionally over long distances to reach their destinations.

> “…cells can exclusively use myosin-based blebbing motility to migrate directionally…”

Using high-resolution rapid imaging, which did not exist to study blebbing in the 1970s, Blaser *et al.* showed that rapidly extending and retracting blebs mediate motility in zebrafish primordial germ cells *in vivo*. Notably, cortical actin filaments were absent from the extending blebs, which indicated that actin polymerization was not driving membrane extension. Moreover, calcium influx preceded blebbing and myosin was activated at the front of blebbing cells. These processes, the authors proposed, induce the plasma membrane to detach from the underlying actin cortex — cytoplasmic flow into this region then induces the extension of a bleb and progressive extension of new blebs enables cells to migrate directionally.

With these findings, Blaser *et al.* brought blebbing into the limelight — showing that *in vivo* cells use this mechanism to move around — and confirmed previous indications that myosin can drive motility. This, and related papers, sparked the creation of a burgeoning, interdisciplinary and fruitful field of bleb research. We now know, for example, that cancer cells can switch between lamellipodial and bleb-based motility. With their groundbreaking study of blebbing, Blaser *et al.* not only shed light on cell motility, they also crucially enabled scientists to move forward towards a new understanding of how cell migration occurs *in vivo*.

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ORIGINAL RESEARCH PAPER Blaser, H. *et al.* Migration of zebrafish primordial germ cells: a role for myosin contraction and cytoplasmic flow. *Dev. Cell* **11**, 613–627 (2006)