Investigating Chemoattractant-Specific Temporal Activation of mTORC2–PKC Signaling Pathways in Human Breast Epithelial Cells

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The mechanistic target of rapamycin complex 2 (mTORC2) regulates cell motility and is commonly assessed by AKT phosphorylation at S473. It remains unclear whether distinct chemoattractants produce stimulus-specific temporal mTORC2 activation patterns and differentially engage downstream PKC pathways. MCF10A breast epithelial cells were stimulated with chemoattractants EGF, IGF-1, or LPA over a 60 minute time interval. Western blotting quantified phosphorylated and total AKT (S473), PKCd (T505), and PKC? (T410). EGF produced a sawtooth AKT phosphorylation profile, whereas IGF-1 and LPA induced more sustained activation. PKC responses were stimulus-specific: IGF-1 was associated with early PKCd phosphorylation, and EGF produced delayed PKC? phosphorylation followed by decline below baseline. These results support a model in which chemoattractant identity is reflected in stimulus-specific temporal mTORC2 signaling dynamics and differential downstream PKC engagement. Understanding how signal timing may contribute to distinguishing extracellular cues may inform broader efforts to regulate cell migration in physiological processes such as wound healing and immune responses, as well as in pathological contexts including cancer metastasis.

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