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L. J. Bugaj, A. J. Sabnis, A. Mitchell, J. E. Garbarino, J. E. Toettcher, T. G. Bivona and W. A. Lim

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### Dynamics of cell signaling and decoding

Defects in cellular signaling pathways, like those in some cancer cells, are often thought to result in increased or decreased steady-state signals that promote or inhibit cell proliferation. But Bugaj *et al.* show that dynamic changes in the duration or frequency of a signal can also alter cellular responses (see the Perspective by Kolch and Kiel). They took precise control of signaling in cultured human or mouse cells with a light-controlled mechanism for activating and inactivating the guanosine triphosphate Ras. Known cancer mutations in components of the Ras-activated signaling pathway or inhibitors of particular pathway components altered signal timing and readouts. The modified dynamics changed transcriptional outcomes and could inappropriately support cell proliferation. The ability to probe responses of signaling networks in this way may enhance understanding of biological regulation and reveal new therapeutic targets.

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