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The fate of cells in skin: from clonal analysis to cell kinetics ALLON M. KLEIN, DAVID P. DOUPE, DOUGLAS J. WINTON, PHIL H. JONES, BENJAMIN D. SIMONS, Department of Physics, Cavendish Laboratory, J J Thomson Avenue, Cambridge CB3 0HE, UK — Biologists are keen to understand the mechanisms of development and maintenance of tissues in mammals. As well as its intrinsic scientific interest, an understanding of the kinetics of cell division has important implications for mechanisms of aging and cancer development. Analysis of cell populations (clones) resulting from progenitor cells provides indirect access to the laws governing cell division and fate. Yet, until recently, the quality of clonal fate data acquired *in vivo* has inhibited reliable quantitative analysis. By addressing a recent, detailed, and extensive experimental study of mammalian skin, we develop a general theoretical framework which shows that the wide range of clonal fate data are consistent with a remarkably simple cell kinetic model. As well as overturning the accepted paradigm for skin maintenance, the analysis introduces a general framework for analysing clone fate data in future experiments. We now have a robust platform to study the effect of drug treatments and the influence of cell mutations on the epidermis.

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