switched on in individual isolated cells within mammary acini. These findings hint that something akin to Gurdon's 'community effect' may enable cancer to take hold. I predict that this is only the start. The slow-burning influence of Gurdon's idea, now fuelled by new imaging technologies, will soon be setting the field alight with new examples of cooperative decision-making in development, disease and regeneration.

Sally Lowell
Centre for Regenerative Medicine, Institute of Stem Cell Research, School of Biological Sciences, The University of Edinburgh, Edinburgh, UK
e-mail: sally.lowell@ed.ac.uk

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Competing interests
The author declares no competing interests.

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chains, as found in rubber bands. Whether the minor elastin structural populations change upon stretching remains to be seen.

Together, these results support the view that protein phase separation does not require predominant formation of secondary structures. Given that small changes in sequence can change material properties or, in the case of RBP LLPS, cause protein aggregation and neurodegenerative diseases, efforts to directly observe condensate atomic structures will be important to better understand the molecular (dys) function of phase-separating proteins.

Nicolas Lux Fawzi
Department of Molecular Pharmacology, Physiology and Biotechnology, Brown University, Providence, RI, USA.
e-mail: nicolas_fawzi@brown.edu

The author is a member of the scientific advisory board for Dewpoint Therapeutics.

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Journal Club

THE SERENDIPITOUS DAWN OF DNA REPAIR

The paper 'Effect of visible light on the recovery of *Streptomyces griseus* conidia from ultra-violet irradiation injury', which appeared in *PNAS* in February 1949, was written by a single author: Dr Albert Kelner, a young research fellow at The Biological Laboratory in Cold Spring Harbor, NY. His fellowship had almost ended, and his professional future was uncertain. The paper summarized his persistent efforts to understand a phenomenon that had repeatedly plagued his experiments, in which he used ultraviolet (UV) irradiation to mutagenize *Escherichia coli* bacteria and the fungus *S. griseus*. What frustrated him was the extreme variability in the lethal effect of UV radiation on different plates within the same experiment. Solving this mystery was not his primary mission in the lab, and his persistent attempts to understand its source hastened his mentor's decision to terminate his position. He nevertheless kept at it until he finally discovered it was the visible light pouring from the windows or the lab's white lamps that made the difference. Exposure to visible light immediately after UV irradiation led to sweeping recovery from otherwise lethal UV doses!

This finding resonated with earlier sporadic observations of the effect of visible light on the mutagenicity of UV radiation. Kelner's conclusion was that "much of the killing of ultra-violet light is due to a light-labile alteration in some constituent in the cell. Exposure to visible light restores this altered constituent to its former state" (Kelner, 1949). More than seven decades later, we call that cellular constituent 'DNA' and its restoration 'DNA repair', but the conceptual breakthrough was there. The phenomenon that sidetracked Kelner's work was enzymatic photoreactivation: in situ repair of the major DNA lesions that are induced by UV radiation — cyclobutane pyrimidine dimers and pyrimidine–pyrimidone (6–4) photoproduct — by light-induced repair enzymes called photolyases.

At the same time, Kelner had to find another job and turned for advice to a prominent scientist at Indiana University, whom he knew from his visits at CSHL, Dr Salvador Luria (a future Nobel prize laureate). In late 1948, Kelner sent Luria a detailed account of his findings and conclusions, with the question "What do you think of all this?". Much to his unpleasant surprise, Luria responded: "You will be interested in knowing that Dulbecco [Renato Dulbecco, then a graduate student in Luria's lab and another future Nobel laureate] has discovered, quite by accident, a phenomenon which may be counterpart on phage of your discovery". It was, indeed, the same photoreactivation, identified by Dulbecco using UV-irradiated bacteriophages, whereby exposure of the host bacteria to visible light reactivated the irradiated bacterial viruses. Thanks to the collegiality of Luria and Dulbecco, and further correspondence between the young, insecure research fellow and the powerful established scientist, it all ended well, and the three earned the appropriate recognition for the discovery (the correspondence between Kelner and Luria was published in 1997 by Dr Errol Friedberg). In June 1949, a brief letter by Dulbecco published in *Nature* succinctly summarized his observations and acknowledged upfront Kelner's observation as a 'personal communication'.

"More than seven decades later, we call that cellular constituent 'DNA' and its restoration 'DNA repair', but the conceptual breakthrough was there"

I can't end this brief account of a fascinating, serendipity-driven turning point in the history of molecular biology without quoting the final words in Albert Kelner's 1951 article in Scientific American,'Revival by Light', in which he suggested that the cellular constituent affected by UV radiation could be 'nucleic acid'. A year before the Hershey–Chase experiment ended the debate about the role of DNA as the genetic material, Kelner asked whether the findings could provide indirect evidence for the 'nucleic-acid hypothesis' and concluded: "Our own feeling is that the nucleic-acid theory is correct … Perhaps the real stumbling block is that we do not yet understand at all well the biological role of that omnipresent and important substance — nucleic acid."

That stumbling block was removed a mere two years later in a letter to *Nature* authored by another former graduate student of Salvador Luria, James Watson, and by Francis Crick.

Yosef Shiloh
Department of Human Molecular Genetics and Biochemistry, Tel Aviv University School of Medicine, Tel Aviv, Israel
e-mail: yossih@tauex.tau.ac.il

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