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Quality improvement at the Academies

Science academies elect new members to their fellowship every year. To the onlooker, the process of selection is arduous and subjective, with decisions being made by small committees arguing seemingly endlessly, over many cups of coffee. Judgements within and across disciplines are hard to make, with personal prejudices never being very far away in deciding the final choices. The crux of the problem, of course, is that there are many nominees and only a small number eventually get elected. What purpose is served by the annual election ritual? It is generally assumed that for perpetuation, the quality of the fellowship must improve (or at least stay constant) with each year's election. How does one quantitate the 'quality of the fellowship'? Clearly, there is no good criterion. However for mathematically inclined modellers, this poses no real impediment. Indeed, Jayant Narlikar begins his discussion of a 'toy model' with the use of a variable x to measure quality of a scientist 'on a scale ranging from 0 to 1, with 1 being the mark of perfection' (*Curr. Sci.*, 1995, **69**, 969). He then proceeds to address the issue of how fast the quality of the fellowship will improve if the 'Radhakrishnan criterion' that each 'new fellow elected is better than the median level of the existing population of fellows' is implemented. To readers averse to mathematical analysis, the essence of Narlikar's thesis is displayed in Figure 1 of his letter, which suggests that the median quality does indeed improve inexorably over a 25-year period, if the criterion $x > M_{n-1}$ is applied, where x is the quality parameter, M_{n-1} is the median quality in year $n-1$ and M_n is the quality in the election year n. Using reasonable values for the strength of the fellowship and the number of newly elected fellows, Narlikar's model suggests an encouraging inference; if only we could assign values of x to people and rationally elected Fellows, then the Academies would 'inexorably' improve; more importantly they would improve in a reasonable time frame viz. a quarter of a century.

V. Balakrishnan (**page 424**), expands on this model and reaches an interesting conclusion – there are 'no quick fixes'. His modified estimate is that a 'sizable improvement' would happen over a 250 year period. This order of magnitude change of time scale for improvement in the Balakrishnan model was arrived at initially assuming immortality of the fellowship; a most desirable simplification, at least as far as Academy fellows are concerned. Balakrishnan concludes that a quality improvement effort spread 'relentlessly' over the centuries would surely benefit our Academies.

Where do all these apparently elegant arguments leave us, as far as the Academy fellowships are concerned? Maybe the Councils will now debate quantitative criteria for fixing the 'quality parameter' x. Until that issue is resolved, a process that may take longer than the modest time spans considered above, we must live with fallible criteria for election to the Academies. For the Academies, holding the median quality index steady may be a challenge, with improvement being a goal best relegated to future generations.

P. Balaram

Signalling at the nucleus

In eukaryotic cells, DNA is efficiently packaged into the nucleus, an organelle bounded by a highly porous membrane. Despite its central role in cell biology, the nucleus as an organelle has begun to be understood only relatively recently. Ironically, the overriding importance of DNA, may have indeed contributed to the limited attention paid by molecular biologists to other structures in the nucleus. Arthur Kornberg wrote some years ago that 'in my theater the nucleic acids write the script, but the enzymes (proteins) do the acting'. This sentiment appears true of the nucleus too. A class of fibrous proteins, nuclear lamins, appear to be critical in several important nuclear functions. The superstructure formed by the lamins physically separates the inner surface of the nuclear envelope from chromatin. As with all biological phenomena, molecular complexity is a feature of the lamins with three major classes already reported. While the biological role of lamins continues to be clarified, their distribution may depend upon cell type, with lamin A appearing only in differentiated cells.

On **page 441**, Manjula and Rao discuss the dynamics of lamin structure with reference to the two hottest topics in cell biology today – cell cycle and apoptosis. The former refers, of course, to events that occur during cell division, while the latter is programmed cell death (sometimes suicide). Apoptosis is a phenomenon that suggests that immortality may be biologically as undesirable in cells as in man. The importance of lamins in uncontrolled cell proliferation makes these proteins important in studies of cancer. The diverse biochemical events involving lamins and their cellular consequences may lead to the lamins becoming a focus for a new class of signal transduction events; only this time the scene of action will be the nucleus.

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