hydrocortisone causes a more rapid nucleo-cytoplasmic transfer of RNAs, as well as an accelerated precursor-product conversion of nuclear RNAs.

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Relationship between Nuclear and Cytoplasmic RNA

Singh and Koppelman have subjected to mathematical analysis[1,2] some of the experiments carried out by my colleagues and myself on the relationship between nuclear and cytoplasmic RNA[3,4]. I have already demonstrated the inadequacy of the model presented by Singh and Koppelman in their first communication[1] by showing that a relationship defined by them as a constant (λ in my report) was in fact not a constant[5]. In their second communication[2], Singh and Koppelman accept this point and present a modified version of the same exercise. As before, they seek to give the impression that they have taken the results of some of our experiments and shown that these results fit the particular mathematical model which they propose. Once again this is not so. In neither of the graphs produced by Singh and Koppelman have our results been accurately transcribed. In both instances, several points given in our original curves have been omitted from the graphs, and the curves have been truncated by deletion of early and late experimental points. This is well illustrated in the data for cytoplasmic RNA adenine shown in Fig. 1 of their communication. In our original report this curve is unequivocally sigmoid, but it appears in their communication as a straight line, an approximation which involves the omission of several

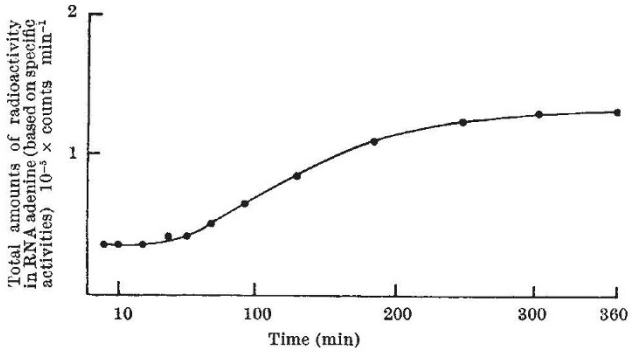

Fig. 1. Total amounts of radioactivity in cytoplasmic RNA adenine. The original graph from Harris *et al.* (ref. 4).

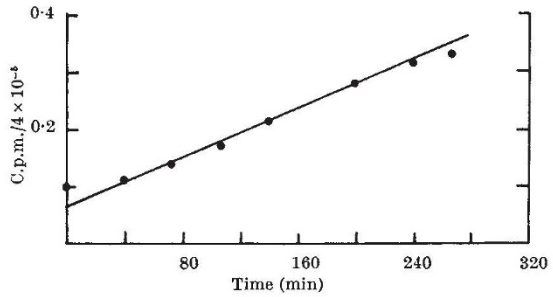

Fig. 2. The same graph as Fig. 1 re-plotted by Singh and Koppelman (ref. 2).

of our experimental points, the insertion of points which do not correspond to our experimental points and the deletion of the end of the curve. In order that readers may assess the extent of the transformation, I have reproduced in Fig. 1 the original experimental curve and in Fig. 2 the same curve as re-plotted by Singh and Koppelman.

It may have escaped the notice of some readers that the position initially adopted by Singh and Koppelman has undergone a change. The original point at issue between these authors and myself concerned the fate of the labelled nuclear RNA. My interpretation of our results was that much of this RNA underwent intracellular degradation. Singh and Koppelman took the view that this interpretation was incorrect. In their first communication[1] they stated: "Although the possibility of such degradation cannot be excluded, it appears from the analysis presented here that it does not occur to any significant extent". In a later communication, however, Singh[6] concluded that the nuclear RNA did contain a "labile fraction in high molecular weight RNA" and estimated that the "half-life time of the most labile component in nuclear RNA" was 20–30 min. In their second communication[2], Singh and Koppelman state: "The deviation of experimental points from the straight line during the early period of incorporation is primarily due to the presence of low molecular weight RNA, which is known to undergo rapid turnover." (It should be noted that even our re-plotted curves fail to conform closely to their model; and no nuclear RNA was "known to undergo rapid turnover" until my colleagues and I revealed the fact[7,8].) Again, later in the same letter: "Recent investigations (not yet published) suggest that such degradation is more prominent in non-growing cells." (With this I agree, and refer the authors to the papers by J. W. Watts and myself in 1959 in which the rapid turnover of nuclear RNA in a non-multiplying animal cell was described in some detail[7,8].)

It thus appears that Singh and Koppelman do not any longer disagree with my view that much of the labelled nuclear RNA does undergo breakdown within the cell to end-products which are soluble in acid. That some nuclear RNA fractions might be precursors of stable cytoplasmic RNA is not, so far as I am aware, denied by anyone.

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Singh and Koppelman[1,2] fit a kinetic model to data of Harris and Watts[3]. Their model depends on the equation

$$\frac{d}{dt}(a_{Sc}) = \lambda (a_{S_n} - a_{Sc})$$

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