points (1)–(3), then either

$$S(I) \sim K \int I \ln I \, d\bar{\sigma},$$

or

$$S(I) \sim K \int I^{\alpha} \, d\bar{\sigma}$$

for some constants K, α ((1) leads to $S_2 = S_3 = 0$, (2) leads to

$$S(I) \sim \int \tilde{S}_1(I(\bar{\sigma})) \, d\bar{\sigma}$$

for some $\tilde{S}_1$).

MEM is usually chosen, because in all other cases $I \geq 0$ is an extra complication and here it follows automatically from the variational principle.

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FIDDY AND GREENAWAY REPLY—We thank Kreĭnovič and Kosheleva for their remarks concerning our criticism[1] of phaseless object reconstruction using the maximum entropy algorithm[2] and other statistical techniques. The paper giving a more detailed explanation of our criticism is not widely available[3]. Because of this, we are taking the opportunity to supplement our necessarily brief discussion[1], and to comment on the points which they have raised.

Their statement in the paragraph beginning "No matter how precise . . ." is an oversimplification. The claim may be true if the multiple sources in question are distributed over a region unresolved by the measurement baseline. However, if the measurements are precise, one may analytically continue the data and thus amend the resolution criteria. Also, the use of entire function theory enables one to predict a countable, complete and often finite set of possible solutions, from precise measurements. In ref. 3 we give examples of the possible solutions consistent with an intensity distribution. In only one case do all the solutions correspond to a double source. The essential point, which is apparent from the other examples, is that even within the given resolution criteria for the truncated data, there is the danger of confusing single and multiple sources when making phaseless reconstructions.

To say that one only requires "the distribution that contains . . . the minimum possible number of components", implies lack of interest in multiple systems. If only upper limits on source extent are required, one may use the measured object autocorrelation. If the source structure is of interest, it is important to ask what the ambiguities are, and to classify them as possible single, double, triple systems. Entire function theory predicts that such a classification is possible, the range of solutions being countable.

We do not deny the usefulness of the maximum entropy method, since with phase information it provides an extremely powerful tool. Gull and Daniell[4] note the possible existence of several entropy maxima and comment that in such cases the reconstruction "will be misleading". They continue "with phase information . . . this cannot happen". We concur, believing that such multiple entropy maxima correspond to ambiguities of the type discussed in refs 1 and 3.

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Effects of sodium butyrate on human chronic myelogenous leukaemia cell line K562

ANDERSSON and his colleagues have postulated that the K562 cell line is of erythroleukaemic origin[1] and can be induced to undergo erythrocytic differentiation by sodium butyrate[2]. However, treatment with sodium butyrate of the original K562 cells fails to produce benzidine-positive staining, cell haemoglobin crystals or the synthesis of human globin.

The K562 cells (initial density 2×10^5 cells ml^{-1}) were cultivated in medium described elsewhere[3–6] in the presence or absence of 1 mM sodium butyrate. In contrast to Andersson's observation, sodium butyrate inhibited the cell growth by 50%. Thus, after 3 d, control cultures contained 8.7×10^5 cells while butyrate-treated cultures had 4.3×10^5 cells. No differentiation was detectable. The Lepehne reaction did not reveal a single benzidine-positive cell. We did, however, observe that cells from cultures treated with butyrate showed various signs of degeneration such as vacuolation, hyaline degeneration and loss of the cytoplasmic basophilia. Electron microscopy also showed various signs of cell injury.

In the normal sequence of erythroid differentiation the cell progresses through a series of definitive recognisable stages culminating in a mature erythrocyte. Andersson *et al.*[2] showed the intracytoplasmic generation of erythrocyte-like bodies which were subsequently expelled from the original cell. This phenomenon has not been described before and these 'erythrocyte-like' particles are probably only hyaline bodies and/or pieces of cytoplasmic debris. Furthermore, neither treated nor control cells synthesised α- or β-globin chains (Fig. 1) as would be expected if erythroid differentiation has occurred. With the report of Rutherford *et al.*[7] in mind, note that embryonic globin polypeptides are not detectable by the column chromatographic procedure used. Thus, it is not possible to exclude the possibility of synthesis of trace amounts of embryonic globin polypeptides, but it seems convincing that adult globin was not synthesised in cells treated with butyrate.

Because our K562 cells do not stain positively after exposure to sodium butyrate we also studied the effect of sodium butyrate in myelosarcomas made up of K562 cells transplanted in nude mice[8,9]. Six intraperitoneal injections of sodium butyrate (275 mg per kg every 2 d) produced extensive necrosis of the myelosarcoma. Imprints from K562 tumours growing *in vivo* in nude mice also failed to show benzidine-positive cells. However, when we attempted to reculture the cells from tumours, ~10–15% of the cells did give positive benzidine staining. These cells were not typical erythroid cells and showed well defined nucleoli. It is most likely that they were of mouse origin or the K562 cells were somehow altered by passage in the mouse to give a false positive benzidine reaction. If Andersson's cells have at any time been passaged in immunodeficient mice, this may account for the benzidine-positive cells. We do not know which clone or subline of K562 was used by Andersson *et al.*[1]. In March 1978, we sent to Dr Eva Klein a clone of K562 which was recultured *in vitro* after being serially transplanted in nude mice for 20 passages. Klein also had a subline of K562, originally provided to Dr G. Henle six years ago, and the myeloid origin of this subline was confirmed by Klein *et al.*[10]. Evidence for the myeloid nature of K562 cells is further supported by the presence of group-specific granulocyte antigens[11].

Another claim of erythroid origin rests primarily on the biosynthesis of glycophorin A, the major sialoglycoprotein of human erythrocytes, by K562 cells[12]. Unpublished results show a very low number of glycophorin A cells in our K562 cell line and no conclusions can be made yet.

In summary, the failure of sodium butyrate to induce erythroid differentation of K562 cells is consistent with our earlier studies on the effects of dimethyl sulphoxide[13]. Both agents produce cytotoxic effects rather than a stimulation of the cell potential for differentiation. The discrepancies between our findings lead us

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