

## Thalassaemia

**SIR** — Orkin et al. in *Nature* of 23/30 December 1982<sup>1</sup> elegantly demonstrated that decreased synthesis of mutant globin  $\beta^E$  chains is due to abnormal processing of the  $\beta$ -specific mRNA primary transcript. This explains the previous finding of decreased mature mRNA in Hb E reticulocytes<sup>2</sup>. Thus, a qualitative change in globin structure is associated with a quantitative change in its production. This is a vindication of the "structure-rate" hypothesis proposed by Itano a quarter of a century ago<sup>3</sup> and further elaborated by Ingram and Stretton<sup>4</sup>. At that time it was suggested that an electrophoretically silent or a synonymous codon replacement might be present in  $\beta$ -globin in  $\beta$ -thalassaemia. If this entailed the requirement for a tRNA species absent or scarce in erythroid cells, it would explain why the polypeptide chain was synthesized at a reduced rate<sup>5</sup>.

Apart from the special case of Hb Lepore, the search for a structural abnormality in the  $\beta$ -globin chain in  $\beta^+$ -thalassaemia has since failed. However, we now have a clear example of a  $\beta$ -globin chain which was already known to be structurally abnormal, and in which a reduced rate of synthesis ( $\beta^+$ -thalassaemia) is indeed a direct result of the structural abnormality. It turns out that the link between structure and rate is not at the stage of translation, but rather at the earlier stage of processing of the primary transcript. The very existence of this was of course totally unknown at the time when the structure-rate hypothesis was originally formulated.

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1. Orkin, S.H. et al. *Nature* 300, 768-769 (1982).
2. Traeger, J., Wood, W.G., Clegg, J.B., Weatherall, D.J. & Wasi, P. *Nature* 288, 497-499 (1980).
3. Itano, H. *Adv. Protein Chem.* 12, 215 (1957).
4. Ingram, V.H. & Stretton, A.O.W. *Nature* 184, 1903 (1959).
5. Itano, H. Symposium on Abnormal Haemoglobins in Africa (Blackwell, Oxford, 1965).

## More Chinese names

**SIR** — I agree with S. Jellis (*Nature* 9 December 1982, p.476) that it is now common in journals from Mainland China to print the transliterated given names as one word. It is also true that usually the surnames have one syllable and the given names have two syllables. Unfortunately it is by no means rare to find two-syllable surnames or single-syllable given names. Perhaps the editors should communicate with the authors to confirm their surnames when in doubt — for instance, when a name such as Ouyang Fan appears. (Both Ouyang and Fan can be Chinese surnames. In this particular case, the gentleman I know is Mr Ouyang).

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## Ball lightning — all in the mind?

**SIR** — There may be a physiological explanation for the lightning-associated phenomenon reported by Burbidge and Robertson in the 16 December 1982 issue of *Nature* (p.623).

On looking at a bright light an after-image is produced. If the light consists of consecutive streaks of lightning running in different directions then the after-image may include a blob where subsequent flashes cross the after-image of previous flashes. The final after-image may well appear like a "central body" with "arms" flowing from it. As the subject moved her eyes, so the after-image would move in respect to the surroundings. Because the image was appearing to move, the subject's eyes would attempt to follow it which would cause the image to move more. As soon as the subject fixed her gaze on an object (the pile of tools) the image would stop moving.

An after-image gradually fades away. The blob, being due to greater intensity of light, would persist longer than the arms and this would give the impression of the arms going back into the blob and the blob itself then disappearing.

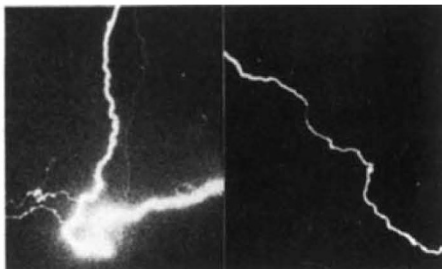
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**SIR** — There seems to be some confusion over the use of the term "ball lightning" in recent discussions in *Nature*, for more than one phenomenon is involved.

(1) Relatively slow-moving luminous spheres may float across one's field of vision after a near lightning strike — probably electrostatically charged gas globules. The term ball lightning here is surely a misnomer, for the phenomenon is clearly a discharge sequela.

(2) Ball-shaped lightning itself is occasionally described, almost invariably by recipients of lightning strikes. To such the discharge, if seen at all, would be viewed along its longitudinal axis, and seen, therefore, as a fireball. Similarly, to



**Left:** Photograph of part of a lightning discharge showing as single puff. It is suggested that this, and those seen on the right are caused by the tortuous course of the discharge momentarily approaching (or receding from) the camera lens, and accordingly being seen along its longitudinal axis. **Right:** Photograph of discharge that has undergone a 90° change of direction. Several puffs are seen in the region of the "U" bend. To an observer at the receiving end of the horizontal component, the discharge would appear as a vertical streak ending in an expanding fireball. Photos by H.G. du P. Gillett.

an observer stationed at the receiving end of the main horizontal component in the right hand photograph, the entire discharge would appear at first as the familiar vertical shaft, but would end in a fireball.

(3) Conversely, to an observer placed diametrically opposite, it would appear very different. The vertical shaft would end as a relatively slow-moving, fading ball of light — perhaps the explanation for a reliably reported observation of an otherwise normal lightning streak that ended thus.

In the photographs, the puffs could be caused by the momentary observation of the discharges along their longitudinal axes, the amount of light being thus enhanced; the lightning's essential tortuosity increasing the puff's diameter.

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## Retroposons defined

**SIR** — Several classes of dispersed repeated sequences in mammalian DNA share common properties which imply that they are derived from RNA<sup>1-4</sup>. Thus after a decade of speculation, "reverse" flow of genetic information is becoming established as a major contributor to the structure, if perhaps not the function, of mammalian genomes. The sequences concerned are the processed pseudogenes representing mRNAs<sup>1</sup>, the pseudogenes representing small nuclear RNAs<sup>2</sup>, and the Alu and related sequences representing various polymerase III RNAs<sup>3</sup>. In each class the RNA-related sequence is tailed by an adenine-rich segment and flanked by a 7- to 21-base pair duplication of the insertion site, implying a common mechanism of insertion. These traces of insertion differ from those of the other major type of dispersed repeated sequence, the transposons, which in contrast move by DNA transposition.

A new name seems to be required for the RNA-derived type of sequence, and I suggest "retroposons", to denote their RNA origin and their dispersed positions. Retroposons are present in several mammalian orders, and given one apparent retroposon in *Drosophila*<sup>5</sup> they may be a feature of eukaryotes in general.

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2. Van Arsdell, S.W. et al. *Cell* 26, 11-17 (1981).
3. Jugadeeswaran, P., Forget, B.G. & Weissman, S.M. *Cell* 26, 141-142 (1981).
4. Sharp, P.A. *Nature* (in the press).
5. Dawid, I.B. et al. *Cell* 25, 399-408 (1981).

## Oh, brother . . .

**SIR** — Orwell's big brother we know about, but Aldous Huxley's . . .? Surely your leading article of 27 January (p.271) can't be an attack on Julian? D SOWBY

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