formation in both proN* and proN′ (Table 1). This suggests that PDI is primarily responsible for the rapid rate of BPTI folding *in vivo*.

The conclusion that PDI principally accelerates the folding of kinetically trapped intermediates, such as N′ and N*, provides an explanation for why the effects of PDI on the folding of BPTI are much greater than on RNase A. The folding of reduced RNase A is relatively rapid even in the absence of PDI[16] and therefore does not appear to be retarded substantially by the accumulation of structured intermediates. By contrast, formation of the native state of BPTI is hindered by the accumulation of highly structured intermediates. Thus, although the uncatalysed rate for folding of BPTI is substantially lower than for RNase A, the PDI-catalysed rates for folding are similar in the two proteins (see Table 1 legend).

PDI could help formation of the final disulphide bond in the kinetically trapped intermediates, N′ and N*, either by accelerating the intramolecular rearrangement of these intermediates (to N_{SH}^{SH}) or by catalysing the direct oxidation of a third native disulphide bond. In the case of N′, we find that the other native two-disulphide species (N_{SH}^{SH} and N*) accumulate rapidly in the presence of PDI (Fig. 3*b*). Moreover, PDI catalyses the rearrangement of N′ (to N_{SH}^{SH} and N*) in the absence of redox reagents (Fig. 3*c*). These observations demonstrate that PDI acts largely by increasing the rate of intramolecular rearrangement steps, although it is possible that PDI also accelerates direct oxidation (see also ref. 13).

The mechanism by which PDI catalyses disulphide bond rearrangements in structured intermediates is not known. It is known, however, that addition of high concentrations of denaturant (6 M urea) accelerates the rate of rearrangement of the N′ (ref. 9) and N* (ref. 8) intermediates, suggesting that the rearrangement of these species requires substantial loss of structure[10]. In addition, PDI has been observed to promote the reductive unfolding of structured intermediates of BPTI[13] and retinol-binding protein[17]. Finally, PDI is able to interact with a wide variety of unstructured peptides[18,19], in a manner similar to the Hsp70 family of molecular chaperones[20]. These considerations raise the interesting possibility that PDI functions in part by promoting both local unfolding and disulphide bond rearrangements in structured intermediates. □

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ADDENDUM

The opioid peptide dynorphin mediates heterosynaptic depression of hippocampal mossy fibre synapses and modulates long-term potentiation

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SINCE publication of our article, it has become apparent that further reference to some topics covered in this paper is warranted. First, reference should have been given to research in invertebrates establishing functional roles for colocalization of neuropeptides with other neurotransmitters. This area of research is discussed thoroughly in a recent review[1]. Second, although not the major focus of the article, our finding that the opioid receptor antagonist naloxone has no effect on hippocampal mossy fibre LTP conflicts with another report[2]. Apart from the different species, experimental conditions and *in vitro* slice preparation used in our study, rather than an *in vivo* anaesthetized preparation[2], we have no explanation for the difference in results. □

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CORRECTION

Pulsed high-energy γ-rays from the radio pulsar PSR1706–44

D. J. Thompson, Z. Arzoumanian, D. L. Bertsch, K. T. S. Brazier, N. D'Amico, C. E. Fichtel, J. M. Fierro, R. C. Hartman, S. D. Hunter, S. Johnston, G. Kanbach, V. M. Kaspi, D. A. Kniffen, Y. C. Lin, A. G. Lyne, R. N. Manchester, J. R. Mattox, H. A. Mayer-Hasselwander, P. F. Michelson, C. v. Montigny, H. I. Nel, D. Nice, P. L. Nolan, K. Pinkau, H. Rothermel, E. J. Schneid, M. Sommer, P. Sreekumar & J. H. Taylor

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IN Fig. 2 of this letter, the y-axis should be labelled as Photons $(cm^2\ s\ MeV)^{-1}$ and not Photons $(cm^2\ s\ GeV)^{-1}$ as published. □