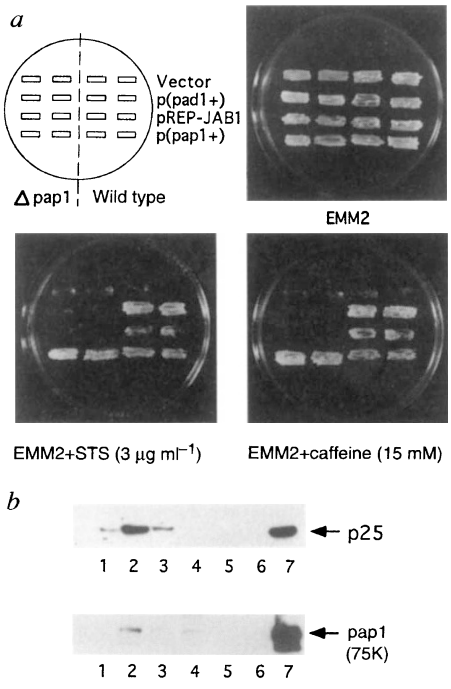

FIG. 4 JAB1 potentiates AP-1-dependent transcription in fission yeast. *a*, JAB1 confers drug resistance in yeast. Wild-type (HM123) or *Δpap1* (TP108-3C) *S. pombe* strains[7] were transformed as indicated and drug-resistant phenotypes examined. Two independent transformants for each plasmid were streaked on a minimal plate EMM2[29] (top right) or on minimal plates containing 3 μg ml^{-1} staurosporine (STS, bottom left) or 15 mM caffeine (bottom right) and incubated for 4 d at 30 °C. Plasmids used were the empty expression vector pREP1, a *pad1*$^+$-containing plasmid (pST23-6)[7], a JAB1 expression vector (pREP41-JAB) and *pap1*$^+$-containing plasmids (pST12 for wild type and pST22 for *Δpap1*)[15]. *b*, The transformants used in *a* were grown in minimal medium and cell extracts prepared. Pap-1-dependent transcription and protein expression were examined by immunoblotting with anti-p25 (upper) and with Pap-1 antiserum (lower). Transformants: wild type containing either the pREP1 vector (lane 1), a *pad1*$^+$ plasmid (lane 2), JAB1 expression vector (lane 3), or *Δpap1* containing a pREP1 (lane 4), a *pad1*$^+$ plasmid (lane 5) or a JAB1 expression vector (lane 6), or a *pap1*$^+$ plasmid (lane 7).

aprotonin and antipain). Lysates were precleared by incubation with GST-coated glutathione–agarose beads. The beads were spun down and the supernatants diluted fourfold with HNT 0 M (without NaCl) buffer before incubation with GSH–agarose beads coated with 4 μg purified GST–c-Jun(1–223), GST–JAB1 or GST[19] for 2 h at 4 °C. Beads were spun down and washed 4 times with HNT 0.1 M buffer, resuspended in SDS-sample buffer and analysed by SDS–PAGE, immunoblotting with GAL4-DBD antiserum and visualized by ECL system.

Electrophoretic mobility-shift assays. Plasmids encoding c-Jun, v-Jun, JunB and JunD cDNAs[19,28] were used for coupled *in vitro* transcription–translation reactions using the TNT reticulocyte-lysate system (Promega). Expression of different proteins was assessed by ^{35}S-methionine labelling and SDS–PAGE (data not shown). Lysates containing similar amounts of either c-Jun, v-Jun, JunD or JunB or unprogrammed lysates (0.5 μl each) were incubated with either purified GST or GST–JAB1 (400 and 800 ng of each protein) and 3 μg poly(dI-dC) on ice for 15 min in 20 μl containing 12% glycerol, 12 mM HEPES (pH 7.9), 60 mM KCl, 5 mM $MgCl_2$, 4 mM Tris–HCl (pH 7.9), 0.6 mM EDTA and 5 mM DTT. A ^{32}P-labelled double-stranded-oligonucleotide collagenase TRE probe[13] was added to the binding reaction (10,000 c.p.m.) and incubated for a further 15 min at room temperature. Protein–DNA complexes were separated on a 5% native polyacrylamide gel.

***S. pombe* strains.** 972(h$^-$), HM123(*h$^-$ leu1*). TP108-3c(*h$^-$ leu1 ura4 pap1 :: ura4*$^+$) and TP42(*h$^-$/h$^+$ leu1/leu1 ura4/ura4 his2/+ade6-M210/ade6-M216 pad1::ura4+/+*). Complete medium, YPD, modified synthetic EMM2, and malt-extract medium for mating and sporulation were prepared as described[29]. Plates contained 1.6% agar. Standard procedures for *S. pombe* were followed[29]; *S. pombe* cells were transformed using the lithium method[30] and extracts prepared by disrupting the cells with glass beads.

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1. Angel, P. & Karin, M. *Biochem. Biophys. Acta* **1072,** 129–157 (1991).
2. Nakabeppu, Y. & Nathans, D. *EMBO J.* **8,** 3822–3841 (1989).
3. Risse, G. *et al. EMBO J.* **8,** 3825–3832 (1989).
4. Hilberg, F., Aguzzi, A., Howells, N. & Wagner, E. F. *Nature* **365,** 179–181 (1992).
5. Johnson, R. S., van Lingen, B., Papaioannou, V. E. & Spiegelman, B. M. *Genes Dev.* **7,** 1309–1317 (1993).
6. Johnson, R. S., Spiegelman, B. M., Hanahan, D. & Wisdom, R. *Mol. Cell. Biol.* **16,** 4504–4511 (1996).
7. Shimanuki, M., Saka, Y., Yanagida, M. & Toda, T. *J. Cell Sci.* **108,** 569–579 (1995).
8. Fields, S. & Song, O. *Nature* **340,** 245–246 (1989).
9. Durfee, T. *et al. Genes Dev.* **7,** 555–569 (1993).
10. Smeal, T., Hibi, M. & Karin, M. *EMBO J.* **13,** 6006–6010 (1994).
11. Angel, P. *et al. Nature* **332,** 166–171 (1988).
12. Wilson, R. *et al. Nature* **368,** 32–38 (1994).
13. Angel, P. *et al. Cell* **49,** 729–739 (1987).
14. Arias, J. *et al. Nature* **370,** 226–229 (1994).
15. Kumada, K., Yanagida, M. & Toda, T. *Mol. Gen. Genet.* **250,** 59–68 (1995).
16. Toda, T., Shimanuki, M. & Yanagida, M. *Genes Dev.* **5,** 60–73 (1991).
17. Chin, K.-V., Ueda, K., Tastan, I. & Gottesman, M. M. *Science* **255,** 459–462 (1992).
18. Uchiumi, T. *et al. FEBS Lett.* **326,** 11–16 (1993).
19. Hibi, M., Lin, A., Smeal, T., Minden, A. & Karin, M. *Genes Dev.* **7,** 2135–2148 (1993).
20. van Dam, H. *et al. EMBO J.* **14,** 1798–1811 (1995).
21. Chan, S. K., Jaffe, L., Capovilla, M., Botas, J. & Mann, R. S. *Cell* **78,** 603–615 (1994).
22. van Dijk, M. A. & Murre, C. *Cell* **78,** 617–624 (1994).
23. Bartel, P. L., Chien, C. T., Sternglanz, R. & Feilds, S. in *Cellular Interactions in Developments: A Practical Approach* (ed. Hartley, D. A.) 153–179 (Oxford Univ. Press, Oxford, 1993).
24. Angel, P., Smeal, T., Meek, J. & Karin, M. *New Biol.* **1,** 35–43 (1989).
25. Guarente, L. *Methods Enzymol.* **101,** 181–191 (1983).
26. Cavigelli, M., Dolfi, F., Claret, F. X. & Karin, M. *EMBO J.* **14,** 5957–5964 (1995).
27. Claret, F. X., Antakly, T., Karin, M. & Saatcioglu, F. *Mol. Cell. Biol.* **16,** 219–227 (1996).
28. Su, B. *et al. Cell* **77,** 727–736 (1994).
29. Moreno, S., Klar, A. & Nurse, P. *Methods Enzymol.* **194,** 795–823 (1991).
30. Ito, H., Fukuda, Y., Murata, K. & Kimura, A. *J. Bacteriol.* **153,** 163–168 (1983).

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CORRESPONDENCE and requests for materials should be addressed to M.K. (e-mail: palford@ucsd.edu).

ERRATUM

Complex burrows of the mud shrimp *Callianassa truncata* and their geochemical impact in the sea bed

W. Ziebis, S. Forster, M. Huettel & B. B. Jørgensen

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THE e-mail address of the corresponding author (W.Z.) was incorrect. It is: wiebke@postgate.mpi-mm.uni-bremen.de □

CORRECTION

Requirement of mammalian DNA polymerase-β in base-excision repair

Robert W. Sobol, Julie K. Horton, Ralf Kühn, Hua Gu, Rakesh K. Singhal, Rajendra Prasad, Klaus Rajewsky & Samuel H. Wilson

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THE second sentence of the main text should read: "When bred, these mice fail to produce offspring that are homozygous for the β-pol deletion mutation, and embryos harbouring the homozygous deletion mutation are present at day 10.5 of gestation in the expected mendelian ratios". □