B destructive

DIFFERENT functions may have been found for the two mitotic cyclins, A and B, both of which activate p34^{cdc2} protein kinase to drive eukaryotic cells through their division cycle. The only clear distinctions between the two have been their kinetics of accumulation and destruction, and their different cellular locations during the cell cycle. F. C. Luca *et al.* (*EMBO J.* **10**, 4311–4320; 1991) now show, in an assay using lysed clam cells, that although truncated versions of both cyclins activate protein kinase activity, only truncated cyclin B can activate the pathway responsible for destruction of full-length, endogenous cyclins. This is not the first claim to have shown functional differences; but the implication of this work *in vitro* is that cyclin B is solely responsible *in vivo* for the activation of cyclin destruction, a process which has to occur before cells can finish mitosis and start the next cell cycle.

Singular work

MICROELECTRONICS normally refers simply to very small electronic devices, but might it be better applied to the new circuit of H. Pothier *et al.* (*Europhys. Lett.* **17**, 249–254; 1992) which shunts around individual electrons? Pothier and colleagues first showed that it is possible to handle electrons individually, rather than in countless and undistinguished millions, two years ago when they developed a turnstile that allows electrons to pass through one by one. Their new electron pump, which can move charge in either direction, pulls an electron in at one terminal and ejects it at the other. Like the turnstile, the pump works because once an electron is inside it, its Coulomb repulsion repels any further electrons; unlike the turnstile, the pump (which is just a few micrometres across) can also work with superconducting Cooper pairs of electrons if cooled enough, the authors believe.

In a twist

THEORIES to explain the force-generating properties of muscle are rarely as engaging as that put forward by C. Schutt and U. Lindberg (*Proc. natn. Acad. Sci. U. S. A.* **89**, 319–323; 1992). The authors propose that segments of actin filaments contract, pulling on tropomyosin (a helical molecule wrapped round actin) which transmits the summed force to the Z-line of the muscle's sarcomere. Myosin crossbridges (more usually assigned the responsibility of generating force) induce the changes in length of the actin segments and bear the tension of the contracting segments. The evidence for this unconventional scheme originates from the observation of actin 'ribbons', which Schutt and Lindberg believe are the untwisted, extended form of actin.

Such basins occur with a regularity that reflects the regional geology — the survey showed that westward-tilted fault blocks are associated with older sediments exposed on their eastern side, and it predicted that more recent sediments would cover the west-central basin area.

Of particular interest was the identification of pre-Pleistocene sedimentary strata, and the location of further outcrops of the Chorora beds (fossiliferous upper Miocene diatomites) was the key to the team's strategy. The weathered Chorora exposures have a characteristic thematic mapping reflectance pattern, which allowed the scientists to locate hitherto unidentified exposures of Chorora beds and led them to concentrate on the Kesem–Kabena basin (top right of the map). The basin is north of Lake Koka in the Awash river system, towards the Afar depression, and is upstream of the well-known sites of Hadar and the Middle Awash.

The next step was just that — to survey the Kesem–Kabena area by vehicle and on foot. From the remote sensing information it seemed that Plio-Pleistocene strata should be exposed along the fault bordering the northwestern limits of the basin, and this is where the search was concentrated. In the event, several sites were located by ground-based transects. In one locality (K-K1), Pliocene vertebrate fossils are abundant and the fossiliferous sediments are likely to be older than 2.3 million years (Myr). Two others (K-K6 and K-K4) are more recent (1.0 Myr) and include rich assemblages of Acheulian artefacts as well as vertebrate fossils[3].

Early hominid teeth

As well as surveys in the Awash river system, the inventory project's 1989 field season took in the south of Ethiopia; here the potential of the Fejej area became clear[4]. The tuff-correlation studies of Brown and his colleagues[5,6] had already shown that the Omo, Koobi Fora and West Turkana fossil sites all sample sediments that are derived from a single lake basin and its associated river systems.

The Fejej group of sites is located in the last relatively unexplored portion of the basin, its northeast quadrant. In 1990 the area was prospected by a team with members from the State University of New York at Stony Book, University of California, Los Angeles, and the US Geological Survey. Among the fossils recovered by Fleagle and colleagues[1] from below the early Pliocene Harr Basalt at site FJ-4 are specimens of early hominid teeth. They clearly resemble the dental remains of *A. afarensis* found at Hadar[7] and Laetoli[8]. Their morphology is unsurprising, but they confirm the presence of *A. afarensis* in the Omo regional deposits and the $^{40}Ar/^{39}Ar$ dates from an overlying basalt suggest that the Fejej hominid remains are at least as old as those from Laetoli (3.6–3.7 Myr) and maybe up to 0.7 Myr older.

Moratorium lifted

Doubtless encouraged by the success of the inventory project, in 1990 the Ethiopian authorities lifted the eight-year moratorium on palaeoanthropological field research. Two research groups returned to familiar territory, the team from the Institute of Human Origins (Johanson, Kumbel *et al.*) to the Hadar site and the University of California, Berkeley team (Clark, White *et al.*) to the Middle Awash. Both have come up with further palaeontological and archaeological evidence for early occupation. The 15 new hominids recovered from Hadar include cranial, mandibular and postcranial remains.

Hominid palaeontologists are eagerly awaiting details of this new evidence, for it will be the first real test of the 'single-species' hypothesis as it has come to be applied to the Pliocene hominids which have been recovered from Ethiopia, Tanzania and elsewhere in East Africa. Most, but not all, recent studies of the Hadar and Laetoli remains have concluded that the collections sample a single, highly, but not excessively, dimorphic early hominid[9,10]. Such a hypothesis implies that both the degree and pattern of variation within *A. afarensis* should be consistent with that predicted by a combination of comparative and phylogenetic analysis. At present we are better able to predict what this means for the cranium, mandible and the dentition[11] than for the postcranial skeleton. But studies in progress should provide the necessary background data, and we shall soon be equipped to make a precise expression of the probability that one, or more, species are represented within the Ethiopian evidence. □

Bernard Wood is in the Department of Human Anatomy and Cell Biology, University of Liverpool, Liverpool L69 3BX, UK.

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