

small natural perforation has been observed in individuals of *Tarsius*, *Macaca*, *Cercopithecus* and *Papio*^{2,3}. Obviously, the trait by itself is no indicator of phylogenetic relationship. Should the interorbital aperture of the Oligocene *Dolichocebus* skull still prove to be natural and as large as represented by Rosenberger¹, it is unlikely that it would have persisted through 25 Myr of descent to reappear unchanged in the grossly different *Saimiri* skull.

The second shared characteristic mentioned by Rosenberger was the "great anteroposterior length of the frontal interorbital process, unique to these species [*Dolichocebus gaimanensis* and *Saimiri sciureus*]"¹. However, measurements are not given. Actually, the interorbital bones of *Dolichocebus* are shattered, the sutures untraceable, with size and osseous relationships of the frontal interorbital process absolutely indeterminate.

Narrow nasals, another apparently "shared" characteristic¹, are, in fact, shared with many primate species, while "Reduced petromastoids" is, again, a bald assertion.

A prominent and impressive feature of Rosenberger's article is his "reconstruction" of the right side of the *Dolichocebus* skull. Cranial contour, angles and curves of the reconstruction, however, are not those of the fossil, which actually appears undistorted in right lateral view¹. Also, size of anatomical details such as auditory meatus, right orbit (compared with intact left of fossil) and teeth is not that of corresponding features of *Dolichocebus*. Comparative size of cheek teeth is $pm^2 < pm^3 < pm^4$ in *Dolichocebus* (Fig. 2) but $pm^2 > pm^3 \leq pm^4$ in the reconstruction¹. Incisors and their alveoli are entirely lost in *Dolichocebus* but the dental arcade must have been V-shaped (Fig. 2). Contour of the projecting *Saimiri*-like incisors shown in the reconstruction is that of a U-shaped arcade.

The remainder of Rosenberger's article deals with "several indications that the masticatory system of *Dolichocebus* was rather lightly built". The "indications" include a description of the form and function of masticatory muscles recreated from traces of bones, absent bones and a barely discernible right temporal line. The not completely erupted right canine tooth of the unappreciated dental system, however, indicates a young animal. With sexually dimorphic monkeys like *Cebus apella* in mind, the likelihood of a heavy masticatory system in a mature male *Dolichocebus* cannot be discounted³.

Passed over by Rosenberger in his discussion of the masticatory system is the *Dolichocebus* dentition represented by stubs of canines and cheek teeth (Fig. 2). The sheared surfaces are measurable and reflect the occlusal pattern. Most striking is the antero-posterior narrowness of the teeth and their progressive transverse expansion from canine (2.5 mm) to first

molar (6.3 mm) or >2.5 times, and from first premolar (2.9 mm) to first molar or nearly 2.2 times.

The expanding gradient is characteristic of zalambdomorphic-dilambdomorphic tooth rows as in 'insectivores' *Nesophontes*, *Potomogale*³ or *Palaeoryctes* (Fig. 2) but not in primates³. In a *Saimiri* skull of the same size (Fig. 2), increase in tooth-row width measured across the alveoli from canine (2.5) to first molar (3.6) is slightly >1.4 times, and from first premolar (2.9) to first molar, nearly 1.3 times or roughly average for the more nearly parallel-sided eutherian tooth rows of platyrrhines³. The longer alveolar length in *Dolichocebus* ($c-m^2 = 17.6$) as compared with that of *Saimiri* (14.1, Fig. 2) reflects the greater dolichocephaly. Evidently, cranial form and dental system of *Dolichocebus* had already diverged widely from those of other known primates extant or extinct.

Other features not mentioned also point to the isolated position of *Dolichocebus* among known primates. They are discussed and illustrated elsewhere (P.H., in preparation). It appears, nevertheless, that Rosenberger's attribution of close relationship between *Dolichocebus* and *Saimiri* is dependent on an equivocal character which even if proven valid would not support the claim.

PHILIP HERSHKOVITZ

Field Museum of Natural History,
Chicago, Illinois 60605, USA

1. Rosenberger, A. *Nature* **279**, 417-418 (1979).
2. Haines, R. W. *J. Linn. Soc.* **41**, 585-607 (1950).
3. Hershkovitz, P. *Living New World Monkeys (Platyrrhini)* Vol. 1, 137, 135-142, 152, 233, 282 (University of Chicago Press, 1977).
4. Van Valen, L. *Bull. Am. Mus. nat. Hist.* **132**, Pl. 6, Fig. 1 (1966).

ROSENBERGER REPLIES—On the advice of the referee, I deleted the following technical comment from the final manuscript¹: Cleaning of the matrix which filled the orbits of *Dolichocebus* was facilitated by periodically examining the skull under UV light. This fluoresced fossilized bone and differentiated it from exogenous material, therefore lessening the chance of damaging the specimen. After consultation with preparators and palaeontologists, I decided that it would be prudent to leave a small fenestra-like gap in the middle of the matrix sheet which closed the space between the orbits, thus protecting the true perimeter of the fenestra. This preserved its original appearance near the orbital apex. Further discussion of *Dolichocebus*, including a metrical demonstration of its uniquely narrowed interorbital process, is presented elsewhere². Note, however, that the pinching and lengthening of the process are patterned attributes correlated with closure of the interorbital sinus. Among living platyrrhines, the combination is seen only in *Saimiri*, which has further

persuaded me that a fenestrated condition was, and still is, the most likely interpretation for the fossil.

The other points raised by Hershkovitz do not require discussion. However, a contrary scientific opinion carries the burden of providing supporting evidence for an alternative solution. If the unfolding of platyrrhine evolution conformed to the darwinian axiom of 'propinquity of descent', does not *Dolichocebus* have to have close living relatives?

A. L. ROSENBERGER

Department of Anthropology,
University of Illinois at Chicago Circle,
Chicago, Illinois 60680, USA

1. Rosenberger, A. L. *Nature* **279**, 417-418 (1979).
2. Rosenberger, A. L. & Fleagle, J. G. *Anais do II Congresso Latino-Americano de Paleontologia* Vol. 2, 537-551 (Universid, 1981); in *Morphologie Evolutive, Morphogenese du Crane et Anthropogenese* (ed. Sakka, M.) (in preparation).

Effect of cytochalasin D on thrombin-induced actin filaments in platelets

IN a recent letter¹ it was shown that cytochalasin D inhibits and reverses the formation of thrombin-induced actin filaments in platelets. It was noted also that SDS-polyacrylamide gels of reduced samples of Triton-insoluble residue from thrombin-treated platelets showed additional protein bands having molecular weights (M_r) of 51,000 and 54,000—it was suggested that these bands were tubulin. Later exchange of information between our two groups led all of us to conclude that these bands are probably reduced chains of fibrinogen or its derivatives, formed by the action of thrombin on platelet fibrinogen. An additional fibrinogen-derived band of M_r 66,000 seems to have been obscured by the bovine serum albumin added to the platelet suspension medium.

Further experimental work to confirm these conclusions is now in progress, but we wish to draw attention to this observation. We also emphasize that this finding in no way affects the main observations and conclusions of the original letter.

N. C. MASIELLO
M. B. ZUCKER

Department of Pathology,
New York University
Medical Center,
New York, New York 10016, USA

J. F. CASELLA
M. D. FLANAGAN
S. LIN

Department of Biophysics,
The Johns Hopkins University,
Baltimore, Maryland 21218, USA

1. Casella, J. F., Flanagan, M. D. & Lin, S. *Nature* **293**, 302-305 (1981).