BIOLOGICAL SCIENCES

Colour Change in the Marsupial Tiger Cat

THE marsupial tiger cat, *Dasyurus maculatus* (Kerr), is found over a wide range of continental Australia as well as in Tasmania. Several of these animals have been marked and released incidental to a study of the related Tasmanian devil. The study area is at Granville Harbour on the west coast of Tasmania (41° 15′ S, 145° 05′ E) and contains a wide variety of habitats from dunes through cleared land and scrub to wet sclerophyll forest.

The history of one individual marsupial tiger cat is of particular note. A male was captured as a juvenile (body weight 1·75 pounds) at Conical Point, 11 miles from Granville, on December 11, 1966. It was trapped again on November 19, 1967, about 55 miles from Granville (body weight 5·5 pounds) and yet again on October 27, 1968, at Granville (body weight 7·5 pounds). When first captured, the animal had been leading an independent life for about 12 months and was probably 18 months old; it was about 3·5years old at final capture.

Detailed mov cments between 1966 and 1968 are not known, but the overall distance travelled between first and last capture (11 miles) is considerable for a small mammal and this furnished a base for programming a detailed study of its movements.

The most remarkable feature was a colour change in the individual. The general body colour of the animal was dark brown when it was captured in 1966 and again in 1967, and this is the normal colour phase for the area. In 1968 the brown colour had been replaced by black with the exception of the head, neck, throat, chest and between the shoulders. The black phase has not previously been reported in this species and must be regarded as rare. Indeed, this is the first example of a colour change in the marsupials.

The late development of the colour is puzzling. It is clearly not seasonal in nature, for the animal was caught at about the same time each year and this type of change s not known in the marsupials.

The development of the colour might be related to the sexual maturity of the individual, but this seems unlikely because marsupials are known to mature at an early age. Such a change would in any event have been observed previously in zoological collections. It would be most surprising if the colour change were developmental in nature, for the related native cat, *Dasyurus quoll* (Zimmerman), which has a more common black phase, shows this colour from the first appearance of the pelage and this is the normal pattern for those marsupials which exhibit not only black but also other colour phases.

It is also possible that the colour change is related to the nutritional status of the individual, and various intriguing possibilities come to mind, such as copper deficiency acting as an inhibitor of melanin during the early life of this particular animal. We hope to recapture this animal again in the future.

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Lactose Intolerance in Thailand

McGILLIVRAY[1] has suggested that lactose intolerance in Asians is limited to "selected groups of adult students in unfamiliar surroundings" (studying abroad) and that it is "a rare condition which must be seen against the background of malnutrition".

We have recently conducted lactose tolerance tests in 114 healthy, well nourished individuals in northern Thailand. Nine Caucasians (controls) had rises in "blood sugar" (determined in duplicate by two separate methods[2,3]) of 23 to 62 mg per cent (mean 41·3 mg per cent) 30 min after a single oral dose of 1 g of lactose/kg body weight following an overnight fast. This is in accord with the results of others[4]. In seventy-five adult Thai subjects the mean change of "blood sugar" in the same conditions was +2·2 mg per cent (range −9 to +19 mg per cent). Fourteen of these individuals were dairy workers who had consumed milk in amounts of 200–300 ml. at a time regularly for several years. In this group the mean change of "blood sugar" was 0 with a range from −5 to +8 mg per cent. Seventy-three of the seventy-five adults developed symptoms after the administration so lactose: three reported only abdominal pain and gasconf distension; and in seventy, diarrhoea ranging from two to twelve watery movements also occurred. In a group of thirty-seven children aged from 2 to 12 years the mean change of "blood sugar" was +10·0 mg per cent (range −12 to +60 mg per cent). Values above 20 mg per cent (indicative of presumably normal lactase activity) were observed in only six of thirteen children under the age of 4 years. In the twenty-four children more than 4 years old the mean change of "blood sugar" was +4·8 mg per cent (range −12 to +14 mg per cent). Two children, aged 9 and 11 years, who had taken cow's milk daily since weaning had rises of 12 and 10 mg per cent. Both developed diarrhoea, although their dose of lactose corresponded to only 500 ml. of cow's milk. Nine of twelve unselected children also developed diarrhoea, with from one to four watery movements.

We draw the following conclusions from this study: (1) Lactose intolerance is widespread in the population of northern Thailand. A similarly high prevalence is to be expected in other south-east Asian populations. (2) The ability to metabolize lactose (implying normal intestinal lactase activity) which must be present during infancy disappears between the ages of 1 and 4 years in most individuals in northern Thailand. (3) There is no evidence that lactose intolerance is related to malnutrition. It seems unlikely that malnutrition would affect intestinal lactase selectively. Normal sucrose metabolism, found in sixteen subjects with lactose intolerance, is evidence against unspecific damage to the intestinal mucosa. (4) It seems that lactase activity, once lost, cannot be induced by the intake of lactose in the form of cow's milk, and it is unlikely that it can be maintained beyond early childhood by continuing a diet rich in milk. (5) Lactase deficiency leading to lactose intolerance is probably genetically determined. The data on the distribution of lactose intolerance support the contention that most humans are lactase deficient after infancy, and that the prevalence of lactose tolerance in Caucasians is a selective adaptation to a high intake of milk over many generations.

The fact that a certain amount of lactose or food containing lactose is tolerated by subjects with presumptive lactase deficiency is easily explained by assuming that diarrhoea induced by lactose is dependent on the dose. The somewhat greater tolerance in children, as compared with adults, may be attributable to a slightly higher residual lactase activity, but also to the larger capacity of the intestines relative to body weight. The absence of lactase induction is supported not only by the test results in dairy workers and children with regular intake of milk: small amounts of lactose in the form of condensed milk mixed with tea or coffee (3 to 4 g of lactose per cup) are