Plasma Cholesterol Levels in Free-ranging Macaques Compared with Captive Macaques and Humans

AKIKO TAKENAKA, YUKO MATSUMOTO,
AIKA NAGAYA, *Nagoya Bunri College*
KUNIO WATANABE, SHUNJI GOTO, *Kyoto University*
BAMBANG SURYOBROTO, *Bogor Agricultural University*
and OSAMU TAKENAKA, *Kyoto University*

ABSTRACT. Plasma total cholesterol in free-ranging Japanese macaques (*Macaca fuscata*) on Koshima islet and in free-ranging long-tailed macaques (*Macaca fascicularis*) at Pangandaran in Indonesia was found to occur at very low levels compared with captive macaques and humans. Although total cholesterol levels in captive macaques were lower than humans, differences in HDL cholesterol levels were only small. In both sexes of wild and captive Japanese macaques, total cholesterol levels decreased from birth through to young adulthood but then increased in adult females of the captive group. In contrast, the value for adult females of the wild troop remained at a low level. Low TCH levels in adult females of the wild Japanese macaque troop may be due to a low energy intake and may have caused a delay in the onset of sexual maturation. Plasma TCH levels increased with the addition of 0.1% dietary cholesterol over six weeks in captive long-tailed macaques. That the cholesterol value after six weeks was dependent on cholesterol levels prior to supplementation indicates that captive macaques are slightly saturated with cholesterol.

Key Words: Total cholesterol; HDL; LDL; Free-ranging macaques; Captive macaques.

INTRODUCTION

In humans, the rate of cardiovascular disease rises with increased uptake of dietary lipid content, due to an elevation in plasma cholesterol levels. The frequency of hypercholesterolemia caused by a heterozygous mutation of the LDL receptor gene in humans has been reported as 1/500 (GOLDSTEIN & BROWN, 1983). Assuming non-human free-ranging primates do not consume as much fat as humans, the mutation rate of hypercholesterolemia will presumably be maintained because the low intake of fat will not cause an increase in plasma cholesterol levels, and mortality due to coronary artery disease will stay small. IWAMOTO investigated the energy and crude fat intake of Japanese macaques on Koshima islet over the course of a year (IWAMOTO, 1982, 1997) and found that crude fat accounted for 29.6% of the total energy intake in autumn (October and November), but only 9.3% in winter. Averaged over the year, crude fat accounted for 17% of total energy intake. Although plasma cholesterol levels in laboratory primates have been studied by incorporating several kinds of fatty acids into dietary oil, to date, there has been no data about the cholesterol levels of free-ranging primates. In the present paper, the plasma total cholesterol (TCH), HDL cholesterol (HDL) and triglyceride (TG) levels in free-ranging Japanese macaques (*Macaca fuscata*) and long-tailed macaques (*Macaca fascicularis*) were measured, and compared with those of captive macaques and humans.