
Abstract

BACKGROUND:
More than 500 enzymes need niacin coenzymes. Therefore, elucidation of the control mechanisms of coenzyme metabolism is fundamentally important.

OBJECTIVE:
NAD(+) is involved in ATP production. Because energy expenditure is generally higher during the day than at night, we investigated whether the metabolism of nicotinamide changes at various times of day and whether stress affects nicotinamide metabolism.

DESIGN:
Twelve women were housed in the same facility and followed the same schedule for activities of daily living for 12 d. Urinary outputs were collected during 5 specific periods to investigate diurnal variations in nicotinamide metabolism. The effects of cold exposure (physical stress), having to perform arithmetic calculations (mental stress), and dark exposure (emotional stress) on nicotinamide metabolism were investigated.

RESULTS:
A diurnal variation in the nicotinamide metabolites N(1)-methylnicotinamide, N(1)-methyl-2-pyridone-5-carboxamide, and N(1)-methyl-4-pyridone-3-carboxamide was observed. Of the stresses studied, cold exposure significantly increased the urinary excretory outputs of the nicotinamide metabolites.

CONCLUSIONS:
Diurnal variations in nicotinamide metabolism were found in these women. The biosynthesis of nicotinamide from tryptophan seemed to be increased by cold exposure.