Eur. J. Clin. Chem. Clin. Biochem.
Vol. 31, 1993, pp. 765–771

Blood Plasma Pseudouridine in Patients with Malignant Proliferative Diseases[1])

By *T. Motyl*[1], *Zdzislawa Traczyk*[2], *Sławomira Cieśluk*[2], *Dorota Daniewska-Michalska*[3], *Wanda Kukulska*[1], *Z. Kałużny*[2], *Małgorzata Podgurniak*[1], *A. Orzechowski*[1] and *B. Dębski*[4]

[1] *Department of Animal Physiology, Faculty of Veterinary Medicine, Warsaw Agricultural University, Warsaw, Poland*
[2] *IVth Division of Internal Medicine, Central Clinical Hospital, Warsaw, Poland*
[3] *Department of Internal Medicine, Central Hospital of Medical School, Warsaw, Poland*
[4] *Department of Biochemistry, Faculty of Veterinary Medicine, Warsaw Agricultural University, Warsaw, Poland*

(Received March 2/July 8, 1993)

Summary: The blood plasma concentration of pseudouridine was estimated in 104 healthy adult subjects, and 108 patients suffering from malignant proliferative diseases. The HPLC method for simultaneous determination of pseudouridine and creatinine was applied.

The average physiological concentration of pseudouridine in blood plasma was 2.43 ± 0.97 $\mu mol \cdot l^{-1}$ or 29.15 ± 7.40 $mmol \cdot mol^{-1}$ creatinine. The physiological urinary excretion of pseudouridine was 14.32 ± 5.20 $\mu mol \cdot 24\,h^{-1} \cdot kg^{-0.75}$ or 19.60 ± 5.22 $mmol \cdot mol^{-1}$ creatinine. Renal clearance of pseudouridine and endogenous creatinine were 4.04 ± 0.99 and 5.50 ± 1.46 $ml \cdot kg^{-0.75}$, respectively. A positive correlation ($r = 0.55$, $P < 0.01$) was found between age (in the range 20–92 years) and blood plasma pseudouridine concentration ($\mu mol \cdot l^{-1}$). By expressing plasma pseudouridine in relation to plasma creatinine, the apparent influence of non-metabolic factors (age, renal insufficiency, blood dilution) on the plasma pseudouridine concentration were largely excluded.

Among haematological proliferative diseases the highest values of plasma pseudouridine concentrations were observed in chronic lymphocytic leukaemia (8.19 $\mu mol \cdot l^{-1}$; 54.9 $mmol \cdot mol^{-1}$ creatinine) and multiple myeloma (7.02 $\mu mol \cdot l^{-1}$; 52.5 $mmol \cdot mol^{-1}$ creatinine). In multiple myeloma, but not in chronic lymphocytic leukaemia, the plasma pseudouridine concentration depended on the clinical stage. A lower, but still significant response in non-*Hodgkin*'s lymphoma was noted (4.03 $\mu mol \cdot l^{-1}$; 40.88 $mmol \cdot mol^{-1}$ creatinine).

A significant increase of the plasma pseudouridine concentration was characteristic of adenocarcinomas of the large intestine, and it occurred in the early stages of malignant growth. In patients with lung cancer the plasma pseudouridine concentration was elevated only in advanced cases with metastases. The increased pseudouridine concentration was evident in all examined cancers of the urogenital system: cancer of the urinary bladder, cancer of the kidney, cancer of the prostate, and cancer of the testis.

It is concluded that the determination of pseudouridine in blood plasma, particularly in relation to creatinine, is a valuable biochemical marker of accelerated turnover rate of nucleic acids associated with neoplastic growth.

[1]) This study was supported by a grant from the Ministry of National Education.