Zusammenfassung

Täglich lokal verabreichte eiweissfreie Fraktionen des hypothalamischen Extraktes zu adenohypophysären Autotransplantaten in die vordere Augenkammer hypophysektomierter Ratten hemmte die Schilddrüseninvolution und stimulierte möglicherweise den Vorgang bei Nebenniere, Hoden und Samenbläschen.

The Urinary Excretion of Noradrenaline and Adrenaline during Acute Alcohol Intoxication in Alcoholic Addicts

High urinary excretion of noradrenaline and adrenaline has been reported[1] in the course of delirium tremens and allied conditions. There was no correlation between the catecholamine output and the intensity of single clinical symptoms, with the presence or absence of ethyl alcohol or drugs in the blood, or with the laboratory findings other than blood pressure and pulse rate. In patients with syndrome B[2], however, the excretion of urinary catecholamines had a definite tendency to fall immediately after the disappearence of the blood alcohol. Therefore it was of interest to investigate, whether or not the presence of alcohol in the blood of alcohol addicts is accompanied by increased excretion of urinary noradrenaline and adrenaline independent of the above-mentioned syndromes.

Material and Method. 16 male alcoholic patients showing no acute signs of alcoholic syndromes were used as test subjects at least one week after recovery. Eight patients consumed brandy or wine, and eight other patients received intravenous infusions of ethyl alcohol 25 vol.% in Ringer solution, on an average 2.3 g/kg within ca. 5 h. The blood alcohol concentrations were determined with the method of WIDMARK[4] in all cases. The peak level varied between 1.5‰ and 3.3‰. The urinary catecholamines were determined in 24 h collections before, during and after alcohol uptake by the method of EULER and LISHAJKO[5].

Results. There was no statistical difference between the excretion of urinary noradrenaline and adrenaline in convalescent alcoholic addicts before, during, and after ethyl alcohol administration, and that of 12 healty persons[1] (Table). In no case following induced alcohol intoxication could the neurological symptoms of syndrome B be detected.

	Healthy persons	Convalescent alcoholic addicts		
		day before experiment	day of experiment	day after experiment
Noradrenaline µg/24 h	18.0±6.9	16.9±7.8	17.3±6.9	17.0±5.7
Adrenaline µg/24 h	6.4±3.1	8.2±4.4	7.6±2.7	8.1±2.8

Urinary excretion of catecholamines in convalescent alcoholic addicts before and after acute alcohol administration.

Discussion. The 24-h excretion of urinary catecholamines in alcohol convalescents showed no alteration when compared with the values of healthy subjects[1]. Ethyl alcohol administered during a short period neither increased the urinary excretion of noradrenaline and adrenaline nor did it induce the picture of syndrome B in these subjects, even if the doses were as high as 2,3 g/kg intravenously. The increase of urinary catecholamines occurring in acute alcohol intoxications together with SB in alcohol addicts[1], seems therefore to be connected with a longer lasting abuse of ethyl alcohol than was the case in our experiments. It is evidently not dependent on the immediate effect of alcohol on the organism but on some factors developing in the course of SB and alcohol hallucinoses. In this connection, it is of interest that alcohol given intravenously in two patients during delirium tremens and SB respectively, did not influence the patterns of the urinary excretion of catecholamines.

The excretion rate of urinary noradrenaline and adrenaline during the 5-h infusion period was found to be in the range of normal diurnal variations reported by EULER and LISHAJKO[5]. Since, in our experiments, the catecholamines were not measured in shorter periods, a slight transient increase such as that shown by other authors[6-8] may have escaped notice.

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Beckomberga Hospital, Stockholm-Bromma and Karolinska Institutet, Department of Physiology, Stockholm (Sweden), March 24, 1960.

Zusammenfassung

Die Katecholaminausscheidung im 24-h-Urin rekonvaleszenter Alkoholpatienten wird durch einzelne Äthylalkoholdosen (2,3 g/kg) nicht beeinflusst.

[1] E. GIACOBINI, S. IZIKOWITZ, and A. WEGMANN, A.M.A. J. gen. Psych., in press (1960).

[2] Syndrome B (SB) is the most frequent acute state following an intense or long lasting alcohol or drug abuse. It is characterized by anxiety, tremor, vasomotoric reactions, hyperhidrosis, sleep disturbances, and anorexia, but without disorientation or hallucinations (for nomenclature see IZIKOWITZ[3]).

[3] S. IZIKOWITZ, Nord. Med. *60*, 1009 (1958).

[4] E. M. P. WIDMARK, Biochem. Z. *131*, 473 (1922).

[5] U. S. v. EULER and F. LISHAJKO, Acta physiol. scand. *45*, 122 (1958).

[6] E. S. PERMAN, Acta physiol. scand. *44*, 241 (1958).

[7] I. ABELIN, CH. HERREN, and W. BERLI, Helv. med. Acta *25*, 591 (1958).

[8] G. I. KLINGMAN and M. GOODALL, J. Pharmacol. *121*, 313 (1957).

PRO EXPERIMENTIS

An Ultra-High Vacuum System Using an Oil-Diffusion Pump with a Non-Refrigerated Isolation Trap[1]

We found that an oil-diffusion pump with a modified Biondi trap[2] charged with activated alumina was very satisfactory in continuously maintaining ultra-high vacuum for periods of several months. The trap did not require refrigeration and the activated alumina beads could be reconditioned by bakeout. Because of the high conduct-

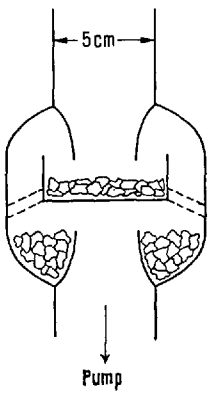
[1] This work was done for the Lawrence Radiation Laboratory at Livermore, California, under the auspices of the Atomic Energy Commission.

[2] M. A. BIONDI, Rev. Sci. instr. *30*, 831 (1959).

ances of our water baffle and isolation trap the pumping speed was very high. The level of impurities in our all-glass system was negligible.

Mercury diffusion pumps have been successfully used for obtaining ultra-high vacuum (10^{-9} to 10^{-10} mm Hg) by trapping the backflowing mercury vapors in liquid nitrogen-cooled isolation traps. Such pumping systems have previously been employed in investigations on the interaction of gases with metals (BECKER[3], EISINGER[4], KISLIUK[5], HICKMOTT[6], and EHRLICH[7]). In our studies gases were adsorbed on the surfaces of metal ribbons, and the pressure changes in the systems were monitored with ion gauges. The amounts of adsorbed gases were determined by flashheating the metal ribbons and recording the resulting desorption pressure peaks.

The use of a mercury diffusion pump always presents the danger of mercury contamination with the consequent difficulty of reconditioning the system. In studying the interaction of hydrogen and of nitrogen with molybdenum in the dynamic system, we used a three-stage glass oil diffusion pump. After some preliminary tests with a liquid nitrogen-cooled isolation trap for preventing oil vapors from entering the system, BIONDI's non-refrigerated high-speed isolation trap was brought to our attention. As it appeared to offer great advantages, we adapted his design to our system (Fig.); we used 8 mesh activated alumina beads (Alcoa, grade F-1) as the trapping material. In addition, a high conductance water baffle was inserted between the pump and the isolation trap. Pumping speeds were obtained, on the low pressure side of the trap, of 14–24 l/sec for hydrogen in the pressure range of 1×10^{-8} to 5×10^{-6} mm Hg. This compares very well with the rated pumping speed of the oil diffusion pump which is quoted by the manufacturer as 25 l of air/s at the pump casing.



Isolation Trap

The working unit (total volume 3·3 l) as well as the isolation trap, could be baked at 450°C by swinging a hinged furnace over the system; the water baffle could be separately heated with electrical tape. In a first bakeout, for dehydrating the activated alumina beads, the temperature was slowly and stepwise increased to 450°C in two days, keeping the pressure below 1 μ in the glass system, and at about 10 μ in the foreline. Another two days of baking at 450°C reduced the pressure to below 0·2 μ and 1 μ, respectively, and the heating was discountinued. A base pressure of 5×10^{-10} mm Hg was measured at room temperature after degassing the gauges and rebaking the system at 450°C overnight. When a steady state hydrogen pressure was established in the adsorption cell, no significant amounts of impurities could be detected except after adsorption times of several hours. A discussion of our studies has been submitted for publication elsewhere[8].

We have operated our system continuqusly for a period of more than three months. Even after this interval the activated alumina bead material was still trapping oil vapors efficiently, as indicated by the low level of impurities in the system. However, a bakeout was necessitated by an inadvertent contamination of our unit with air. Ultra-high vacuum was again obtained after baking at 450°C overnight.

We would like to express our appreciation to Mr. N. MILLERON of the Lawrence Radiation Laboratory, Livermore, for this valuable advice and guidance in designing our system.

H. U. D. WIESENDANGER and R. A. PASTERNAK

Stanford Research Institute, Menlo Park (Calif.), May 2, 1960.

Zusammenfassung

Ultrahochvakuum mit Basisdruck von weniger als 5×10^{-10} mm Hg wird routinemässig erzeugt und für mehrere Monate mittels einer Öldiffusionspumpe aufrechterhalten. Eine mit aktivierter Alumina beschickte Isolationsfalle von grossem Querschnitt ist zwischen Pumpe und Glassystem eingesetzt; so wird ohne irgendwelche Kühlung das Zurückströmen von Öldämpfen in die Experimentierapparatur vollkommen verhindert.

[3] J. A. BECKER, *Advances in Catalysis*, Vol. 7 (Academic Press 1955), p. 136.

[4] J. EISINGER, J. chem. Phys. *29*, 1154 (1958).

[5] P. KISLIUK, J. chem. Phys. *30*, 174 (1959).

[6] T. W. HICKMOTT and G. EHRLICH, J. Phys. Chem. Solids *5*, 47 (1958).

[7] G. EHRLICH, J. phys. Chem. *60*, 1388 (1956).

[8] R. A. PASTERNAK and HANS U. D. WIESENDANGER, to be published.

COGITATIONES

Zur Rolle von Schwermetallionen im Wirkungsmechanismus von Strahlenschädigung und Strahlenschutz

Es ist – vor allem von BACQ *et al.*[1] – darauf hingewiesen worden, dass viele strahlenschutzwirksame Substanzen Komplexbildner sind bzw. im Organismus in solche übergeführt werden und dass auch für ausgesprochene Chelatbildner wie Komplexon oder Oxin Strahlenschutzwirkung festgestellt wurde. Dies kann als ein Hinweis dafür angesehen werden, dass an den für die Strahlenschädigung verantwortlichen Reaktionen Metallionen massgeblich beteiligt sind.

Es wird allgemein angenommen, dass diese Schädigungsreaktionen in einem Angriff von OH·- oder OOH·-Radikalen auf noch unbekannte biologische Funktionsträger bestehen und – zum Beispiel über Hydroperoxyde – zu funktionsunfähigen Folgeprodukten führen[2]. Es ist

[1] Z. M. BACQ, A. HERVE und P. FISCHER, Bull. Acad. Méd. Belg. *18*, 226 (1953). – P. ALEXANDER, Z. M. BACQ, S. F. COUSENS, M. FOX, A. HERVE und J. LAZAR, Rad. Res. *2*, 392 (1955).

[2] S. z. B. Z. M. BACQ und P. ALEXANDER, *Grundlagen der Strahlenbiologie* (Stuttgart 1958), p. 73. – R. LATARJET, *Les Peroxydes Organiques en Radiobiologie* (Paris 1958).