changes, etc., treated and control animals responded in an identical fashion.

Of the animals that survived indefinitely, presumably because of accessory cortical tissue, those in the treated group continued to gain weight just as well when the yeast supplement of the diet was discontinued.

Summary. Fifty-nine adrenalectomized rats were fed a high yeast diet and their survival compared to 56 control animals on a stock diet. Reports that there is a factor in yeast (presumably vitamin G) which will extend the lives of adrenalectomized rats were not confirmed. The survival of treated animals was entirely within normal range.

10574 P

Conversion of 1,2,5,6-Dibenzanthracene by Rabbits, Rats, and Mice. Significance in Carcinogenesis of this Conversion.

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Boyland studied chemically the conversion of certain carcinogenic as well as non-carcinogenic compounds.[1, 2] This communication reports a study, by combined chemical and physical methods, of the conversion and excretion of 1,2,5,6-dibenzanthracene by rabbits, rats, and mice. Ether extracts of the urine and feces of injected animals were examined by spectroscopy in the ultraviolet region of the spectrum with the hydrogen discharge tube as a source of light.

Rabbits, rats, and mice were injected subcutaneously or intramuscularly with 2-10 cc of a solution containing 500 mg of pure 1,2,5,6-dibenzanthracene in 100 cc of olive oil. The urine and feces of the injected animals were collected from metabolism cages at intervals of 3 days.

The urines were acidified with HCl and extracted continuously with ether for 48-72 hours. The ether was extracted (1) with 10% Na_2CO_3 solution to separate the acid compounds, and then (2) with a 10% NaOH solution to separate the phenolic compounds. The residual ether contained the neutral compounds. The extracts (1) and (2) were next acidified with HCl, and reëxtracted with ether.

[1] Boyland, E., and Levi, A. A., *Biochem. J.*, 1935, **29**, 2679; 1936, **30**, 728, 1225.

[2] Levi, A. A., and Boyland, E., *J. Soc. Chem. Industry*, 1937, **61**; *Chem. and Industry*, **15**, 446.

The 3 ether solutions were concentrated to a volume of 25 cc each and examined spectroscopically.

The feces were acidified with HCl, mixed with anhydrous Na_2SO_4, ground to a powder, and extracted as were the urines.

1. *Fraction containing ether-soluble, acid substances.* Feces and Urine: This fraction from injected rabbits, rats, and mice gives no absorption which suggests the presence of acid conversion products of dibenzanthracene.

2. *Fraction containing ether-soluble, phenolic substances.* Feces and Urine; Rabbits: This fraction from rabbits injected with dibenzanthracene gives a group of absorption bands not given by similar fractions from the excreta of normal rabbits, and not in the positions of the bands given by dibenzanthracene.

Feces and Urine; Rats and Mice: This fraction from injected rats and from mice gives identical absorption bands. They do not resemble those of dibenzanthracene and are not given by a similar fraction from normal rats and mice. Traces of similar bands are given by the urine of injected rats and mice.

The positions of the absorption bands in this fraction from injected rats and mice differ from those of the bands given by a similar fraction from injected rabbits. This suggests that dibenzanthracene is metabolized differently in different species. The presence of bands in a fraction designed to contain phenolic compounds suggests the presence of a phenolic derivative of dibenzanthracene.

3. *Fraction containing ether-soluble, neutral substances.* Feces: Absorption bands are given by this fraction from injected rats, mice, and *rarely* from rabbits. Their positions are similar to those of the bands given by an ethereal solution of dibenzanthracene. No bands suggest the presence of any neutral conversion product of dibenzanthracene.

Urine: No bands are given by this fraction from injected rabbits in positions similar to those of dibenzanthracene. No indication of the presence of any neutral conversion product of dibenzanthracene has been found. A similar extract from injected rats and mice occasionally gives the absorption bands of dibenzanthracene, but this finding is probably an artefact.

To isolate the phenolic conversion product of dibenzanthracene a large number of rabbits and rats were injected weekly with that compound. The ether-soluble phenolic material was isolated from the excreta, freed from contaminants by high vacuum distillation, and further purified. From the rabbits about 70 mg of a crystalline material* and from the rats about 5 mg of a uniform, fairly pure

* Dr. Boyland kindly supplied an absorption curve of dibenzanthracene deriva-

material was obtained. This crystalline material obtained from rabbits has proved to be non-carcinogenic for 9 mice that have been under observation 6 months after injection. Nine litter-mate controls injected with the same amount of dibenzanthracene have developed tumors. This observation suggests that in certain animals an immunity to carcinogenesis by chemicals depends upon the ability to convert the carcinogen from a neutral to a phenolic compound.

Summary. From the extracts of excreta of rabbits, rats, and mice injected with 1,2,5,6-dibenzanthracene, substances of a phenolic nature were isolated which are considered to be conversion products of dibenzanthracene. The substance isolated from injected rabbits was non-carcinogenic and gave absorption bands different from those of the substance obtained from injected rats and mice. This fact suggests that different species metabolize dibenzanthracene differently. The absorption bands of unchanged dibenzanthracene were present in the fraction containing neutral compounds of feces of injected rats, mice, and *rarely* of rabbits.

10575 P

A "Sulfapyridine-Fast" Strain of Pneumococcus Type I.

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Sulfapyridine exerts *in vitro* a bacteriostatic effect on the pneumococcus under aërobic conditions. It was of interest to determine whether a strain of this organism could be adapted to growth in increasing concentrations of the drug and so become "sulfapyridine-fast." The acquisition of "sulfapyridine-fastness" by a strain of pneumococcus has been reported recently by Maclean, Rogers, and Fleming.[1]

A mouse-virulent strain of pneumococcus Type I (SV-I) was used in the present experiments. The stock solutions of sulfapyridine were made by dissolving the drug in N/10 HCl, diluting with distilled water and neutralizing with N/10 NaOH. The dilutions of sulfapyridine in 2% serum-broth were stored in the ice-box.

tive isolated from rabbits' urine. The shape of the curve and the positions of the maxima and minima are identical with those of the absorption curve of the phenolic derivative isolated by us from rabbits.

[1] Maclean, Rogers, and Fleming. *Lancet*, 1939, **1**, 562.