

from studies of blood concentration, after oral, intrapleural, and intraperitoneal administration to dogs. Although these experiments are not directly comparable to the clinical use of sulfathiazole, they may well serve as a guide in the matter of dosage in the local application of the drug to the pleural and peritoneal cavities.

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Experimental Production of Tumors by Tars from Various Foods.

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In view of the successful production of tumors by crude coal tar¹⁴ and its derivatives with known chemical composition,¹⁻⁴ interest has been directed to the question whether tars prepared from substances which we eat or smoke are also carcinogenic. Fukida and Kinoshita⁵ found that tar from rice bran is carcinogenic to the skin of mice. Kenneway⁶ produced cancers and papillomas by human skin tar and yeast tar. Shibata¹¹ reported on the carcinogenic action of the tar from sugar. Roffo⁸ found tumor growths in the stomach, liver, and cecum of rats fed on bread and milk to which was added animal fat or olive oil that had been heated to 350°C for half an hour. Widmark¹³ succeeded in obtaining adenocarcinomas of breast with alcohol or petroleum-ether extract of roasted horse muscle, coffee and brown butter. Lü,⁷ Taki,¹² and Sugiura,¹⁰ etc., produced tumors on mice by tobacco tar. Roffo⁹ was able to identify

¹ Cook, J. W., Haslewood, G. A. D., Hewett, C. L., Hieger, I., Kenneway, E. L., and Mayneord, W. V., *Am. J. Cancer*, 1937, **29**, 219.

² Cook, J. W., and Kenneway, E. L., *Am. J. Cancer*, 1938, **33**, 50.

³ Cook, J. W., and Kenneway, E. L., *Am. J. Cancer*, 1940, **39**, 381.

⁴ Cook, J. W., *Nature*, 1940, **145**, 335.

⁵ Fukida, T., and Kinoshita, R., *Transact. Jap. Path. Soc.*, 1923, **13**, 636.

⁶ Kenneway, E. L., *B. M. J.*, 1925, **2**, 1.

⁷ Lü, Fu-hwa, *Frankf. Z. Path.*, 1934, **46**, 513.

⁸ Roffo, A. H., *Bull. de l'Ass. franc. l'etude du cancer*, 1939, **28**, 556.

⁹ Roffo, A. H., *Z. f. Krebsforsch.*, 1939, **49**, 588.

¹⁰ Sugiura, K., *Am. J. Cancer*, 1940, **38**, 41.

¹¹ Shibata, S., *Higu, Kiyo.*, 1928, **12**, 298.

¹² Taki, S., *Osaka Igaku Z.*, 1937, **36**, 483.

¹³ Widmark, E. M. P., *Nature*, 1939, **143**, 984.

¹⁴ Yamagiwa, K., and Ichikawa, K., *Verhandl. d. jap. path. Gesell.*, 1915, **5**, 142.

the presence of 1-2 benzpyrene, a carcinogenic hydrocarbon, in tobacco tar.

The following experiment was carried out to find whether tars from certain common food articles also have carcinogenic properties.

Material and Method. The material consisted of polished rice, pea flour, soybean, casein, wheat gluten, whole wheat, corn, cabbage, pepper, beef, and pork. Each of these, in dry form, was placed in an iron retort to about one-half of its full capacity and was then heated on a strong gas flame for destructive distillation. The distillate was collected in a water-cooled receiver. To remove the small amount of water present, the distillate was shaken with an equal part of chloroform. The water fraction and the chloroform fraction were then separated. The chloroform was removed by distillation and the water fraction was concentrated on a steam bath. These two fractions were finally mixed together and used for the experiment.

For the purpose of painting, 11 groups of white mice of 10 each were used, one group for each kind of tar. The painting was done on alternate days. The area of the skin painted was about 1.5 cm square on the back at the level of the scapulae, the hair having been previously removed by a thin paste of barium sulphite, 1 part, and talcum powder, 3 parts. The animals were from our own stock, 3-4 months old, and weighing 20-25 g. When one animal died it was replaced by a new animal, so that the number of living animals in each group was kept constantly at 10.

For control, 5 animals were painted with coal tar which had been found to be carcinogenic.

Results. Up to the time of this report, 230 mice were painted for 15 to 343 days (animals dying in the first 2 weeks of the experiment were excluded). Of these, 4 developed papillomas (wheat gluten, 1; pepper, 1; cabbage, 2) in 52 to 315 experimental days. The 5 controls all developed tumors (3 papillomas and 2 carcinomas) in 60 to 83 days.