

TABLE III.

Summary of data	Cholesterol fed animals only			
Groups	A	B	C	D
No. of pigs	11	12	4†	5
No. of animals with gallstones	0	10*	1	5

*No satisfactory autopsy on 2 remaining animals which died at night. Gall bladders burst and contents were lost.

†Bile murky but no hard stones in 3 animals.

an abrupt fall in red cell count without the usual preliminary loss in weight and other evidences of illness, and when the autopsies showed gallstones.

Guinea pig bile contains relatively little lipid. These gallstones were rich in calcium phosphate, although they contained some cholesterol. Irritation of the membranes of the gall bladder and the biliary passages was common and some impaction of ducts was observed in cholesterol-fed animals. No stones were found in control animals.

If this high incidence of gallstones is to be attributed to the relatively small increase in riboflavin intake, these data suggest that a critical level of tolerance was exceeded. That this is not a definite figure but may vary with the intake of other dietary factors

is also suggested.

Examination of autopsy notes for guinea pigs of our previous series revealed that all the animals which had gallstones were on diets which probably contained extra riboflavin. Incidence was especially high when unextracted casein and/or egg yolk protein had been fed at levels exceeding 25%. We thought at the time that the gallstones might be due to high protein intake.

The whole problem of the relationship of the intake of B vitamins to tolerance for foods high in cholesterol obviously needs further investigation. Preliminary publication of our findings seems desirable at this time because of the wide and indiscriminate use of very high dosages of preparations of the various B factors.

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Mortality in Severe Experimental Burns as Affected by Environmental Temperature.

ROBERT ELMAN, WARREN M. COX, JR., CARL LISCHER, AND ARTHUR J. MUELLER.

From the Department of Surgery, Washington University Medical School and Barnes Hospital, St. Louis, Mo., and the Laboratories of Mead Johnson and Company, Evansville, Indiana.

Our armed forces are on duty in all parts of the globe, and are subjected to all extremes of temperature—from arctic to equatorial. Burns from bomb flashes, gasoline fires and escaping steam are common in modern war, yet we have been unable to find any observations on the effect of environmental temperature on the early mortality resulting from such events. The only comment on the environmental management of the burned patient is that he should be kept warm because of the fall in body temperature commonly accompanying shock. While engaged in a study of certain pathological and

chemical changes following experimental burns in dogs, the results of which will be reported elsewhere, we noted an increased mortality during several hot days during the summer months when the temperature rose to 95°F. These observations seemed to indicate that environmental temperature actually did affect mortality.

As an experimental approach to this problem, we have burned rats under controlled conditions, placed them at 4 different temperatures, and determined their survival after 24, 48 and 72 hr. Our major interest was in the mortality during the first 24 hr, since

secondary factors undoubtedly affect survival after this initial period. The striking results obtained prompts this preliminary report.

Adult rats were anesthetized with nembutal intraperitoneally (.033 g per 100 g of body weight) and the lower portion of their body, to the axilla, immersed in hot water. They were held vertically by two forceps—one at the scruff of the neck, and the other grasping the proximal end of the tail. Immersion lasted 7 sec. Two degrees of burns were studied: (1) 152 rats in water at 80°C (176 F), and (2) 78 rats in water at 90°C (194 F). Immediately after immersion the rats were kept in rooms held at one of four temperatures, 32°, 55°, 75° and 99°F. These room temperatures showed a maximum variation of plus or minus 2°F. The mortality after 24, 48 and 72 hr was observed.

Results are apparent from the accompanying chart. All animals placed in rooms at 32° and 99°F were dead within 24 hr. At 55°F, 100% of those burned at 90°, and 82% of those burned at 80°C were dead within 24 hr. The 18% in the latter group which survived the 24-hr period were still alive at the end of 72 hr. Of those placed in a room at 75°F only 26% died in the first 24 hr among the 80° burns, 65% were dead at the end of 48 hr and 83% in 72 hr. Of those burned at 90° and held at 75°F, the mortality was 36%, 95% and 100% at 24, 48 and 72 hr respectively.

These observations indicate the importance of environmental temperature in the early mortality following extensive body burns. Apparently the most favorable temperature is about 75°F, which is actually a little higher than the level assumed to be the normal average for human comfort. It is obvious that the commonly used heat tent which increases the environmental temperature above this point will be deleterious by increasing mortality in severe burns. On the other hand, these findings suggest the importance of lowering room temperature of burned patients in climatic extremes, when the environmental temperature rises much above this point.

Summary. Environmental temperature has a decisive influence on the 24-hr mortality following a severe cutaneous burn. The lowest mortality (32%) occurred at 75°F and increased to 100% with either an increase or decrease of 20°F.

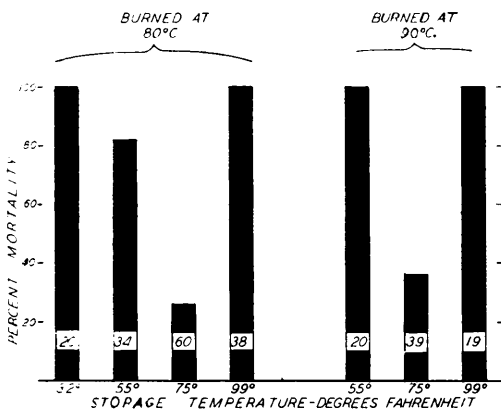


FIG. 1.

Twenty-four hour mortality of burned rats. The figures on the columns indicate the number of rats used in determining the mortality figure.