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## Abstracts

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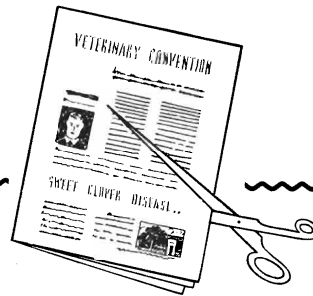
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# ABSTRACTS



**PENETRATION OF SULFONAMIDES.** *In vivo* experiments on guinea pigs and man have been performed to determine the penetration of sulfonamides from various vehicles into the skin. Skin biopsies were analyzed for total sulfonamide concentrations after varying periods of application.

Sulfanilamide, sulfathiazole, and sulfadiazine in a comparable base at comparable concentrations and times of application gave comparable tissue levels demonstrating no difference of penetration into the intact skin. Sodium sulfacetimide (Albucid soluble) gave greater penetration after a 3 day application than the sulfonamide bases tested.

Increasing the concentration of sulfonamides in comparable ointment bases did not increase the absorption by the intact skin of sulfanilamide, sulfathiazole, and sulfadiazine. Sodium sulfacetimide showed only a slight effect of concentration.

Increasing the time of application increased the skin absorption of sulfonamides in all cases, especially of sodium sulfacetimide.

Of the 7 ointment bases examined, 2 oil-in-water and 5 water-in-oil emulsions had no effect on the absorption of sulfonamides by the skin including sodium sulfacetimide.

An ointment containing a solubilizer and wetting agent in greater amounts gave no greater absorption. Injured skin absorbs much greater amounts of the sulfonamides from ointments than intact skin. Sodium sulfacetimide is especially

penetrating into injured skin. Injured skin absorbs sulfonamides from wet packs to a much greater extent than from ointments.

(Strakasch, E. A., and Clark, W. G. 1943. *Studies on penetration of sulfonamides into the skin. Am. J. Med. Sci. 26:276-282*)

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**SPINAL ANESTHESIA AFFECTING CIRCULATION.** Laboratory experiments were performed on cats, dogs, and rabbits (a) by administering procaine spinally or intravenously, (b) by testing the procaine effect on isolated heart-lung preparations, and (c) with the heart perfused after the method of Langendorf.

In dogs and rabbits artificial respiration was regulated carefully so that blood pressure remained at normal levels. When spinal anesthesia was induced, the blood pressure fell. The same experiment was tried on morphinized and nembutalized dogs with the same results. The experiment was repeated on non-narcotized rabbits and the same results were acquired.

Experiments were carried out on narcotized and non-narcotized dogs and cats with eventration of all viscera except the liver and kidneys, and the normal blood supply withheld from the liver. Dogs nembutalized and then given procaine into the spinal canal showed a drop in blood pressure; the pulse rate remained unchanged. Thus the absence of most of the blood vessels in the splanchnic region does not inhibit the fall in blood pressure

which ordinarily occurs during spinal anesthesia. Accordingly, if the fall in pressure is due to an increase in size of the vascular bed, the lungs and muscular field are enough without the splanchnic vessels.

In narcotized dogs with the abdominal aorta clamped at its bifurcation, and both axillary arteries ligated and tourniquets applied to all limbs at their junction the blood pressure fell from 120 mm. to 75 mm. when procaine was given in the subarachnoid space. Apparently the exclusion of the vascular area of so extensive a field of muscles could not inhibit the normally anticipated blood pressure fall occasioned by spinal anesthesia.

The concentration of procaine and split products in the blood is related to the amount and concentration of procaine injected and the time lapse between injection and the sampling.

There is no change in blood pressure when the aqueous humor was removed from the eye of a cat and replaced with procaine. In 1½ hours after ocular injection, the blood contained 0.0037 mg. of procaine and split products per cc.

Procaine is absorbed from the spinal canal and is found as split products in the aqueous humor in dogs and rabbits. This is also true for humans. These split products may occur in the ventricles of the brain and may account for consequent effects on the central nervous system.

Dogs and rabbits under spinal anesthesia showed no falls in systolic and diastolic blood pressure. When the abdominal aorta was clamped it produced a pressure that was normal or higher than normal. When procaine was given in the spinal canal there was no increased fall in pressure as the aorta was clamped. Thus cardiac poisoning by procaine cannot be considered.

It is possible to get a toxic effect of procaine on cardiac muscle after subarachnoid injection. Large toxic doses in high concentration cause (a) complete cessation of the heart beat, (b) cessation of ventricular heart heat, but regular auricular contraction, (c) alteration in rhythm such that the auricles contracted 2 or 3 times to each ventricular contrac-

tion, and (d) extreme slowing of the heart rate.

The spleen is of no value in protection against hypotension of subsequently induced spinal anesthesia.

(Kisch, Bruno. 1943. *Circulation in spinal anesthesia with procaine*. *Exp. Med. and Surgery*. 1:336-365.)

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**PERSISTENCE OF BRUCELLA IN BODY TISSUES.** In an effort to solve the puzzling aspects of host-parasite relationship of brucellosis in man, the authors turned to investigation of the disease in experimental animals. Utilizing the hog, a natural host, and the dog, an unusual host, they conducted the experiments with two objects in mind: (1) to determine how long the organisms remained in the tissues when they were no longer demonstrable in the blood, and (2) under these circumstances, in what tissues could they be found most frequently.

Two strains of *Brucella suis* were used for inoculation into test animals. Strain A was selected from the spleen of a naturally infected hog and was highly virulent for guinea pigs. Strain B was obtained from a case of Hodgkin's disease at autopsy and possessed only slight virulence for guinea pigs. The test animals included 8 hogs selected from the same litter and 9 mongrel dogs. Repeated inoculations of the test animals were made at intervals of from 7 to 21 days, each time using a freshly prepared bacterial saline suspension of the *Brucella* strains. The dogs were divided into 4 groups such that each strain was inoculated both intravenously and intraperitoneally in various animals. Hogs numbered 1 to 6 were inoculated with strain B intraperitoneally for 14 weeks; then numbers 1 to 5 were given intravenous injections of the same strain until they were destroyed. Number 7 hog was given doses of strain A orally and number 8 was injected intravenously with strain A in equal amount. At frequent intervals the animals were bled for blood cultures, *Brucella* agglutination and opsonocytaphagic tests.

The results showed that the Brucella organisms usually disappeared from the blood stream of both dog and hog within 1 to 3 weeks after an inoculation although the organism could sometimes be recovered from tissues 3 to 7 months later.

When autopsies were made on those inoculated dogs and hogs having negative blood cultures and showing no evidences of clinical infection, the Brucella organisms were recovered most frequently from the lymph nodes. In an equal number of cases, however, no organisms were recovered from any site.

During the course of experimental inoculation with Brucella the agglutination titers of both dog and hog showed a tendency to rise early and to remain at a high level. There was no appreciable difference when heat-killed organisms were used instead of live organisms.

It was noted that there were no distinct differences in virulence between the 2 strains of *Br. suis* as shown by infections produced in the dog and hog even though

the animal strain A was much more virulent for guinea pigs than the human strain B.

(Kerby, G. P., Brown, I. W., Margolio, G., and Forbus, W. D., 1943. Bacteriological observations on experimental brucellosis in dogs and swine. *Am. J. Path.* 19(6):1009-1020.)

**A STUDY OF MILK BOTTLE WASHING.** A routine survey of 105 milk bottle washing plants of 26 different types was carried out in Greater London. In 204 visits, 2406 bottles were taken for bacterial counting. Samples were taken from all bottles and incubated at 22° and 37° C.

The plants were classified as (a) large plants of the straight through and come back type, (b) small rotary plants, (c) plants employing steam sterilization in a

(Continued on page 170)



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Mastitis will never be controlled by the veterinarian alone. Such a statement seems a bit heretical, but when and if mastitis is controlled it will be done by the veterinarian, owner, herdsman, and the hired man who milks and feeds the cows.

### **Eastern States Lead**

The role of the veterinary profession then in controlling mastitis becomes one of an advisor and educator. He may play his part in the program by making the diagnosis, planning a sanitary program and treating selected cases. But without a religious adherence to these sanitary measures his diagnosis and treatment will gain no results in the end. The practitioner in the dairy districts of the Middle West is wondering what he can do to show his clients that they must follow such a program if they want to stop their mastitis losses.

The eastern states, it is generally conceded, are well ahead of us as regards mastitis control. They have forced the dairyman to adopt certain sanitary measures in order that he might have a market for his milk. In some areas of the eastern states mastitis tests are run on herds periodically, and if a herd shows infection, the milk from that herd cannot be sent to market until the trouble is eliminated. Naturally, herd owners in those areas are eager to follow any recommendations made for mastitis control.

### **Cooperation of Processors**

Several large operators in the processing end of the dairy industry have indicated that they would like to cooperate with the veterinarian in some plan to control mastitis. These men, looking at the situation from a purely business standpoint, believe that if they were buying clean milk they would have less trouble in producing quality products. Also, they point out that a patron whose herd is free from mastitis would be getting more milk per cow, making more money, and hence the processor would not have so much grief over milk prices. They have indi-

cated that the veterinarian might expect as regards laboratory tests, and some have indicated that as soon as possible in the future they might be able to cooperate further by refusing to buy mastitis milk.

In seeking a solution to the problem of controlling mastitis, the veterinary profession might do well to call on the various dairy processors' associations for their help. The task of educating herd owners that certain sanitary practices are necessary to fight mastitis is a big one. The veterinary practitioner, for the most part, has had little success and he will run no risk of being called incompetent by asking for aid from others vitally interested in the dairy industry.

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## **ABSTRACTS**

*(Continued from page 153)*

cabinet after washing by hand or mechanical means, and (d) plants using hand washing alone. In the large plants, 55.5 per cent of the bottles had less than 600 colonies when incubated at 22° and 37° C., and only 1.1 per cent had more than 25,000 colonies. The corresponding figures for the small rotary plants were 49 and 6.4 per cent, for steam sterilization plants 50 and 23 per cent, and plants employing hand washing 6 and 23.5 per cent.

A comparison of plants relying wholly or mainly on soaking in a detergent section with those relying exclusively on spray from jets showed that though good results might be obtained by either method, the spray type of plant gave on the average better results than the soaker type of plant. The general conclusion is reached that equally good results may be obtained in large or small rotary plants relying on sterilization by a caustic detergent as in plants employing steam sterilization, and that the uniformly best results are obtained in properly designed and operated plants of the spray type.

From a study of the process of disinfection by caustic soda it is concluded that

the two main factors responsible for destruction of bacteria are the concentration and the temperature of the detergent solution. Virtual sterility can be achieved either by use of relatively strong caustic soda solutions at a low temperature or relatively weak caustic soda solutions at a high temperature. The use of substances such as sodium bicarbonate and sodium hexametaphosphate to increase wetting, softening, emulsifying, and deflocculating powers of caustic soda and so help the removal of micro-organisms from the bottle is strongly recommended. These substances must be used in addition to the basic concentration of caustic soda, and not as substitutes for it.

Bottles emerging from the detergent section of properly operated plants are virtually sterile. In nearly all types of plants, they become recontaminated during the subsequent process of rinsing. This constitutes one of the major problems of bottle-washing. Contamination is due mainly to the use of warm recirculated rinse water, which constitutes a favorable medium for bacterial growth. There seem to be two methods by which this contamination may be avoided. (1) Bacterial growth in the rinse water may be checked by the addition of chlorine or one of its compounds. To be effective this procedure must be carried out with a degree of care and superiorism that is unusual in bottle-washing plants, and its uncontrolled use is likely to degenerate into an excuse for dirtiness. (2) Warm recirculated rinse water for internal spraying of bottles may be replaced by hot spray at a temperature too high for bacterial growth in order to remove the detergent. The bottle can be cooled by external rinses of recirculated water progressively decreasing the temperature. In this way none of the recirculated, contaminated rinse water should enter the bottle and the bottle should finally emerge as sterile from the rinse as from the detergent section.

A minor yet important source of contamination is due to growth of bacteria in jets and manifolds incorporated in the rinse section. Frequent cleaning and sterilization of the jets and manifolds are required to prevent this occurrence. It is

further pointed out that many softening plants seem to contaminate the water and thus prevent a satisfactory bottle from being delivered.

The temperature of the bottle on discharge should not exceed 68° F. if the bottles are to be filled at once, otherwise the temperature of the milk is raised to an undesirable extent. If the bottles are not to be filled immediately they should be stored inverted in clean crates or drainage racks in a cool, dry, well ventilated room. Storage in a warm moist atmosphere leads to considerable bacterial multiplication. On no occasion should the bottles be stored upright.

Experimental observations show that imperfectly cleaned bottles lead to a more rapid deterioration of the milk. It may be pointed out by a recent review of the literature that numerous outbreaks of diseases have occurred, attributed to bottles coming from infected houses and distributed again without adequate sterilization. Milk may become contaminated from human cases and carriers of infectious disease in the dairy who handle the bottles during the filling, capping, or distributing process. Proper sterilization will guard against infection of the bottles from diseased consumers. Automatic filling and capping machinery can do much to prevent this spread of infection.

The ordinary wide-mouthed bottle with the press-in disk cap is particularly susceptible to contamination from human and animal sources, and should not be allowed unless fitted with a hooded cap. In its place there may be used (a) a narrow-necked bottle designed to minimize the contact of milk with the outside of the neck during the operation of pouring, and closed with a deep press-over aluminum cap covering the rim, or (b) a single-service paper-bound container.

Many washing machines at present in use have been designed by engineers and are operated by technicians without strict regard to bacteriological principles.

*(Hobbs, B. C., and Wilson, G. S. 1943. Cleaning and sterilization of milk bottles. J. Hyg. 43(2):96-120.)*