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A Brief Review Of Aureomycin

Alan Raun
Iowa State College

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Alan Raun, V.M. 2

OF WHAT good is aureomycin to the veterinary profession? That's the question asked by practicing veterinarians as this new antibiotic comes into the therapeutic limelight.

Most of the work done on aureomycin to date is experimental and much of that *in vitro* only. However, it appears that this new antibiotic has definite therapeutic value against various bacterial, rickettsial and virus infections.

Aureomycin, first reported by Duggar[1], is the antibiotic procured from the mold, *Streptomyces aureofaciens,* a member of the same genus from which streptomycin and various other antibiotics have been obtained. It has been used on a number of human cases, but as yet very little material is available on its use in the treatment of animal diseases. The following is a brief summary of what is known of the drug at present.

Experimental work has shown that aureomycin has a low toxicity, practically no side reactions and can be administered orally, intravenously or intramuscularly. However, in intramuscualr injections a slight irritation of the perivascular tissue surrounding the site of injection sometimes occurs. Following oral doses aureomycin appears in the urine in about one hour, is actively secreted for from six to twelve hours; and traces may be found in the urine as long as three days following its administration. Therapeutically effective concentrations also exist in the cerebrospinal fluid within six hours following an intravenous injection,[2] thus proving the drug is readily diffused through the blood-brain barrier.

At the present time there is no evidence of methemoglobin formation, no chronic toxicity resulting from continued administration of large doses of the drug. No modification of the vasomotor action of epinephrine, acetylcholine or histamine has been observed. Aureomycin does not appear to have any effect on the heart or kidneys, nor is the blood sugar level affected.[2]

Aureomycin *in vitro,* was found to be highly effective against almost all coccidial diseases and many diseases caused by Gram-positive and Gram-negative rods. Exceptional bacteriostatic action was observed against the following type species:

Staphylococcus aureus: A common etiologic agent in wound infections and pyemias of all animals. It causes pustular dermatitis and gastroenteritis in dogs and mastitis in the bovine.

Streptococcus zooepidemicus: The common pathogen of the horse which causes abortion, sterility, cervicitis and metritis in the mare and navel ill, arthritis and septicemias in the foal. It may also cause genital and urinary tract infections, calf dysentery and mastitis in the bovine.

Salmonella pullorum: The etiologic agent in enteritis and bacteremia in the young chick commonly called pullorum disease.

Aerobacter aerogenes: A Gram-negative bacterium that is one of the causes of urinary tract infections in dogs and mastitis in the cow.

Shigella gallinarum: The cause of fowl typhoid.

Erysipelothrix rhusiopathiae: The etiologic agent in erysipelas in swine and fowl and erysipeloid in man.

Pasturella multocida: The cause of

fowl cholera, septicemias in swine, sheep and goats and what is commonly called hemorrhagic septicemia in cattle.

Also of extreme interest to the veterinary profession is the fact that this new antibiotic may prove to be an effective combatant of brucellosis in man and animals.[3] So far, results of aureomycin therapy are only available in the treatment of human cases resulting from infection by Brucella organisms. In the cases thus far recorded, immediate therapeutic results have surpassed those obtained with any other specific therapy including a combination of streptomycin and sulfadiazine. Aureomycin has been used successfully in the treatment of brucellosis but surprisingly appears to have no inhibitory action *in vitro* against the Brucella organisms.

One advantageous property of the drug is that aureomycin is active against many penicillin-resistant organisms as well as against some streptomycin-resistant strains. Also, bacteria do not become resistant to aureomycin in the living animal. Aueromoycin is easily assayed because both serial and cup plate methods have been developed.

Although much higher titres of the drug must be built up to produce the desired or optimum effect, this effect can be maintained with relatively small daily doses. Another factor that may influence the use of aureomycin is that both blood and serum have an antagonistic effect on the drug. So far, however, aureomycin produces a more pronounced effect against certain organisms in the living animal than against those same organisms in an artificial culture.

Even though the drug deteriorates rapidly at room temperatures in neutral and alkaline solutions, bacteriostasis can be maintained if fresh drug is added every 24 hours. In solution aureomycin is quite unstable and is affected by a variety of substances.

Although the future of aureomycin in the treatment of animal diseases by the veterinary profession is still to be ascertained, present knowledge of the drug points to its possible extensive use in veterinary therapeutics. If this is true, one more link has been forged in the chain that will some day effectively control the diseases of the animal kingdom.

1. Duggar, S.M. Introductory paper, read before the conference of the Section of Biology of the New York Academy of Science, July 21, 1948.
2. Harned, **et al.** The Pharmacology of Duomycin. An. of the New York Acad. of Sci., Nov. 30, 1948.
3. Spink, W. W. **et al.** Aueromycin Therapy in Human Brucellosis due to *Brucella melitensis.* Journal of Am. Med. Assoc. 138:1145-1148. Dec. 18, 1948.
4. Chandler and Bliss: *In Vitro* Studies with Aureomycin, An. of the New York Acad. of Sci., Nov. 30, 1948.

Body Minerals

Chemical analyses show that the body minerals are mainly calcium and phosphorus which together comprise no less than 75 percent of the total minerals. The remaining 25 percent consists almost entirely of the four elements potassium, sodium, sulfur and chlorine. Magnesium occurs to the extent of .05 percent and iron to .004 percent. Spectrographic methods of analyses reveal the presence of 20 or more other elements in amounts too small for quantitative measurements. Feeding tests show that five of these trace elements including copper, iodine, manganese, cobalt and zinc are essential for animal life. Thus far none of the other trace elements occurring in the body have been proved to be essential for animal life. Pending such proof they are regarded as accidental contaminants.

Of a lot of 108 cattle slaughtered at the Cudahy Packing Company in Denver recently 76 carcasses were so bady bruised that the necessary trimming resulted in a loss of $1,200. Dr. W. T. Spencer, who examined the carcasses, said most of the damage resulted from overcrowding at loading and unloading shutes.

A quarter of a million Brucella infected cows produce milk which is consumed raw in the United States.