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Experimental Production of Mastitis with *Haemophilus somnus* in the Lactating Bovine Mammary Gland

DEAR SIR:

Haemophilus somnus is well known as the cause of bovine infectious thromboembolic meningoencephalitis (1,2,3) abortion (4,5), and is involved in fibrinous pneumonia (6,7). It has recently been isolated from 60% of preputial washings of bulls (8), 77% of male reproductive tracts (9) and 8 to 12.5% of bovine female genital tracts (10).

Evidence of the prevalence of *H. somnus* in the bovine, as well as a close relationship to *Histophilus ovis* (11) which will cause mastitis in sheep (12) has led to the suspicion that *H. somnus* is involved in bovine mastitis. Recently, *H. somnus* has been isolated from a spontaneous case of mastitis in a cow in Switzerland (Corboz L., personal communication, 1983). The affected cow was ten days postpartum and had mild swelling of the quarter which was not particularly painful. The cow was not affected systemically and recovered after intramammary treatment with penicillin, tetracycline and neomycin. The organism was recovered as a pure culture from the affected milk but attempts at isolations from the nasal cavity, uterus and urine of the cow was negative.

We have, in preliminary studies, experimentally reproduced two types of bovine mastitis with *H. somnus* in mature dairy cows. Three of six cows infused with 5×10^4 colony forming units of *H. somnus* strain 43826 developed a chronic mastitis. One of the cows responded rapidly to treatment with an intramammary infusion of penicillin G, streptomycin, neomycin, polymyxin B and sulfathiazole sodium.[1] One untreated cow shed *H. somnus* for seven weeks before she was culled, and one cow without treatment was dried off while shedding. The other three cows developed a severe gangrenous mastitis (Figure 1), from which the organism was isolated from supramammary lymph nodes and liver or lung at necropsy. Clinical illness was apparent 12 to 24 hours postinoculation, and the milk had a grey whey and fine white clots which settled. The secretion from affected quarters later turned yellow, was more translucent and viscous with some large yellow clots present. In one case the secretion had a red tinge. A clinically obvious gangrene of the teat and surrounding skin was seen by 60 hours. In these cows, there was spread to the ipsilateral noninoculated quarter by direct extension through parenchyma. Cellular response at 24 hours as measured by white blood cell counts and somatic cell counts of milk from inoculated quarters of cows which developed gangrenous mastitis were poor compared to those which developed chronic mastitis (Table I).

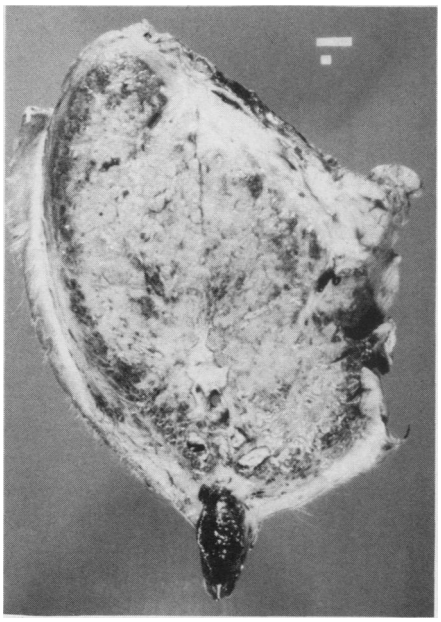

FIGURE 1. Gangrenous mastitis produced in a cow 88 hours postinoculation with *H. somnus* strain 43826.

It is the purpose of this letter to draw to the attention of veterinarians the potential for this organism to cause mastitis of both a fulminant gangrenous and a chronic nature, and to alert laboratory workers to the possible presence of this fastidious organism in mastitic milk samples.

Yours sincerely,

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TABLE I
SOMATIC CELL COUNTS (SCC) IN *HAEMOPHILUS SOMNUS* INFECTED QUARTERS

	Type of Mastitis					
	Chronic			Gangrenous		
Cow (N)	2	24	91	26	59	96
Preinoculation SCC (x10³)	127	217	466	209	143	195
12 Hours Postinoculation SCC (x10³)	9 999	7 468	8 860	1 494	1 711	3 055

[1]Strepenco-Rogar/STB, Montreal, Quebec.

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BOOK REVIEW

The Anatomy of the Domestic Animals, Volume 3. A. Schummer, H. Wilkens, B. Vollmerhaus and K.H. Habermehl. Published by Springer Verlag New York Inc., New York. 1981. 610 pages. Price $99.50.

This volume is subtitled "The Circulatory System, the Skin and the Cutaneous Organs of the Domestic Mammals" and this fully describes its content. It begins with details of blood cells and their formation together with a general account of the structure and function of blood vessels. The heart of each species is described next. This section is written by Schummer (Giessen) and is followed by a formal account of the arteries and veins by Wilkens (Hanover). In most of this part of the book all the common domestic mammals are dealt with together using a comparative approach but there are separate sections devoted to the arteries and veins of the feet of the carnivores, pig, ruminants and horse. The section on lymphatic system is by Vollmerhaus (Munich) and consists of an introductory discussion of the immune system and the structure, function and development of all the lymphatic organs followed by the expected account of the lymph vessels and nodes. The vessels are described in a comparative fashion according to region but the nodes are described separately for each species. The last quarter of the book by Habermehl (Giessen) is devoted to the skin and includes sections on hair, hooves, horn and specialized glandular areas including the mammary glands. After a general introduction, the carnivores, pig, ruminants and horse are dealt with individually.

The original book was published in German in 1976 and has been translated by W.G. Siller and P.A.L. Wight of the Agricultural Research Council, Poultry Research Station in Edinburgh. They previously translated Schummer's "Anatomy of the Domestic Birds" which is part of the same series of texts. The language is simple and clear and adheres closely to the original. Occasionally the usage has an archaic ring — "milch cows" for example — but this does not detract and the translater's convention that all anatomical terms are first used in their latin form and are subsequently anglicized, works well. The translaters do sometimes seem confused about whether they should use the terms "cranial" and "caudal" or the almost obsolete "anterior" and "posterior" which are now restricted to the eye alone. They also develop terms based on a literal translation of the German which do not coincide with common usage: thus we find "leading hair" and "awn" used where Evans and Christensen (Anatomy of the Dog, Saunders, 1979) use "straight" and "bristle" hairs. We also find "streak canal" and "teat cystern" where "teat canal" and "teat sinus" would be more common today.

The content is very detailed, as is necessary in a reference work, but is very dry to the average reader with little attempt to relate structure to function or to practical considerations. The reader might even suspect that there is a deliberate attempt to avoid areas of the vascular system where the gross anatomy has particularly interesting implications. Thus we find scant mention of the vascular arrangements of the ovarian pedicle or the vascular cone of the testis, no interpretation of the rete mirobile in the base of the cranium and only passing mention of the reversal of flow in the superficial epigastric veins of lactating ruminants. Unfortunately too, the introductory review sections preceding each system are not very recent; thus there is no mention of placental lactogens in the control of mammary development and other examples could be cited.

These are minor criticisms and they are peripheral to the prime intent of the work which is to describe the skin and vasculature of the domestic mammals. This is achieved with a wealth of beautifully produced illustrations, many of which are colored. The detail and coverage, encompassing all the domestic species, is unsurpassed in English. The reader will by now rightly suspect that this is not a book that is essential for every practitioner's office shelf or for every student of veterinary anatomy and in this it differs from Volume 2 of this series, "The Viscera of Domestic Mammals" which I regard as indispensible. It is an important reference work that will be used by teachers and research workers of all kinds who are concerned with domestic mammals as well as those with direct anatomical interests. *P. Flood.*