

Title : DEXTRAN AS A LOCAL ANESTHETIC ADJUVANT

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**Introduction.** Since Loder's introductory report in 1960, dextran has been used as a local anesthetic adjuvant.<sup>1</sup> Usually dextran 40, a dextran preparation having an average molecular weight of 40,000, is selected. Other dextrans with higher molecular weights are available. We have performed this study measuring the duration of action of dextran:local anesthetic mixtures following coccygeal nerve blocks in rats, to determine which dextran is the superior adjuvant.

**Methods.** Test mixtures consisted of bupivacaine (Breon) 0.75%, 0.2 ml, and an equivalent volume of either dextran 40 (Travenol), dextran 75 (Travenol), dextran 110 (Fisons), dextran 150 (Fisons) or normal saline. Bilateral coccygeal nerve blocks were performed in Sprague Dawley rats matched for age and weight. Each rat was anesthetized transiently with methoxyflurane. A nerve stimulator facilitated locating the coccygeal nerves. After the block, the animal was placed in a special cage from which the tail was accessible. Upon awakening the tip of the rat's tail was periodically stimulated. Return of response to stimulus demarcated the duration of block. Statistical analysis was by unpaired Student's t-test.

**Results.** Effects of varying molecular weight dextrans on bupivacaine's mean duration (HR  $\pm$  S.D.).

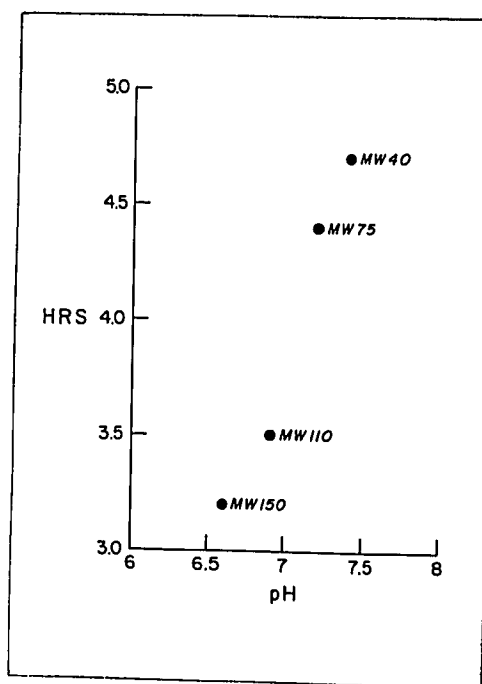
Solution	Duration	N
Dextran 40	4.7 $\pm$ 0.3 <sup>+</sup>	20
Dextran 75	4.4 $\pm$ 0.3 <sup>+</sup>	11
Dextran 110	3.5 $\pm$ 0.4	10
Dextran 150	3.2 $\pm$ 0.4	10
Saline Control	2.9 $\pm$ 0.4	8

<sup>+</sup>  
P < 0.05

**Discussion.** Dextran 40 was the best adjuvant of the four dextrans tested. However, we attribute our results not to dextran's molecular weight but rather its pH. Figure 1 shows the pH for each adjuvant and its mean duration. This relationship is in agreement with the theory that dextran's adjuvant properties are pH dependent: more alkaline the dextran, greater the prolongation.<sup>2</sup> Of clinical importance is the fact that if dextran is used with a local anesthetic, its pH should be checked since the pH of dextrans vary markedly.

Utilization of an acidic dextran is probably ineffectual. This could explain the several recent dextran studies with negative findings.<sup>3,5</sup>

Figure 1



#### References.

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3. Bridenbaugh LD: Does the addition of low molecular weight dextran prolong the duration of action of bupivacaine? *Regional Anesthesia*: 3:6-7, 1978.
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5. Buckely FP and Fink BR: The duration of action of nerve blocks produced by local anesthetic - dextran mixtures. *ASA Scientific Papers*, pp 215, 1979.