cells of spinal roots, concluded that these cells were capable of producing and polymerizing tropocollagen into collagen and a recent report shows that the Schwann cells produce the collagen found very near to their basement membrane[11]. This is in accordance with the observations of Friede et al.[12] in their in vivo studies on Schwann cells.

It is thus evident that the Schwann cells may be, in some way, connected with the synthesis of collagen under certain conditions of stress or degeneration of nerves. In fact, in the present experimental work, collagen has been found to be located actually within the Schwann cell cytoplasm. In the light of the current observations, it is, therefore, obvious that immobilization of a muscle, besides affecting the unmyelinated fibers, also leads to an increased production of collagen by the Schwann cells.

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Evidence for differences in alpha-adrenergic receptor affinity in stress susceptible swine

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Summary. pA_2-Values were determined using phentolamine-methoxamine. The mean pA_2-value on aortic strips from stress susceptible swine was 7.81 and 7.39 for control. The α-adrenergic receptor from stress susceptible swine has a higher affinity than that of control.

The role of the sympathetic nervous system in the course of the hyperthermia induced by halothane or succinylcholine in stress susceptible swine is unclear. The stress susceptible swine is used as an animal model since a similar drug induced malignant hyperthermia syndrome exists in humans[2]. At present there are primarily two thoughts concerning the site of action of drug induced malignant hyperthermia. One site is thought to be skeletal muscle and another site the sympathetic nervous system[3-9]. Alpha adrenergic agonists promote whereas α-adrenergic receptor antagonists and adrenergic neuron blockers inhibit the development of malignant hyperthermia[7-9]. The purpose of this study was to obtain additional information concerning the possible role of the sympathetic nervous system in malignant hyperthermia induced in stress susceptible swine.

Methods. Yorkshire or Yorkshire crossbred swine were obtained from the Department of Animal Science's herd. The pigs in this herd are screened at 7–11 weeks of age for stress susceptibility using halothane, blood typing and measurement of creatinine phosphokinase levels[10,11]. Pigs weighing 55–70 kg were electrically stunned and exsanguinated. The terminal aorta was removed and placed in a modified Krebs-Henseleit (Krebs) solution containing indomethacin (5×10^{-7} M) which was used throughout the experiment[12]. In the initial studies the aorta strips were observed to increase in tone after being immersed in Krebs solution for 60–90 min despite frequent bathing fluid changes. This increase in tension progressed over several hours. The addition of indomethacin to the Krebs solution prevented the increase in tone and permitted reliable dose-ratios to be determined. The aorta was helically-cut into strips approximately 2 mm wide and 15 mm long. The strips were placed in 10-ml isolated organ baths containing Krebs solution maintained at 37 °C and aerated with 95% O_2: 5% CO_2. The strips were placed under 4 g tension and responses were isotonically recorded. Strips were allowed to equilibrate for 90–120 min prior to adding agonists. Using methoxamine as the agonist and phentolamine as the antagonist, pA_2-values were obtained. The phentolamine concentration ranged from 10^{-8} to 10^{-6} M and was allowed to equilibrate with the tissue for 100–120 min prior to adding methoxamine. All dose ratios were appropriately corrected for changes in sensitivity during the course of the experiment by running a 'time control' tissue, which received only methoxamine[13]. Schild plots were used to obtain the pA_2-values[14]. pA_2 is equal to $-\log K_B$ where K_B is a quantitative measure of the dissociation of the receptor-antagonist complex. The dissociation constant (K_B) is inversely related to affinity and sould be the same for any one antagonist reacting with a common receptor[15].

Results and discussion. The pA_2-values from control and stress susceptible swine are presented in the table. The mean phentolamine pA_2-value for the stress susceptible swine was significantly different from control. The affinity of the α-adrenergic receptor in stress susceptible pigs was 2.6-fold greater than that of control pigs.

pA_2-Values for phentolamine on aortic strips from control (C) and stress susceptible swine (SSS)

	C	SSS
	7.7	8.0
	7.3	7.2
	7.2	
	7.2	8.2
	7.4	7.5
	7.5	8.1
	7.3	7.7
	7.5	7.9
	7.4	7.9
$\bar{x}$	7.39	7.81
SEM	0.12	0.05

The mean pA_2-value for SSS is significantly different from C ($p < 0.01$) using the 2-tailed t-test.

While this study does not differentiate between skeletal muscle or the sympathetic nervous system as the primary site for drug induced malignant hyperthermia, it does suggest that the sympathetic nervous system (α-adrenergic receptor) is abnormal in stress susceptible swine. An enhanced sympathetic response could well explain the hypertension and enhanced heat production seen in the stress susceptible animal[6]. Since drugs which antagonize the sympathetic nervous system are effective in preventing the malignant hyperthermia, this suggests that the sympathetic nervous system may well play a key role in the syndrome.

1 Acknowledgments. The author appreciates the cooperation of Dr L.L. Christian and the Meat Laboratory in obtaining the tissues and the technical assistance of Vern Hoyt.

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Analgesic dipeptide, L-Tyr-D-Arg (D-kyotorphin) induces Met-enkephalin release from guinea-pig striatal slices

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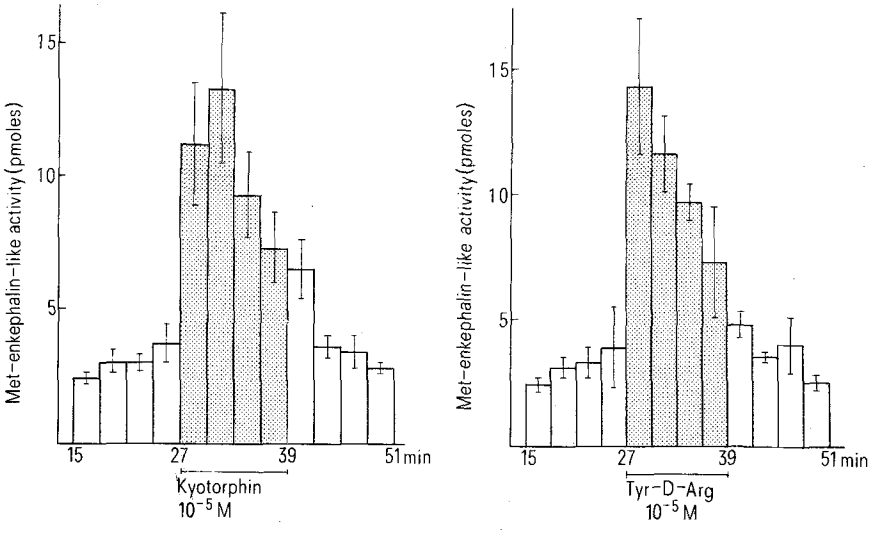
Summary. Kyotorphin (L-Tyr-L-Arg), an analgesic dipeptide isolated from the bovine brain, and its analogue, L-Tyr-D-Arg (D-kyotorphin) have a naloxone-reversible analgesic effect. Both peptides (10^{-5} M) induced an approximately 4-fold increase of the basal release of Met-enkephalin from striatal slices. Therefore they may produce their analgesic effects through release of Met-enkephalin. The stronger in vivo effect of D-kyotorphin may be explained by its resistance to degradation.

Kyotorphin (L-Tyr-L-Arg) is an analgesic dipeptide originally isolated from the bovine brain[2,3] using an in vivo analgesic assay method[4].

Kyotorphin reveals actions of the opioid type including analgesic effects[5,6]; these opioid actions can possibly be explained on the basis of an enkephalin release but not on the basis of interaction with opiate receptors[3,7]. The analogue L-Tyr-D-Arg (D-kyotorphin), which is stable enzymatically in the brain, also produces a naloxone-reversible analgesia when administered intracisternally to mice[8].

Recently, Laubie and Schmitts[9] reported that D-kyotorphin, given into the nucleus ambiguus in the dog produced a vagal bradycardia which was reversed by naloxone. In an attempt to examine the possible mechanism of these opioid actions, we investigated the effect of D-kyotorphin on the enkephalin release. Experiments to determine the release of enkephalin were performed using the guinea-pig striatal slices. The release experiments were carried out as described recently[7]; the radioimmunoassay used for the determination of Met-enkephalin had a sensitivity of 1 fmole/tube and the overall recovery of the procedure was $87 \pm 6\%$ ($n = 6$).

Kyotorphin and D-kyotorphin induced Met-enkephalin release at rates of approximately 4 times basal release (fig.)



Effects on the Met-enkephalin release from the guinea-pig striatal slices.