decreasing gastric damage than was their administration prior to cold-restraint stress.

Discussion. It is clear that antacid drug administration either prior to or immediately following cold-restraint stress reduces ulceration relative to water-treated or non-treated animals. More striking, however, was the finding that antacid administration following stress but prior to 'post-stress delay' had the most significant ulcer-reducing effect. A similar but smaller effect was noticed with water-injected rats. It appears that substances which have a buffering effect in the stomach will exert an antiulcerogenic effect if administered at a time just prior to the 'post-stress delay' period. These results suggest that parasympathetic rebound, and hence, accompanying vagal-stimulated increases in gastric acid secretion, is indeed responsible for the phenomenon of 'post-stress delay' - induced increases in ulcer severity, relative to animals examined immediately following a stress treatment[4–6].

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Evidence against a reflex vasodilation in hemorrhagic hypotension[1]

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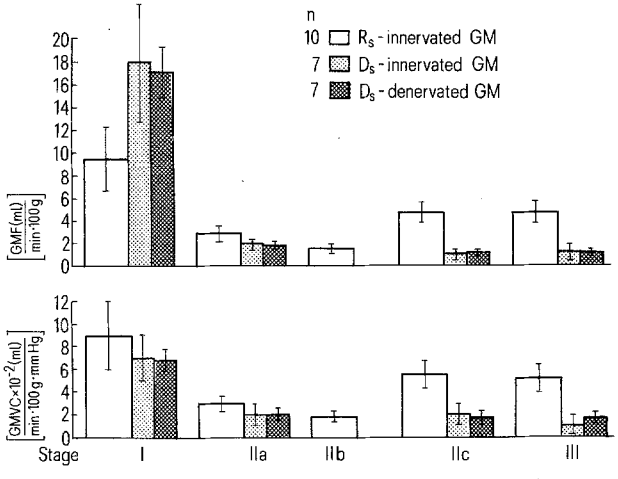
Summary. These studies indicate that the loss of skeletal muscle vascular tone following severe blood loss is not the result of a local reflex initiated by tissue ischemia.

It has long been recognized that severe blood loss results in hypotension and tissue hypoperfusion, and if not corrected early will result in irreversible cellular damage and cardiovascular failure[3]. Studies by our group suggest that a major part of the total cardiovascular decompensation occurs as a result of a paradoxical loss of vascular tone in the skeletal muscle[4–6]. The significance of the peripheral vascular failure has been examined by Rothe and Selkurt[7] who reported a 40% fall in total peripheral vascular resistance between early and late hemorrhagic hypotension. These studies together with recent observations in which we have shown a relationship between vascular decompensation and survival[8] provide evidence that the skeletal muscle vasculature plays a major role in the peripheral vascular failure occurring during severe blood loss. The aim of the present series of investigations was to determine whether or not a local reflex triggered by tissue ischemia may be responsible for the previously reported skeletal muscle vascular decompensation.

Methods and results. To accomplish the stated objectives 3 groups of experiments were conducted using the vascularly isolated cross-perfused canine gracilis muscle preparation reported by us previously[6]. Skeletal muscle blood flow was monitored using an electromagnetic blood flow probe in the venous line draining the vascularly isolated gracilis muscle. Pressures were recorded with the aid of Statham pressure transducers.

The protocol consisted of a controlled step-wise hemorrhage until the shocked animal's mean arterial pressure (MAP) had fallen to 35–40 mm Hg, after which the pressure was maintained by appropriate blood volume adjustments. To facilitate data reduction the basic protocol was divided into the following series of stages. Stage I was the prehemorrhage control; stage IIa was the point during the hemorrhage procedure when the MAP had first reached 35–40 mm Hg; stage IIb was the point during blood loss where maximum skeletal muscle vasoconstriction occurred (or minimum conductance determined by dividing blood flow by perfusion pressure); stage IIc was the point of maximum blood loss during the shock procedure; and stage III was the point when a reinfusion of 25% of the maximum shed blood volume was necessary to maintain MAP at 35–40 mm Hg.

In the 1st group of experiments the recipient animals were subjected to the shock procedure while the vascularly



This histogram represents the hemodynamic response of the vascularly isolated cross-perfused gracilis muscle bed to hemorrhagic hypotension. The 10 R_s-innervated data were taken from experiments in which the gracilis muscle of the shocked recipient animal was perfused by normal donor blood. The D_s data were taken from experiments in which the donor animals were shocked with the result that the arterial blood perfusing the isolated gracilis muscle contained shock elements. This D_s group was further subdivided into innervated and denervated groups. Only the R_s group showed vascular decompensation (vasodilation) in stages IIc and III even though both the innervated and denervated D_s groups had severely compromised flow. The conclusion was reached that vascular decompensation was not the result of a local reflex initiated by tissue ischemia. GMF is gracilis muscle blood flow and GMVC is gracilis muscle vascular conductance. The data is presented as mean ± 1 SEM.

isolated and innervated gracilis muscles of the recipient dogs were perfused with blood derived from a normal donor animal (R_s-innervated GM). The results of this study indicated a progressive fall in both gracilis muscle blood flows (GMF) and gracilis muscle vascular conductances (GMVC) through stage IIb (figure). However, as the experiment progressed into stages IIc and III there was a significant increase in both GMF and GMVC which we interpret as vascular decompensation.

In the 2nd group of experiments the innervated gracilis vascular beds of the recipient animals were perfused with blood derived from the shocked donor animals (D_s-innervated GM). Again the initial response was vasoconstriction in stages IIa and IIb; however, no vasodilation occurred in the subsequent stages IIc and III.

The 3rd group of experiments was similar to the 2nd except that the gracilis muscle was denervated (D_s-denervated GM). The results obtained from these 7 experiments also indicated persistent vasoconstriction which was not followed by a loss of vascular tone.

Conclusion. The data acquired from these 3 groups of experiments suggests that initial vasoconstriction is the result of both increased sympathetic nervous activity and elevated plasma levels of vasoconstrictor agents. In addition, since the vasodilation (vascular decompensation) occurred only in the hemorrhaged animals with intact sympathetic nerves (group 1), and not in either group 2 or 3 the possibility that a local neural reflex plays a significant role in the peripheral vascular failure is unlikely.

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Effect of p-nitrophenylglycerol on motility of rat epididymal spermatozoa

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Summary. Using a convenient capillary tube assay, the antiswarming agent acting on *Proteus,* p-nitrophenylglycerol (PNPG), was found to have produced an antimotility effect in sperms from rat cauda epididymides.

The normal motility pattern in some simple procaryotic flagellates, such as *Escherichia coli* and *Salmonella typhimurium,* can be altered by the presence of many chemicals. These chemicals may exert their effects at any one of the following levels: behaviourally active compounds, including attractants and repellents, act by stimulating chemotactic orientation in the organism[2,3]; uncouplers inhibit motility by shutting off the energy source[4], while other compounds, though not toxic enough to cause an immediate lethal effect to the organism, may disintegrate the coordinated function of the flagella[5]. In addition to these compounds, p-nitrophenylglycerol (PNPG) has recently been reported to be an effective antiswarming agent in preventing *Proteus* contamination[6,7]. Kopp et al.[7] observed PNPG had no effect on the morphology or function of *Proteus* flagella and suggested that it may interfere with the mechanism of negative chemotaxis. Similar studies testing chemicals which might alter the motility of spematozoa were also reported[8]. It appears now that a list of motility-altering chemicals is available for a practical as well as a mechanistic investigation of motility.

The fertilization of eggs in higher organisms requires an aim-at-target directional swimming performed by the randomly distributed spermatozoa. It has also been reported that chemotaxis is essential for fertilization[9]. Various attempts have been initiated to identify effective male contraceptives which act in one way or another to stop fertilization[10-17]. While many of these chemicals have been investigated for their antispermatogenic effects, the approach of inhibiting fertilization at the level of disrupting the directional swimming should not be ignored. This report describes our study on the effect of PNPG in reducing spermatozoa motility.

Materials and methods. Spermatozoa were collected from cauda epididymides of rats weighing 270-320 g (Sprague-Dawley) and suspended in an isotonic pH 7.5 Tris buffer solution[18]. Cell debris was removed by passing the suspension through sterilized cotton cloth and the final concentration of spermatozoa was adjusted to 10 ± 2 million spermatozoa per ml. The quality of the spermatozoa was monitored microscopically, so that only samples from batches with 40% or more spermatozoa showing rapid forward motion were employed.

Quantitative assay of spermatozoal motility was done using a method similar to those employed in the study of bacterial motility[19]. This is a more convenient assay than that using flat capillary tubes[20]. The capillary tubes that contained the test medium were 75 mm long with an internal diameter of 1.1-1.2 mm (Kimble Co., Toledo, Ohio, USA). The capillaries were handled with forceps. One end was sealed in a flame to minimise physical disturbance due to convention and gravity. The capillary was then quickly passed several times through the flame and immediately plunged open end down into a small beaker (10-25 ml) containing about 5 ml of PNPG dissolved in buffer medium. As the capillary cooled, liquid was drawn in about 25-35 mm. This capillary was ready then to be inserted (without rinsing) open end first into a small test tube (10×75 mm) containing the spermatozoa suspension (10 ± 2 million spermatozoa per ml) to a depth of approximately 2 mm.