the race was 1.47–0.13%; after 20 km it was 1.40–0.10% ($p<0.001$).

**Conclusion**: In spite of running through the tunnels, a rise in blood CO was not detected; to the contrary, a decrease was measured. The very low CO level in the last kilometers of the run and the increased minute ventilation during jogging explains this small but significant reduction.

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## Effect of IV Organophosphate Application (Paraoxon [E 600]) on Coagulation in Mini-Pigs

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**Introduction**: Paraoxon (E-600) can cause thrombosis, embolization, and death in mini-pigs. There is little agreement, however, about the extent and nature of the coagulation abnormality induced by paraoxon.

**Purpose**: Establish, in a controlled study, the dose-effect curve between the quantity of paraoxon administered and blood coagulation in the mini-pig.

**Material and Methods:** Animals fasted for 12 h were premedicated with 0.5 mg Fentanyl (orally). After adequate sedation (assessed by clinical impression), 400 mg Ketamine and 2 mg Flunitrazepam were given intramuscularly (IM). The animals were weighed and an ear vein was cannulated (G22). After preoxygenation by mask, muscle relaxation was achieved with 10 mg Alcuronium. Additional intravenous (IV) drugs were given: Lidocaine 2 mg/kg, and Fentanyl 0.15 mg. The animals were intubated with a size 7.0 endotracheal tube and mechanically ventilated to achieve normocapnia [$F_iO_2$ = 0.5 ($N_2O$ + 0.4% Halothane), tidal volume = 10 ml/kg, 20 cycles/min]. Additional doses of relaxant and opiate were given throughout the procedure as needed. *Monitoring and baseline measurements*: continuous BP (carotid artery), CVP (left jugular), capnometry, arterial and venous blood gases, Hematocrit (Hct); [Hemoglobin], coagulation profile (PT, PTT, Factor V, Factor VIII, fibrinogen, and right jugular. The measurements were carried-out every 10 minutes (nine times), and then every 20 minutes (three times). Fluids were administered through the left jugular vein to maintain the Hct close to baseline value. Paraoxon was infused continuously through an ear vein. The control animals did not receive Paraoxon.

**Results**: Low-dose Paraoxon activates intrinsic coagulation (PTT) without having any significant influence on the extrinsic coagulation (PT). Increases in dose did not have any additional effect on either the intrinsic or the extrinsic coagulation pathways.

**Discussion**: The selective influence of Paraoxon on the intrinsic pathway of coagulation is striking. An explanation cannot be offered at this stage. The lack of a dose-dependent relationship and the lack of effect in-vitro implies an indirect effect.

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## Diaspirin Cross-Linked Hemoglobin (DCLHb): An Effective Resuscitation Solution in a Swine Model of Hemorrhagic Shock

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**Purpose**: DCLHb is an acellular, human hemoglobin-based, oxygen-carrying resuscitation solution that currently is being evaluated in clinical safety studies. This study examined the effects of increasing doses of DCLHb in a pig hemorrhagic shock model. Results were compared to infusion of lactated Ringer's solution (LR, 3x hemorrhage volume) and untreated animals.

**Protocol**: Eight treatment groups (5 pigs/group) were hemorrhaged 30 ml/kg in 20 minutes (min) (5 min @ 3 ml/kg/min, then @ 1 ml/kg/min) followed immediately by infusion of either 10 g/dl DCLHb (0.5, 1.0, 2.0, 4.0, 10.0, or 30.0 ml/kg infused at 1 ml/kg/min) or LR (90 ml/kg infused at 3 ml/kg/min). The untreated group received no fluids. Mean arterial blood pressure (MAP) was monitored continuously and a variety of clinical chemistry and cardiovascular variables were monitored at predetermined time points for an additional six hours following resuscitation.

**Results**: The table below presents MAP values (mean—SEM) following hemorrhage and infusion.

| Treatment (ml/kg) | Baseline (mmHg) | End Hem (mmHg) | 5 min-Post (mmHg) | 3 hr-Post (mmHg) |
|---|---|---|---|---|
| DCLHB (0.5) | 119 ±4 | 45 ±1 | 102 ±8§ | 112 ±11†§ |
| DCLHb (1.0) | 114 ±5 | 48 ±7 | 98 ±10†§ | 106 ±3†§ |
| DCLHb (2.0) | 112 ±3 | 50 ±6* | 121 ±4†§ | 111 ±5†§ |
| DCLHb (4.0) | 114 ±4 | 43 ±3* | 112 ±8†§ | 122 ±5†#§ |
| DCLHb (10.0) | 121 ±1 | 79 ±5*†# | 134 ±7†§ | 147 ±8†#§ |
| DCLHb (30.0) | 129 ±9 | 53 ±7* | 138 ±6†#' | 160 ±6†§ |
| LR (90) | 118 ±5 | 47 ±4* | 105 ±8†§ | 103 ±6†§ |
| Untreated | 109 ±2 | 37 ±2* | 56 ±7† | 79 ±8†§ |

*$p$ <.05 vs Baseline
§ $p$ <.05 vs End Hemorrhage
†$p$ <.05 vs Untreated
#$p$ <.05 vs Lactate Ringers(LR)

The MAP in all groups decreased from baseline by end of hemorrhage. The DCLHb and LR groups had significantly greater MAP than untreated animals by 5 minutes after the start of infusion. MAP in the DCLHb and LR groups tended to remain greater than untreated animals through the six-hour study.

**Conclusion**: Infusion of DCLHb produced an immediate and significant increase in MAP when given following hemorrhage in pigs. In addition, DCLHb was as effective as much larger volumes of LR in restoring and maintaining pressure following hemorrhage. DCLHb appears to be an effective fluid for use in resuscitation from hemorrhagic hypovolemic shock.