utilize a previously undescribed property of plasminogen, solubility in dilute mineral acid, to extract it from placental and plasma fractions. Purification of over 250-fold has been obtained by successive extractions with 0.2N H_2SO_4 and precipitations at pH 5.2. The total yield has ranged from a minimum of about 10% to almost complete recovery of the enzyme present in the starting material, with an average recovery of about 30%.

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Observations on Pain and Temperature Perception within the Sternal Marrow Cavity. (18064)

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It is generally known that during the performance of a sternal marrow aspiration, the subject usually experiences an aching pain of one to five dol† intensity at the moment of actual aspiration of marrow contents. This pain is separate and distinct from any discomfort that the patient may experience during the introduction of the aspiration needle and it is not abolished by procainization of the skin and periosteum. In most areas of the body specifically studied, both pain and temperature can be perceived. Many workers (1,2) have shown that distension of the stomach with sufficient force results in pain. Wolf and Wolff(2) have demonstrated that a sense of warmth or cold is experienced when either water warmer than 40°C or colder than 18°C is circulated within the stomach. It is common experience that either pain or temperature sensation may be elicited by suitable stimulation of the skin. The normal bladder possesses both pain and temperature sensation(3).

Therefore, we wished to determine the presence or absence of temperature perception within the sternal cavity.

Sternal marrow aspiration was performed in 3 healthy, young adult males. The procedure was preceded by anesthetization with 4 cc of 2% procaine of the skin, deep tissue and periosteum overlying the site of the puncture. Great care was taken to ensure complete anesthesia of these structures before introducing the needle. An 18 gauge needle was employed. The gross appearance and the stained smears of the material aspirated gave proof that the needle was in the marrow cavity. In each subject warm or cold isotonic saline was injected in random order using a 2 ml capacity Luer glass syringe. Care was taken that the subject received no cue as to the temperature of the saline either from comments of the examiners or from spillage on the skin.

During the entire procedure, the first subject noted, in addition to the pain incident to withdrawal of the marrow sample, a deep burning pain of one to 2 dols intensity. Following marrow aspiration, while the needle remained in the cavity, 4 injections of 1 ml each of isotonic saline were given. The temperature of the 2 injections of cold saline solution was approximately 18°C and of the

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† Hardy, Wolff and Goodell(4,5) define the "dol" as a unit of painfulness equal to 2 just noticeable differences in pain intensity of pain. Ten dols equal the maximum pain.

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warm 40-45°C. Twenty to 30 seconds were required to complete each injection. At the beginning of each injection there was an aching pain which was in every way similar to that experienced during aspiration. This pain diminished before the injection had been completed. There was no temperature sensation experienced by the subject with either the hot or the cold saline solution.

The second and third subjects did not experience the constant deep burning pain noted by the first, but they did experience pain during the initial seconds of saline injection. Neither of these subjects experienced any temperature sensation with the injection of 1.5 ml of isotonic saline ranging in temperature from 16°C to 45°C. No sensations of pressure were felt by the subjects during any of the procedures.

We conclude from these observations that structures in the sternal marrow cavity are pain sensitive while being insensitive to temperature within the range studied. The pain results from traction and pressure upon these sensitive structures without giving rise to a sense of pressure or fullness.

Summary. Pain and temperature sensitivity of the structures in the sternal bone marrow cavity was tested on three normal subjects. Four injections of 1 ml of hot (40-45°C) and cold (16-22°C) saline were made through the anesthetized skin and periosteum of each subject. No temperature sensations were reported although a deep burning pain and an aching pain were reported at the beginning of each injection.

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Metabolites of Pamaquine in Urine.* (18065)

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Pamaquine, (8-(4-Diethylamino-l-methylbutylamino)-6-methoxyquinoline), a derivative of 8-aminoquinoline, exerts a curative action in mosquito-transmitted vivax malaria presumably by attacking a tissue form of the plasmodium which is responsible for relapses (1-4). Two pieces of evidence suggest that the compound exerts its activity *in vivo* through a metabolic transformation product. One, there is no correlation between the mean plasma concentration of pamaquine and its antimalarial effect(3) and two, the drug, although it exerts considerable activity against plasmodia *in vivo*, is relatively inactive in growing cultures of erythrocytic parasites(5).

The usefulness of pamaquine is limited by the frequent occurrence of toxic effects with doses in the therapeutic range. The adverse reactions include the regular production of methemoglobin and the occasional occurrence of acute hemolytic anemia. Since the drug does not produce methemoglobin nor hemolysis *in vitro*, except in concentrations far in excess of those achieved in plasma

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