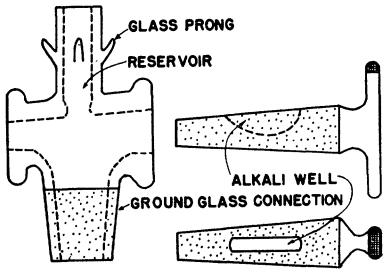

FIG. 1. Apparatus for addition of alkali to a filter paper strip in a Warburg flask side arm.

into the main compartment to stop metabolism and liberate bound carbon dioxide. The center well may be used for storing this acid. After the evolution of carbon dioxide is complete, the manometer is read and the stopcock turned 180 degrees until the alkali well touches the filter paper in the connection. The alkali will then wet the paper strip, absorb the carbon dioxide in the flask, and permit a manometer reading due to oxygen uptake alone. The respiratory quotient may be readily calculated from the two manometer changes and a knowledge of the volume of carbon dioxide originally present in the incubation medium.

For the calculation of volume changes from the manometer readings, it is necessary to use Warburg flasks calibrated with the apparatus inserted. The alkali well should not be included as part of the flask volume in this calibration. The reader is referred to the original papers (*3, 4*) and to standard texts (*1, 2*) for theory and applications.

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The Thromboplastic Potency of Different Morphological Parts of Rabbit Brain

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The thromboplastic materials currently used in blood coagulation studies are generally aqueous suspensions of dehydrated tissues and organs, principally brain, lung, and placenta. Ordinarily, entire organs are used for this purpose, obscuring the possible differences in thromboplastic potency between the morphological parts of the organ. It is the purpose of this paper to present data which indicate that the medullae of male rabbit brains differ significantly from the other morphological parts of the brain in thromboplastic potency.

The materials and methods have in the main been described elsewhere (*1*). For the purpose of this investigation the brain was divided into the following parts: cerebrum, cerebellum, corpora quadrigemini, cerebral peduncle, and medulla. In each experiment, the powders were prepared for extraction and suspension from the pooled similar parts of a dozen fresh rabbit brains.

Normal human oxalated plasma was used. The Quick one-stage method was employed with the following modification: suboptimal[1] concentrations of thromboplastic suspensions were used in order to slow the reaction by deficiency of thromboplastin. Variations in the thromboplastic potency would thus, we believe, tend to be more sensitively reflected in the clotting time.

TABLE 1

PLASMA CLOTTING TIME IN SECONDS WITH THROMBOPLASTIC SUSPENSIONS (0.1 G/10 ML PHYSIOLOGICAL SALINE) OF THE VARIOUS BRAIN PARTS

	Cerebrum	Cerebellum	Corpora quadrigemini	Cerebral peduncles	Medulla
Mean	19.4	20.1	22.1	19.6	33.0
Median	19.4	20.7	21.3	19.7	32.2
Low	16.4	13.3	16.5	15.2	20.4
High	22.2	32.3	34.2	24.3	47.9

The one-stage method was therefore used as a thromboplastin assay instead of a prothrombin test.

The acetone-dried residue of the rabbit brain had a mean dry weight of 1.2 g. Of this, the cerebrum, cerebellum, corpora quadrigemini, cerebral peduncle, and medulla represented 56%, 12%, 4%, 14%, and 12%, respectively. The powders were all cream-colored and had a faint characteristic odor. Insufficient trituration[2] yielded a cork-colored material with granular aggregates, and prolonged trituration produced a very fine, whitish powder. Both the latter products yielded much less active thromboplastic suspensions. The cause for this is not yet known.

Table 1 shows the summarized data of the clotting times of seven sets of preparations of the various brain parts, using 17 different normal plasmas. Each preparation represents the pooled similar parts of 12 rabbit brains. It is seen that the cerebral preparations were generally not only more active, but they also showed smaller variation than any other brain part. Statistical analysis (Student's "t" test) showed that the differences between cerebrum, cerebellum, corpora quadrigemini, and cerebral peduncle were not significant. There was, however, a highly significant difference between the medulla and the other brain parts as a whole ($p < .005$), as well as between the medulla and other brain parts individually.

It was of interest to determine whether the lower potency of thromboplastic suspensions from medulla

[1] By optimal concentration is meant that obtained from the smallest amount of powder/10 ml saline which will yield the shortest clotting time for normal plasma in the one-stage method. In our laboratory this is 0.5 g powder/10 ml saline. It clots plasma in about 11–12 sec. The suboptimal concentration used was 0.1 g/10 ml.

[2] In Waring blendor with acetone.

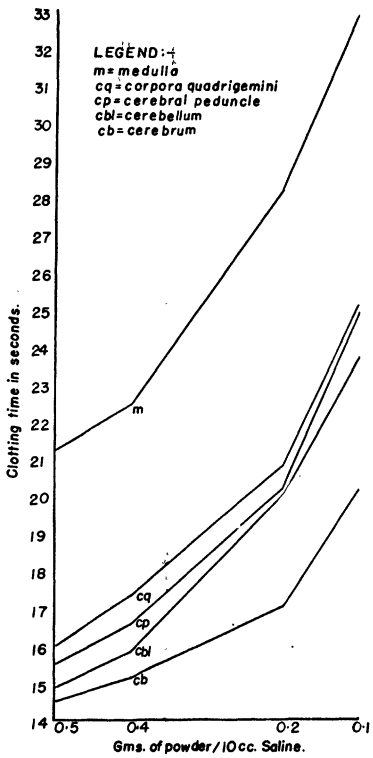

FIG. 1. Comparison of the thromboplastic potency of the various brain parts in different concentrations.

was also evident when greater concentrations of powder were used.

Fig. 1 presents the data obtained with the pooled brain parts of a dozen rabbits used in the various concentrations. It is seen that the clotting times of the 0.1 g/10 ml extracts correspond well to the means of Table 1, and that the difference between medulla and the other morphological parts of the brain is also evident at the higher concentrations of thromboplastic suspensions.

It is too early to attribute general significance to the data presented here; such analyses must await further studies. An immediate result, however, has been the improvement of the thromboplastic preparations used in the prothrombin determination in the clinical laboratory. These are now prepared minus the medulla. Phenol to a final concentration of 0.25% is

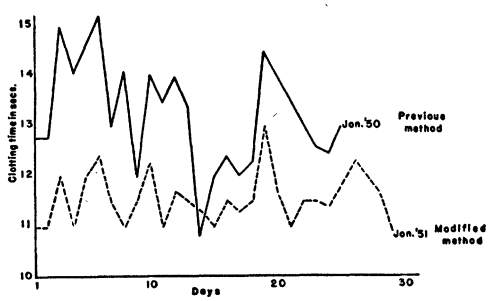

FIG. 2. Comparison of routine control prothrombin times obtained with the former and with revised thromboplastic preparations.

also added to the suspensions to prevent bacterial growth, which seriously reduces the potency of the thromboplastic suspensions (*2*). The behavior of these preparations has been gratifying: activity has been increased, and variation between normal controls has been reduced (Fig. 2). Normal control times range between 10–13 sec and are largely between 11–12 sec. The resulting preparations have also been very stable; large amounts of such suspensions have been kept in the refrigerator for a month, with portions removed for daily routine use, with no apparent deterioration.

References

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The Viscosity of the System Methanol-Toluene

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The viscosity composition curves of many binary liquid systems have points of inflection, and when the components are of nearly equal viscosity they may even exhibit maxima and minima where the viscosity is respectively greater or smaller than that of either pure component. Such curves have been reported for the systems formamide-isobutyl alcohol and formamide-isoamyl alcohol (*1*).

Viscosity data on the system methanol-toluene at 20° C lead to a strikingly similar curve (Fig. 1). The

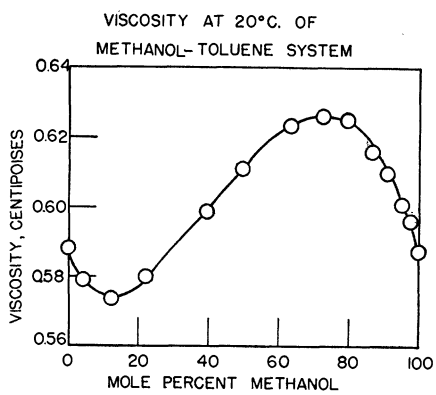

FIG. 1.

density determinations were not precise enough to show whether there is any dilatation when mixing small amounts of methanol with toluene, but showed a definite contraction when the solution contained more than 20 mole % methanol (Fig. 2).

The methanol used for these experiments was Baker's C. P. Analyzed Absolute Methanol, assay (by vol) 99.5%. The toluene was bought from Central Scientific Company and was labeled "Toluene for Technical Use." These materials were purified by