4 times greater than that of the natural peptide. From the fact that the tissue peptide contains 30% lysine, it is possible to conclude that the activity resides within the lysine portion of the molecule. Additional evidence to support the implication of lysine was obtained from a comparative study on the mode of inactivation of these peptides by desoxyribonucleic acid (DRNA) and ribonucleic acid (RNA). Both peptides combine stoichiometrically, at pH 6.5 with DRNA but not with RNA; it is apparent that both peptides combine with RNA in multiple proportions depending upon the relative concentrations of the reactants. In this respect, the similarity between the RNA-peptide interaction and antigen-antibody reactions is pointed out. A mechanism by which the tissue polypeptide could take part in the natural resistance of animals to infection and the possible role of these basic peptides in fibrinoid degeneration is discussed.

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Received July 31, 1952. P.S.E.B.M., 1952, v81.

Use of Radioactive Iodinated Human Serum Albumin as Tracer Agent in Study of Cerebral Disorders.* (19770)

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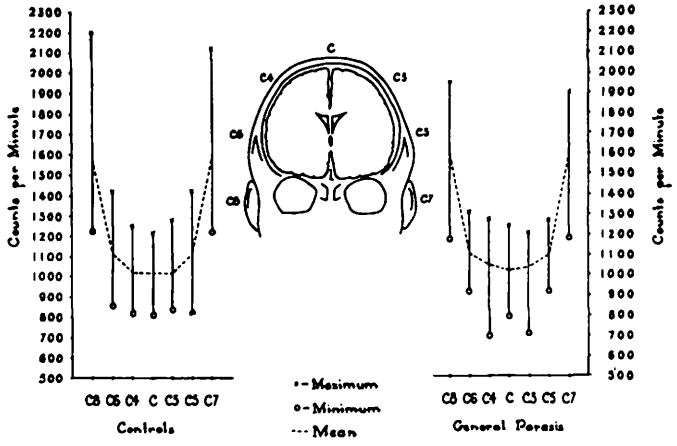
During the past 4 years diiodofluorescein (DIF)(1-7), radioactive potassium(8,9), iodinated human serum albumin (RIHSA)(10), sodium iodide(11), and radioactive copper (12) have been used in the study of intracranial lesions by the isotope-encephalometric technic. An increased radioactivity at a particular site has been used as evidence of the possible presence of a neoplasm. The reported accuracy of localization of tumors has varied from 5%(13) to 95%(5). Technics have varied with advances in the instruments used. Emphasis has been placed on the study of patients with known or suspected tumors. In previous studies with DIF by the authors (14) increases in uptake above 10% were observed in 21 of 25 cases of cerebral neoplasm, diagnosed by operation or autopsy. However, wide variations in uptake on repeated studies were observed in some of the patients with neoplasms. Accurate studies of control groups were difficult due to the rapid excretion of

* This investigation was supported in part by a research grant from the National Institute of Neurological Diseases and Blindness, of the National Institutes of Health, Public Health Service.



Variations in Uptake at "C" Positions From Patient to Patient

FIG. 1.

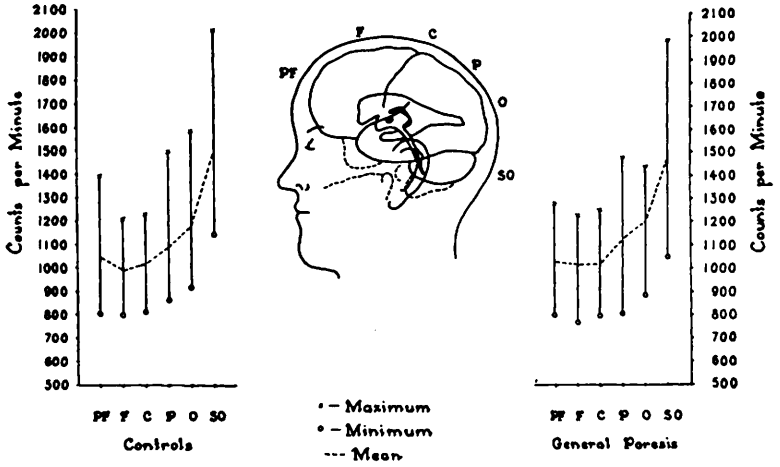
DIF. For this reason the present studies were undertaken with RIHSA. Chou *et al.* (10) have emphasized that one of the advantages of RIHSA is that it remains in the tissues for several days. This permits repeated counting on each patient.

It is the purpose of this communication to present an analysis of data obtained with reference to: 1) variations in the level of uptake of RIHSA in normal individuals and in patients with diffuse cerebral diseases, and 2) variations in uptake from symmetrical paired positions in normal individuals, patients with diffuse cerebral disease, and patients with focal cerebral neoplasms.

Method. All patients were given 10 drops of Lugol's solution 3 times daily for 2 days prior to the intravenous injection of a standard dose of 200 microcuries of RIHSA.† A survey of the radiation arising from within the skull 24 hours after injection was made by placing a shielded GM tube over 32 standard areas (6 midline and 13 symmetrical, paired positions). One minute counts were taken at each position. An elastic rubber bathing cap was placed over the head, and all points were measured to be certain of accurate symmetrical positioning. A Mark 1, Model 13, bismuth cathode end-window Geiger-Muller tube was used (Radiation Counter Laboratories). It was held in a cylindrical lead shield of one-half inch thickness. This tube assembly was placed on the area to be measured in such a way that the tube axis was normal to the skull. The pulses from the tube were fed directly into a scaling circuit, and readings were obtained in counts per minute. When significant differences in uptake between symmetrical paired positions were observed these counts were checked until reproducible results were obtained.

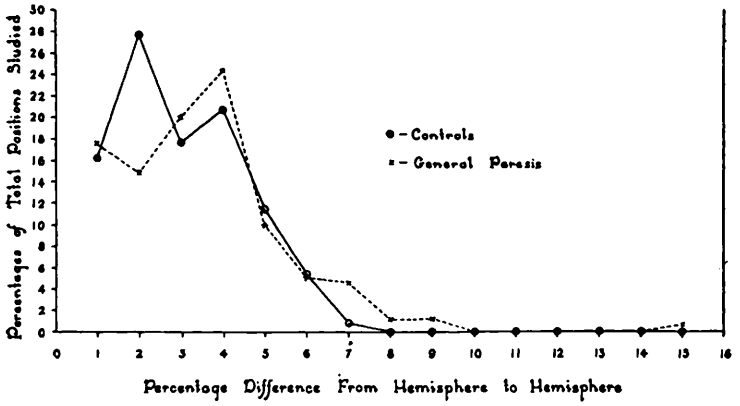
Results. 1. *Variation in the level of uptake of RIHSA at any given point.* In 10 normal healthy adults and 13 patients institutionalized with general paresis the uptakes in each individual at 32 sites were studied following the injection of RIHSA. The uptakes obtained in the seven positions extending from the left temporal to the right temporal area are plotted in Fig. 1. In the group of controls a wide variation from person to person in the absolute counts per minute with constant dosage was observed. For example, in the C8 position the counts varied from 1200 to 2200 counts per minute. The dotted line represents the arithmetic mean at each of the 7 positions. This describes a symmetrically concave curve and is similar to the pattern observed in individual uptakes. In the group of patients with general paresis (Fig. 1) the variation in levels of uptake is similar to that observed in the normal group. Also the curve

† Obtained from the Abbott Laboratories, North Chicago, Ill.



Variations in Midline Uptake From Patient to Patient

FIG. 2.



Variations in Percentage Uptake Within the Same Patient

FIG. 3.

of the means for this group is almost identical with the control group.

The level and range of uptake of the 6 median sagittal positions are presented in Fig. 2. In the normal controls there is a wide range of variation in uptake. The mean at each point is plotted along a dotted concave curve. This curve is similar to the pattern observed in individual uptakes. In the patients with general paresis the variation in level of uptake was similar to that observed in the normal group. The curve of the means is almost identical with that in the normal group. This variation was not altered when correction was made for the patients' weights.

2. *Variation in the uptake of RIHSA at symmetrical paired positions in the same individual.* The percentage differences in uptake between the 13 paired symmetrical positions in each of 10 controls and 13 patients with general paresis were determined. The frequencies with which increasing percentage differences were obtained are presented in Fig. 3. In the control group the greatest difference observed between paired positions was 7%. In the group with general paresis a similar distribution was observed with an

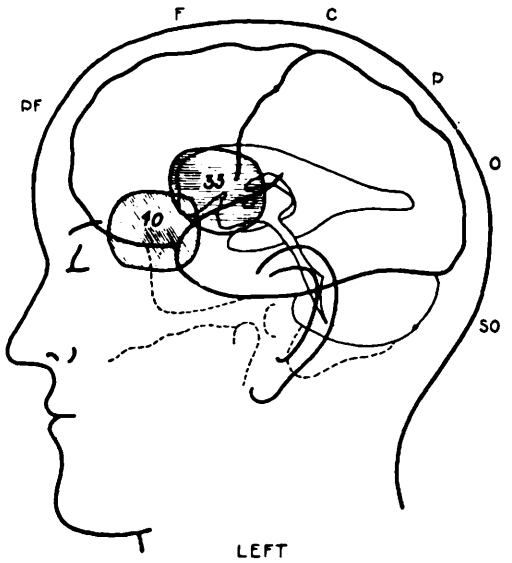


FIG. 4. Localization of meningioma using RIHSA. Figures in shaded areas indicate % increase in radioactivity over symmetrical position on the right side.

occasional difference as high as 9%, and one of 15%.

In patients with cerebral neoplasms which show an increased uptake of RIHSA the percentage differences in symmetrical positions varied widely—from 12 to 64%. A representative example is presented in Fig. 4.

Discussion. The possible localization of cerebral neoplasms by various methods using radioactive materials has been studied by many investigators in the past four years. If a sufficiently accurate method were available it would have a wide range of clinical usefulness. The present studies indicate that with the methods used there is a wide variation in uptake of RIHSA by the brain. This is related both to biological factors, such as the distribution of RIHSA in the body tissues and to technical factors. The significance of this method in the localization of cerebral neoplasms depends upon more extensive studies of normal individuals and patients with a wide variety of cerebral disorders in addition to patients with cerebral neoplasms. These studies are in progress.

Summary. 1. The use of RIHSA in studies of cerebral disorders is presented. With a 200 μc dose of RIHSA wide individual variations in uptake at each position were observed. The patterns and the levels of uptake in normal individuals were similar to the patterns and levels of uptake observed in patients with general paresis. 2. The percentage differences in uptake at symmetrical positions in normal individuals and in patients with general paresis were similar. This percentage difference rarely exceeded 10%. In contrast with this patients with cerebral neoplasms, who showed an increased uptake at the site of the tumor, showed differences in uptake from 12 to 50%.

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