graphic analysis has shown that this product contains three organic acids, one of which we have been able to identify as glycollic acid. It may be noted that we have found titration in glacial acetic acid to be a good method of analyzing the reaction product for rhodizonate. Our titration experiments suggest furthermore that this is a promising means of studying the rather puzzling barium salts of rhodizonic acid and related compounds.

References

1. JOANNIS, J. *Compt. rend.*, **116**, 1518 (1893).
2. ———. *Ann. chim.*, **7**, VIII, 107 (1906).
3. ———. *Compt. rend.*, **138**, 874 (1914).
4. NIETSKI, R., and BENCKISSER, T. *Ber.*, **18**, 1833 (1885).

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Localization of Brain Tumors with Radioiodide[131] [1]

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Radioactive diiodofluorescein (DIF*)[2] and radioactive iodinated human serum albumin (RIHSA*)[2] have been employed with great success in isotope-encephalometric localization of brain tumors (*1–4*). These agents are not specific for cerebral tumor tissue. The localization obtained with an isotope-encephalometer is merely indicative of an area in the brain in which the blood-brain-barrier has been disrupted, thus allowing extravascular diffusion of anions. At this clinic a constant effort has been made to further simplify and improve the procedure. It has been demonstrated that iodine[131] as NaI*[3] may be used in place of DIF* or RIHSA* and give very satisfactory results.

The procedure calls for an oral administration of a tracer dose of NaI* of about 300/μc to the patient suspected of having a brain tumor and who has been "lugolized" to block the thyroid. Lugolization of the patient is accomplished by giving Lugol's solution 10 drops three times daily for 3–4 days starting 24 hr prior to the administration of the tracer. The effectiveness of this technique has been reported elsewhere (*1*). After lugolization, the thyroid uptake of I^{131} by the end of 24 hr is less than 1% of the administered dose. The NaI* is excreted rapidly through the urine (30–70% in the first 24 hr); thus 3–4 days of lugolization are more than adequate to safeguard the thyroid gland.

Best results can be obtained by waiting for an hour after the oral administration of NaI* before the head survey is started. With the scintillation counter (*5*) at present in use the counting rate will reach, over different positions of the head, 4000–7000/min. This is roughly half the cpm obtained 24 hr following intravenous administration of RIHSA* of the same amount of activity as NaI*; or that obtained half an hour following intravenous administration of ½ mc of DIF*.

TABLE 1

SUMMARY OF 16 CASES*

Patient	IEM	How verified	Diagnosis
G.O.	No focus	Negative angiogram	No tumor
H.F.	Left deep temporal focus	Angiogram and air study	Not operated upon because of advanced heart disease
J.K.	Left deep frontotemporal focus	Angiogram	A-V angioma
G.T.	Right temporal focus	Craniotomy	Glioblastoma
C.H.	Right frontal focus	"	Astrocytoma
F.L.	Left temporal focus	"	Metastatic tumor
P.M.	Anterior fossa focus, probably midline	"	Olfactory grove meningioma
L.H.	Left frontotemporal focus	X-ray	Metastatic from breast cancer
D.V.	Right midtemporal	Craniotomy	Astrocytoma
J.H.	Right temporal-parietal	Negative air study	No tumor
E.R.	No focus	Negative air study	" "
M.S.	Left post-fossa focus	Craniotomy	Chronic inflammatory process
R.S.	Right temporal focus	"	Glioblastoma

* Nine tumors correctly diagnosed, 2 tumors ruled out, 1 chronic inflammatory focus localized, 1 false positive, 3 under observation.

Up to the time of this report 16 patients have been studied with this technique. A summary of the isotope-encephalometric and other diagnostic and/or operative findings is given in Table 1.

Table 2 illustrates a case of correct localization by using NaI*.

In this case, the highest "differential uptake" ever recorded in this clinic with I^{131}-containing tracers was obtained. In most of the tumor-positive patients of this group the "differential uptake" was greater as compared with those of the same types of tumors subjected to either the DIF* or RIHSA* techniques re-

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[2] Both DIF* and RIHSA* are obtainable from Abbott Laboratories, North Chicago, Ill.

[3] Obtained from Oak Ridge National Laboratory. (Note: Sometimes radioiodine[131] is shipped as an iodate.)

TABLE 2*

Position	cpm	%D
Anterior temporal region	R ——→ 4920 L ——→ 5086	L. 2.5
" frontal	R ——→ 4760 L ——→ 3618	Rt. 24
Midtemporal	R ——→ 5325 L ——→ 4108	" 22
Midtemporal (above ears)	R ——→ 5614 L ——→ 2916	" 48
Posterior temporal	R ——→ 3679 L ——→ 3147	" 15

* D.V. 3½ U.H. 814982 7-2-51.
Tracer: I^{131} 100/μc.
Counter: scintillation.

Interpretation: Extensive focus in right frontotemporal region. Craniotomy: Extensive cystic astrocytoma in right frontal and temporal lobes.

ported previously. Further data are needed to clearly substantiate this point.

If the high "uptake" of $(I^-)^{131}$ in tumor tissue is due to disruption of blood-brain-barrier (BBB), plus an abnormality of protein-binding in the tumor tissue, it would be reasonable to venture the hypothesis that $(I^-)^{131}$, being a negative ion, will readily penetrate through the disrupted BBB and be bound to "abnormal protein radicals" present in the tumor tissue. Since NaI* per se will supply more available $(I^-)^{131}$ than either DIF* or RIHSA*, the high difference of uptake seems to be reasonable.

The advantages of $(I^-)^{131}$ are: (1) economy, (2) ease of oral administration, and (3) adequate localization characteristics.

References

1. CHOU, S. N., *et al. Proc. Soc. Exptl. Biol. Med.*, **77**, 193 (1951).
2. MOORE, G. E., *et al. Radiology*, **55**, 334 (1950).
3. ———. *J. Neurosurg.*, **5**, 392 (1948).
4. MOORE, G. E. *Science*, **107**, 569 (1948).
5. KOHL, D. A., MOORE, G. E., and CHOU, S. N. *Nucleonics*, **9**, (1), 68 (1951).

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Mechanical Group Therapy[1]

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Therapeutic relaxation (TR) purports to be primarily a self-help treatment system. It can be used for individuals or groups, with or without a recording device. The treatment for all patients is the same. No effort is made to select those with a particular type of disease or disorder for this therapy. Some symptomatic improvement has been reported by most patients. TR can also be used prophylactically from the mental health standpoint.

This mental health program is recorded on reels of tape. Each daytime broadcast is divided into a half-hour discussion period and a half-hour treatment period. The 100 discussion periods are of four general types, which serve in part to give plausible explanations for the whys and wherefores of the treatment periods and the sleep program. The 20 daytime treatment periods are made up of a series of simple repetitive phrases (recitations) that have been recorded at a monopitch. The scanning, droning monotone is intended to create a soporific effect. The sleep program is comprised of these recitations only.

A reel of tape plays for 30 min. Each of the 20 reels is used for both the treatment periods and the sleep program, and each reel contains a different set of recitations. Each reel has its set of 8 recitations recorded on both sides of the tape. When one side of a reel has been played out, it is "pancaked" by a nurse or hospital aide. Thus, time is not lost in rewinding.

It is believed that two of the recitations—the first and the eighth—can be very important. For this reason, both appear on each of the 20 reels. Each lasts for 6 min as compared with 3 min for each of the intermediate six recitations. The first recitation is "I *can* rid myself of any symptoms, completely and in less than a minute." The eighth recitation is "I'm not *overly* dependent on medicines or doctors."

Periodically, the phrase "Pay attention, pay attention" is heard because the recitations used all through the night are also broadcast during the treatment periods of each forenoon and afternoon program. For the same reason the phrase "Mind a blank, relaxing more" appears from time to time.

The daytime program schedule is essentially as follows: Between 9:00 and 10:15 A.M., between 1:00 and 2:15 P.M., and between 4:00 and 4:30 P.M. This last half-hour is a "live" group therapy period and is held the first 4 workdays of each week. All other portions are transcribed and broadcast 7 days a week.

Sleep program. It is difficult in some ways to separate the night portion of TR from the remainder of the mental health program. I hasten to say that the benefits to be mentioned later are not to be ascribed to the sleep program alone. The sleep therapy component of TR was first used at the Aiea Heights Naval Hospital in June 1945. The opportunity for considerably more extended observations did not appear until five years later, when the sleep treatment study was renewed on the neuropsychiatric service at Kennedy Hospital in May 1950.

Recitations constitute the sleep program, which is broadcast 7 nights a week. Wires run from the tape recorder to a loudspeaker on each of the five wards of this neuropsychiatric service. The volume levels can be controlled independently from each adjacent nurse's office.

Because the sleep program reels are also used during the treatment periods in the daytime therapy ses-

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