from dystrophic muscle decreased during the 7-14 day culture period, whereas no comparable decrease was observed in cultures of normal tisue. Changes in the DNA content did not indicate definite differences. 4) Differences between several parameters determined in normal and dystrophic human muscle tissue cultures were found to be highly inconsistent or of no apparent relevance for the pathological state of the tissue.

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Changes in Liver Tyrosine-α-Ketoglutarate Transaminase Activity During Growth of Walker Carcinosarcoma 256. (26060)

GENE GIRKIN AND RALPH F. KAMPSCHMIDT

Biomedical Division, Samuel Roberts Noble Foundation, Inc., Ardmore, Okla.

The tyrosine oxidizing system of liver is a series of enzymes converting tyrosine to fumarate and acetoacetate in the presence of α-ketoglutarate(1). A decreased tyrosine oxidation was observed in liver of rats fed a low protein diet(2). More recently, evidence has been presented suggesting that the lower level of tyrosine oxidation resulted from a decrease in activity of the initial enzyme in the tyrosine-oxidizing-system, tyrosine-α-ketoglutarate transaminase(3).

In addition to low protein diet, a decrease in liver tyrosine-α-ketoglutarate transaminase activity has been reported in rats subjected to tourniquet injury(4). An increase in activity of the enzyme has been reported following injection of hydrocortisone(5). An adaptive increase in tyrosine transaminase activity followed tyrosine injection. However, tyrosine was an effective stimulus only if the adrenal glands or hydrocortisone also were present(5). This discovery suggested that adrenal steroids played a major role in regulation of activity of this enzyme.

A number of studies have suggested an altered activity of the adrenal gland in tumor-bearing animals(6). Also, tumor-bearing animals generally exhibit a loss of appetite, particularly during late stages of tumor growth. It was therefore of interest to study the effect of tumor growth on liver tyrosine-α-ketoglutarate transaminase activity.

Methods. Female Holtzman rats weighing 160-200 g were used in these experiments. The Walker carcinosarcoma 256 was transplanted by injecting a cell suspension of tumor into both *rectus femoris* muscles according to the method of Talalay *et al.*(7). All animals were fed a diet of Rockland rat chow and water *ad libitum*.

Livers to be used for transaminase determination were excised and chilled immediately in cracked ice. After chilling, livers were perfused with cold isotonic saline and homogenized in a Potter-Elvehjem homogenizer with sufficient 0.15 M potassium chloride to give a 10% homogenate. The homogenates were centrifuged at 15,000 × g for 20 minutes at 0°C. Tyrosine-α-ketoglutarate transaminase activity was determined on the supernatant according to the method of Lin and Knox(5). Enzyme activity was expressed as μmoles of *p*-hydroxyphenylpyru-

vate formed per g dry weight of liver per hour.

To facilitate comparison of enzyme activity with tumor growth, animals were divided into 3 groups based on tumor weight as related to body weight. Tumors comprising less than 10% of body weight were considered "small," those 10-25% of body weight "medium," and those greater than 25% of body weight were designated "large."

Partial hepatectomies were performed according to the procedure of Higgins and Anderson(8). After 7 days animals were sacrificed and tyrosine-α-ketoglutarate transaminase activity determined on the regenerating liver.

Results. Data illustrating effect of growth of the Walker tumor on liver tyrosine-α-ketoglutarate transaminase activity are presented in Table I. No significant difference in enzyme activity was apparent in animals with tumors less than 10% of total body weight. A moderate increase in enzyme activity was noted in livers of rats with tumors 10-25% of body weight, while a 2-fold increase in transaminase activity was observed in livers from rats with tumors greater than 25% of total body weight. Thus, the tumor exerted little effect on liver tyrosine transaminase activity until the late stages of tumor growth.

An increase in glutamate-oxalacetate transaminase activity in regenerating liver 5-10 days following hepatectomy has been reported (9). It was of interest to determine if such an increase occurred with tyrosine transaminase since an increased mitotic activity is known to occur in livers of tumor-bearing animals(6). From data presented in Table II it was apparent that no change in tyrosine transaminase activity occurred in regenerating liver. Therefore, it seemed unlikely that the increase in enzyme activity observed in late stages of tumor growth was the result of an increase in mitotic activity.

TABLE I. Effect of Growth of Walker Tumor on Liver Tyrosine-α-Ketoglutarate Transaminase Activity.

Group	No. of animals	Enzyme activity*	P value†
Normal	16	134 ± 7‡	
Tumor§–Small	9	125 ± 9	>.200
Medium	8	188 ± 18	<.005
Large	13	269 ± 31	<.001

* Expressed as μmoles of *p*-hydroxyphenylpyruvate formed/g dry liver/hr.
† Compared with normals.
‡ Mean ± stand. error.
§ Small tumor, <10% body wt; medium tumor, 10-25% body wt; large tumor, >25% body wt.

TABLE II. Tyrosine-α-Ketoglutarate Transaminase Activity in Regenerating Rat Liver.

Treatment	No. of animals	Enzyme activity
Untreated	7	145 ± 8*
Sham	5	144 ± 12
Hepatectomy†	8	156 ± 11

* Mean ± stand. error.
† Hepatectomies were performed 7 days prior to transaminase determination.

Discussion. An elevated free tyrosine concentration in livers of tumor-bearing animals could account for the increased tyrosine transaminase activity. However, this possibility appeared to be eliminated since a lower than normal concentration of free tyrosine has been reported in livers of animals bearing the Walker tumor(10).

A 10-fold increase in liver tyrosine-α-ketoglutarate transaminase activity has been reported following injection of hydrocortisone (5). Unfortunately, little reliable information is available concerning functional status of the adrenal gland in tumor-bearing rats. However, Nadel and Burstein(11) have reported a 3-fold increase in urinary corticosteroids in late stages of tumor growth in guinea pigs. These authors suggested that the general stress associated with neoplastic diseases resulted in an increased adrenocortical activity. On the basis of available evidence, it appears that the increase in liver tyrosine-α-ketoglutarate transaminase activity in latter stages of tumor growth may be related to an increased adrenal steroid production.

Summary. Liver tyrosine-α-ketoglutarate transaminase activity was not affected by Walker carcinosarcoma 256 in the early stages of tumor growth. During latter stages of tumor growth a 2-fold increase in liver tyrosine transaminase activity was noted. No change was observed in tyrosine transaminase activity in regenerating liver; therefore, it

seemed unlikely that increased transaminase activity in the late stages of tumor growth resulted from an enhanced liver mitotic activity.

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Selective Depression of Sympathetic Transmission by Intravenous Administration of Iproniazid and Harmine.* (26061)

LEON I. GOLDBERG AND FRANCES M. DACOSTA†

Section on Experimental Therapeutics, National Heart Institute, Bethesda, Md.

Gertner(1) demonstrated that when the superior cervical ganglion of the cat was perfused with monoamine oxidase (MAO) inhibitors, transmission through the ganglion was blocked. With low concentration of the inhibitors, the depression of transmission developed gradually, unlike the immediate blocking effects of hexamethonium. The present study was designed to compare the effects of intravenous administration of 2 MAO inhibitors, iproniazid and harmine, on transmission through sympathetic and parasympathetic ganglia of the dog and cat.

Methods and materials. (a) Dog Experiments: Mongrel dogs of both sexes were anesthetised with a mixture of pentobarbital, 15 mg/kg and barbital 225 mg/kg administered intravenously. Vagus nerves were cut bilaterally in the neck and mechanical respiration was provided. The chest was opened transversely, 2nd and 3rd ribs were removed, and a Walton strain gauge arch was sutured to the right ventricle. Heart contractile force and carotid arterial pressure were recorded with a Grass Polygraph as previously described(2). The stellate ganglion and sympathetic trunk were exposed on one side. The sympathetic trunk was crushed and ligated at the level of the 4th thoracic ganglion and a shielded 27 gauge silver wire electrode was placed on a presynaptic sympathetic nerve between 2nd and 3rd thoracic ganglia. A similar electrode was placed on a suitable postsynaptic sympathetic nerve. Pre- and post-synaptic nerves were stimulated by means of a Grass Model S-4G stimulator for 10 sec. periods at a frequency of 17 cycles/sec. with monophasic pulses of 0.5 sec. duration. Maximum increments in heart rate to increasing voltage was ascertained for pre- and post-synaptic nerves and the nerves were stimulated alternately with such voltage (ranging from 3-15 volts) during the course of experiment. The vagus was stimulated at 5-10 minute intervals with a fixed voltage which had previously been found to produce marked bradycardia. Anatomical dissection in the dog is described by Mizeres(3) and the technic for stimulation is essentially that de-

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