mal in size and appearance. Subsequent histo-cytologic studies showed no anatomic abnormalities. Usual doses of endocrine replacement medications were sufficient.

Post-hypophysectomy, the patient rapidly improved. At three months, the following changes have occurred: (CLINICAL) 1) skin less pigmented, 2) acanthosis nigricans much improved, 3) liver about half former size, 4) beginning subcutaneous fat deposition. (LABORATORY) 1) serum no longer lipemic, with neutral fat levels returned to normal, 2) liver function tests returned to normal, 3) hyperinsulinism and insulin resistance less severe.

Our pre-hypophysectomy studies showed immunoreactive growth hormone levels to be low normal with no significant increase following intravenous insulin or arginine. These pre- and post-hypophysectomy findings suggest that the central problem involves the pituitary's secretion of an abnormal hormone with melanotrophic and growth hormone properties.

Regulation of growth and plasma growth hormone in a Laron's dwarf. M. JOYCELYN ELDERS, JOHN T. GARLAND, WILLIAM H. DAUGHADAY, DELBERT A. FISHER, and EDWIN R. HUGHES. *Univ. Ark. Med. Ctr., Little Rock, Ark., Washington Univ., St. Louis, Mo., and UCLA, Torrance, Calif.*

Laron identified a group of children with severe growth failure and high levels of immunoreactive human growth hormone (IR-HGH). To investigate why these patients often have elevated HGH, we studied a 7½ year old Saudia Arabian boy with a height of 85 cm (HA 2 yrs) and basal IR-HGH levels of 32 to 84 ng/ml (normal—less than 5 nanagrams per ml). Fasting blood sugars were often in the hypoglycemic range, and hyperglycemia induced by glucose infusion did not suppress his high IR-HGH. The serum IR-HGH was increased markedly by arginine infusion. High dose HGH treatment (7.5 mg q 12 hrs × 9 doses) did not modify his IR-HGH response 1 hour after arginine (increment over control was 111 and 121 ng/ml before and after treatment). Plasma sulfation factor (SF) was low and did not rise with treatment, as it does in the usual HGH deficient patient. Chronic administration of HGH (2.5 mg 3 × per week) produced a modest growth acceleration of 2.6 cm over the 5 months period compared to an expected response of 6.5 to 12 cm per year, in patients lacking HGH.

These studies suggest that the persistently elevated IR-HGH is due to either a lack of SF to suppress the hypothalamic growth hormone releasing factor or that the hypothalamic HGH receptors share the same defects as those receptors responsible for the initiation of SF synthesis. Regardless of the interpretation, the IR-HGH in these patients does not appear to be under the hypothalamic control system demonstrable in normal individuals.

Glucagon stimulation test (GST): Its effect on glucose homeostasis and growth hormone release in the normal and hypopituitary patient. H. LAWRENCE VALLET, CARLOS CINTRON, THOMAS MOSHANG, JR., and ALFRED M. BONGIOVANNI. *Univ. of Pennsylvania Sch. of Med., The Children's Hosp., Philadelphia, Pa.*

Glucagon causes pituitary polypeptide hormone release in patients with normal pituitary function. We have assessed the effect of a standard dose of glucagon, 0.5 mg. I.M., in 17 patients ages 9 mos. to 14 years who presented with short stature of various etiologies. Results reveal that glucagon induces growth hormone (GH) levels equal to or greater than those achieved by either an Insulin Tolerance Test (I.T.T.) or Arginine Tolerance Test (A.T.T.). A 17 mμg/ml difference in GH levels was noted at 90 to 120 mins. after the glucagon injection. Among the normal respondents (≥5.0 mμg/ml rise), there were neither false negative nor false positive tests when compared to a matched I.T.T. or A.T.T. One glucagon non-respondent (≤1.0 mμg/ml) also had a negative exercise tolerance test yet had a blunted A.T.T. One patient with a blunted G.S.T. had a normal I.T.T.

After glucagon, the mean glucose levels of the growth hormone deficient patients were 20 mg% higher than in the normal patients. Their lowest blood sugar occurred later in the test than in the normal and subnormal respondents. A "back-to-back" A.T.T.-G.S.T. done the same day induces two peaks of growth hormone without risk of hypoglycemia, and may be the most reasonable screen for this type of patient. Glucagon may be used to further our understanding of the abnormalities of glucose homeostasis in growth hormone deficient patients.

Growth hormone (GH) as a therapeutic agent in patients with intrauterine growth retardation (IGR). THOMAS P. FOLEY, JR., MAURICE SHAW, ALICE BAGHDASSARIAN, PETER NISSLEY, ROBERT G. THOMPSON, and ROBERT M. BLIZZARD. *Johns Hopkins Univ. Sch. of Med., Baltimore, Md.*

Eleven patients with IGR of unknown cause were studied; 4 of 5 followed for 12–19 months on GH grew significantly. In 9 of 11 the bone age (BA) was significantly retarded. Pretreatment growth rates (GR) were less than expected for chronological age (CA). All secreted normal amounts of GH with arginine infusion and insulin hypoglycemia before and after therapy.

The data is summarized below in 5 patients:

Patient	Birth Wt	Birth Lt	Gestation	Onset of therapy			Growth rate (cm/year)				
							Pre-Rx	on HGH: dose mg/day			
	Gm	Cm	weeks	CA	HA	BA		5mg	2.5mg	2.0mg	1mg
A.W.	1650	48.5	39	9 11/12	6 8/12	6 3/12	4.6	10.2	—	—	7.2
C.V.	1920	43.4	39	8 8/12	3 9/12	6 0/12	5.3	—	—	—	8.0
M.S.	2180	48.5	39	6 6/12	2 10/12	4 6/12	4.2	11.4	—	5.2	5.5
J.S.	1760	42.0	39	4 4/12	1 9/12	2 8/12	5.5	13.4	—	8.9	7.6
G.R.	3104	43.2	39	12 11/12	7 2/12	11 0/12	4.3	—	6.8	—	4.4

Conclusions: (1) Exogenous GH accelerates growth rates in some patients with IGR; (2) Higher doses are required to accelerate growth to the GR attained in patients with GH deficiency; (3) Some patients with IGR with skeletal retardation may be candidates for exogenous GH therapy when available in abundant supply.

Newborn urinary cyclic AMP and developmental renal responsiveness to parathyroid hormone. LOUIE G. LINARELLI. *Mercy Hospital and Children's Hospital of Pittsburgh, Pittsburgh, Pa.* (Intr. by Thomas Oliver).

Since the renal action of parathyroid hormone (PTH) is known to be mediated via 3′,5′-adenosine monophosphate (cyclic AMP), urinary cyclic AMP studies were used to determine proximal tubular maturation. Ten formula fed full-term male infants showed a 30 to 60 fold increase in phosphate clearance and excretion with a 3–4 fold increase in urinary cyclic AMP comparing their first and third day 24-hour urines.