facies, increased body hair, and inappropriate insulin responses to glucose and arginine. In the presence of these signs of corcoid exctiess, rapid linear growth and skeletal maturation continued in all patients. Fasting growth hormone levels and acute responses to insulin and l-arginine remained within normal limits. Urinary testosterone in the boy decreased from 15.1 μg/24 h before treatment to 1.2 μg/24 h; however, further testicular enlargement occurred during therapy.

Adrenal function in the two patients so studied revealed pituitary-adrenal suppression. Excretion of Porter-Silber (P-S) chromogens was within normal limits and not suppressed by dexamethasone. Neither patient responded to metyrapone or ACTH. Thus, it is likely that the urinary steroids measured as P-S chromogens were derived from MPA rather than from endogenous adrenal corticoids.

Experience with these patients suggests that bone advancement cannot be arrested with larger doses of MPA without producing potentially hazardous side effects.

92 *Causes of Failure of Catch-up Growth After Certain Forms of Growth Retardation.* H. David Mosier, Jr., Univ. of Calif., Irvine Coll. of Med., Dept. of Ped., Memorial Hosp. of Long Beach, Long Beach, Calif.

These experiments were carried out in order to elucidate regulation of catch-up growth and occasional failures in catch-up which are observed clinically. Growth retardation was produced in Long-Evans rats, 37 to 41 days of age, by fasting, by cortisone injections, or by propylthiouracil (PTU) feeding. The cortisone or PTU treatments were adjusted to produce maximum differences in body weight between control and experimental groups that were equivalent to the differences produced in fast periods. Light and electron microscopy of epiphyseal cartilage and tibial epiphyseal width determinations were performed in representative groups. Serial measurements of body weight and tail length were carried out for 60 to 80 days from the start of the experimental treatments. Food intake was recorded.

In the fast experiments refeeding was followed by nearly complete catch-up in body weight and tail length. After cortisone treatment there was no catch-up in body weight or tail length growth. After PTU there was a slight tendency to catch-up in body weight and tail length. The latter appeared to show a pattern of late catch-up. The results correlated with anatomic changes in cartilage.

The findings suggest that in the rat cortisone treatment in the post-weaning period permanently damages growth mechanisms and prevents growth recovery in certain circumstances. Hypothyroidism also results in a delayed catch-up in skeletal growth. These experiments illustrate certain complexities in the problem of elucidating the underlying basis of catch-up growth. The usefulness of this experimental model in studies of catch-up growth is demonstrated.

93 *The Prepubertal Androgenic Response to ACTH.* Robert L. Rosenfield, Burton J. Grossman and Natividad Ozoa. The Pritzker Sch. of Med. and LaRabida-Univ. of Chicago Inst., Dept. of Ped., Chicago, Ill.

The following studies were undertaken to explore in detail the androgenic secretory capabilities of the prepubertal adrenal. Five 6–11-year-old children with active rheumatic carditis, otherwise non-toxic, were given ACTH gel 2.2–2.9 μ/kg i.m. daily for one week as initial therapy. Plasma C 19 steroids and indices of testosterone binding protein concentration and unbound androgens were determined by competitive protein binding techniques developed in this laboratory.

Mean urinary corticoids rose from a mean (±SD) of 1.1±1.2 to 15.7±4.3 mg/day and 17-KS from 0.84± 0.69 to 3.4±0.98 mg/day. Baseline mean plasma concentrations (±SEM) were: testosterone (T) 6.7±2.4 (range 1.6±15.0), androstenedione (Δ) 15.2±4.4 (range 2.7–29.6), and dehydroepiandrosterone (D) 71.6±6.2 (range 39.8–124) ng%. Following ACTH, these were increased in each: T–22.3±3.9, Δ–149±22, and D–347±95 ng%. D-sulfate rose in each from 13.5±3.2 (range 2.3–19.8) to 62.8±24 μg%. These changes were accompanied by a fall in testosterone binding protein concentration in four. There was a concurrent rise in unbound androgen levels in all subjects as a consequence of ACTH. This steroidogenic pattern is characterized by a disproportionate increase in Δ concentration, the values sometimes exceeding those of the normal adult. Evidence, thus, has been gained that the adrenal cortex of the prepubertal child evidences a characteristic androgenic response to chronic ACTH administration.

94 *Effects of Human Growth Hormone (HGH) on 79 Hypopituitary Children.* Thomas Aceto, Jr., Alvin B. Hayles, Mary L. Parker, S. Douglas Frasier, Richard W. Munschauer and Giovanni Di Chiro, Depts. of Ped., Med., Rad., SUNY, Buffalo; Univ. of Minn., Rochester; Washington Univ., St. Louis; USC, L.A.; NIH, Bethesda, Md.

We have treated 58 idiopathic (IH) and 16 organic hypopituitary (OH) children for 12 months, using 5 treatment regimens, in order to determine optimum therapy with HGH and glucocorticoids. All patients had: growth hormone levels < 5 mμg/ml plasma during insulin induced hypoglycemia; bone ages of 12 years or less; sexual infantilism. In IH, height was –4 SD or further below the mean. In OH, pretreatment growth rate was below 2.5 cm/year. Listed are 5 treatment regimens and growth rates during therapy.

Dx	Subject No.	Age Years	HGH U; 3×/ week	Cortisone 20 mg/ M²/day	Thyroxine 0.2 mg/ M²/day
OH	10	14.9	2	+	+
OH	6	14.0	Emb. 2	+	+
IH	24	12.1	2	+	+
IH	19	11.5	2	0	0
IH	20	11.5	10	0	0

Dx	Subject No.	Age years	Growth cm/year	Failures < 5 cm/ year
OH	10	14.9	5.6±2.4	6/10
OH	6	14.0	6.8±2.0	1/6
IH	24	12.1	7.1±1.5	6/24
IH	19	11.5	9.4±0.9	1/19
IH	20	11.5	10.1±1.0	3/20

Conclusions: HGH stimulated linear growth of hypopituitary children to varying degrees; more effectively in younger smaller dwarfs, less effectively in the older