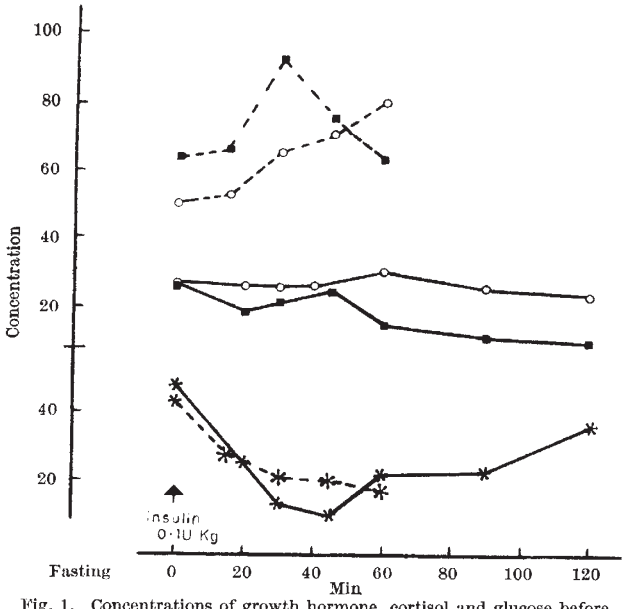

Fig. 1. Concentrations of growth hormone, cortisol and glucose before and during an intravenous insulin-tolerance test in two young female subjects with chronic starvation due to anorexia nervosa. Case 1 shown by continuous lines; Case 2 by interrupted lines. The test in Case 2 was terminated with glucose at 60 min because of severe neuroglycopenic symptoms. ○, Cortisol, μg/100 ml.; ✱, glucose, mg/100 ml.; ■, growth hormone, μmg/ml.

hormone is unknown. It has been suggested, on indirect evidence[4], that secretion of growth hormone is impaired in chronic malnutrition.

We have measured levels of growth hormone in plasma by a sensitive and specific radioimmunoassay technique[5] in two young female subjects with profound chronic undernutrition due to primary anorexia nervosa before and during insulin-induced hypoglycaemia. Each subject was a typical example of the condition, had recently lost two stone or more in weight and, at the time of examination, weighed less than 70 lb. Total daily dietary intake was unknown but estimated to be less than 400 calories. Since food and even minimal exercise may profoundly alter the level of growth hormone in the blood[2], assays were carried out with the subjects in bed after an overnight fast and during the course of a standard intravenous insulin-tolerance test (0·1 U/kg body-weight). Glucose was measured by glucose oxidase, cortisol by fluorimetry.

The results, shown in Fig. 1, indicate high levels of growth hormone in the plasma at rest (upper limit of normal less than 10 μmg/ml.) with no response in one subject, and a minimal non-sustained increase in the other in response to an induced hypoglycaemic stimulus adequate to produce neuroglycopenic symptoms. Plasma cortisol responses were similar; fasting-levels were high (upper limit of normal, less than 25 μg/100 ml.) and increased minimally, or not at all, during induced hypoglycaemia.

The suggestion is made that the stimulus to growth hormone produced by starvation is, or is near, maximal and the high level achieved thereby is responsible for prevention of death from fasting hypoglycaemia, but, because of limited reserve capacity, resistance to induced hypoglycaemia is reduced[6].

VINCENT MARKS
N. HOWORTH

The Area Laboratory,
West Park Hospital, Epsom, Surrey.

F. C. GREENWOOD

The Imperial Cancer Research Fund,
Lincoln's Inn Fields, W.C.2.

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Fasting Levels of Growth Hormone in Men and Women

THE finding of a twenty-fold difference in fasting sera between adult females and males, as reported by Unger *et al.*[1], is intriguing. It may serve to explain the higher free fatty acid levels observed in both healthy and diabetic female subjects compared with males[2], for the effect of growth hormone both *in vitro* and *in vivo* on enhancing the lipolytic activity of adipose tissue is well known[3]. On the other hand, the possibility that at least part of this sex-difference may be attributed to the presence of prolactin must be considered. This might occur in either or both of the following ways: (1) the growth hormone antigen used contained some contaminating prolactin; (2) human prolactin cross-reacts with anti-human growth hormone antisera. The biochemical similarity between these two polypeptides is well known[4] and the *in vivo* similarity between them has also been noted[5]. The problem of immunological specificity is also open to some question, as recently discussed by Berson *et al.*[6]. Indeed, Hayashida[7] has considered the evidence that human prolactin and growth hormone represent different activities of the same molecule. Greenwood[8] has also reported that he has noted a cross-reacting substance in plasma throughout pregnancy, and also in placental extracts. This presumably is related to the placental lactogen of Josimovich, which has been shown to be immunologically similar to growth hormone[9].

In conclusion, it appears that no definite statement can be made at the present time regarding the significance of this sex difference in serum growth-hormone-levels. The possibilities are either that this has a true physiological significance or that the higher levels in females simply represent cross-reacting prolactin. Some of this controversy may be resolved by comparing the levels of growth hormone in the pre-pubertal age group.

C. FAIMAN *

Department of Physiology,
University of Manitoba.

* Medical Research Fellow.

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Antidiuretic Hormone and Bile Flow

DURING experiments related to the excretion of manganese[1], variations in flow of bile in the rat suggested the possibility that bile flow is sensitive to the action of the antidiuretic hormone.

Intravenous injections of 'Pitressin' (Parke-Davis 0·3–0·6 pressor units/100 g) into rats induced a sudden short-lived diminution of bile flow. In this investigation the bile was delivered directly on to filter-paper strips via polyethylene catheters and the diameter of the round spots was measured with callipers to the nearest 0·1 mm. The standard curve shown in Fig. 1 relates this measurement to the volume of bile. Collections lasted between 10 and 150 sec, producing spots between 11 and 21 mm in diameter.

The sharp fall of the bile flow after pitressin is shown on Fig. 2. This fall had a mean and standard deviation of 70 ± 10 per cent in the seventeen animals tested. The basal level oscillated around a fairly constant mean, even if the experiments lasted for 3 h. These oscillations were present regardless of the animals' state of hydration.