TERMINOLOGIA

Human Chorionic Somato-Mammotropin (HCS), Proposed Terminology for Designation of a Placental Hormone

Recent studies of JOSIMOVICH[1], GRUMBACH and KAPLAN[2] and their co-workers on the human placenta, indicate that it contains a new protein hormone, possessing some biological properties in common with those of human pituitary growth hormone (HGH): (a) it exhibits lactogenic activity in the pigeon and pseudopregnant rabbit[1]. (b) It has growth-promoting activity as indicated by the rat body weight and costal cartilage assays[2-4]. (c) It is active as a luteotropic agent[5]. (d) It stimulates protein synthesis in a cell-free system[3]. (e) It facilitates lipolysis in vivo[6] and in vitro[7]. (f) Although it has low potency in promoting growth, it enhances the activity of HGH[3,8] in the rat. (g) It causes hypoglycemia[4] in the rat. (h) When administered in amounts sufficient to raise the concentration in plasma to that found in late pregnancy, it promotes nitrogen, potassium, phosphorus, and calcium retention, as well as calciursis, in patients with hypopituitary dwarfism[9] in whom it also has been shown to have a diabetogenic and insulinogenic effect. (i) Immunologically[1,2], the hormone cross-reacts with rabbit antisera to human growth hormone.

The hormone has been obtained in highly purified form[3,4,10,11] and shown to be a protein of mol. wt. about 20,000 with a single polypeptide chain. The NH_2- and COOH-terminal amino acid residues were found to be valine and phenylalanine respectively and certain amino acid sequences of the hormone were shown to be similar to that of HGH[12,13]. The hormone has been named as human placental lactogen (HPL)[1] and chorionic growth hormone-prolactin (CGP)[2] and has also been designated as purified placental protein (human) [PPP(H)][3] and placental protein[4].

In order to eliminate confusion by the use of different terms for the same hormone, we wish to propose that henceforth the hormone be called human chorionic somato-mammotropin. Since the hormone is located in the syncytiotrophoblastic layer of the human placenta[14], the same cells producing human chorionic gonadotropin (HCG) and since it has both growth hormone (somatotropin) and lactogenic hormone (mammotropin) activities, it would be practical to designate a term which is in line with the established terminology for a gonadotropin produced by the human placenta. Hence, the name human chorionic somato-mammotropin (HCS) indicates the origin of the hormone as well as the biological properties now known[15].

Zusammenfassung. Es wird vorgeschlagen, dass das von verschiedenen Forschern als «human placental lactogen», «chorionic growth hormone prolactin», «purified placental protein (human)» usw. bezeichnete plazentare Hormon «chorionic somato-mammotropin (HCS)» benannt wird.

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PRO EXPERIMENTIS

Sterile Submerged Culture of Some Graminaceous Plantlets

Sterile cultures of various plant organs, such as roots, stems or embryos, in synthetic agar or liquid media have been described by a number of authors[1,2], but the submerged, shaken culture of whole plants has not yet been reported.

Seeds of wheat (*Triticum vulgare*, var. Mentana) were sterilized for 5 min in a 0.1% solution of $HgCl_2$. The embryos, separated from the seed by means of a sterile needle after repeated rinsing with distilled water, were placed in 100 ml of White's medium (WHITE[2], p. 74) in 500-ml flasks: the latter were on a shaker rotating at 200 rpm and with a throw of 5 cm. The cultures were incubated at 27 °C and in the dark. Under these conditions, the embryos started germinating after 24–48 h. After

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10 days, the plantlets were well developed with a normal morphological structure of both leaves and roots. The plant growth was considerably influenced by the carbon source (Table I).

The best growth was obtained with fructose, glucose or sucrose as a carbon source; with all other carbohydrates, the growth was much poorer. With maltose, raffinose and inulin, leaf growth rate was higher than root growth rate; galactose and lactose inhibited growth almost completely.

Table I

Carbon source	Leaf Mean length (mm)	Root Mean length (mm)	Ratio leaf length/ root length × 100
Control (no sugar)	0	0	–
Glucose	9.38 ± 1.55	27.13 ± 3.9	34
Fructose	15.23 ± 1.22	31.49 ± 2.5	48
Saccharose	10.00 ± 0.94	14.62 ± 1.26	68
Maltose	5.7 ± 0.7	2.00 ± 0.26	285
Lactose	1.37 ± 0.25	0.54 ± 0.1	25
Galactose	0.21 ± 0.17	0.00	–
Raffinose	5.00 ± 0.45	1.53 ± 0.19	326
Xylose	2.4 ± 0.47	2.4 ± 0.38	100
Dulcitol	0.0	0.0	–
Inulin	0.97 ± 0.53	3.27 ± 0.24	151

F value (leaf, significance level 1%): observed, 25.67; theoretical, 2.18.
F value (root, significance level 1%): observed 4.37; theoretical, 2.51.

Table II. Effect of light on the growth of wheat plantlets in submerged 10-day culture

Culture[a] conditions	Leaf Mean length (mm)		Root Mean length (mm)	t
Dark	10 ± 0.94	3.8	14.62 ± 1.26	0.05
Light	15.9 ± 1.2	$P > 0.01$	14.63 ± 1.5	$P < 0.05$

[a] Sucrose was the carbon source.

The maximum dry weight of a whole single plant obtained with fructose as the carbon source was 13 mg and the total plant dry weight per flask was about 130 mg.

Wheat embryos were also cultured in fluorescent light (3000 lumens) under the same conditions as in the dark. The main difference was noted in the mean leaf length; the mean root length was not significantly influenced by light (Table II).

Similar results have been obtained by growing other graminaceous plants such as rye and barley, or plants such as *Ipomoea rubrocaerulea* and *Digitalis purpurea* in submerged culture with sucrose as carbon source.

Plant growth under the conditions described was found to be dependent on the continuous agitation of the flasks, i.e. on the continuous aeration of the liquid culture medium. Under stationary conditions, the embryos did not even start germinating. This type of plant growth in a submerged shaken culture, such as that used for growing bacteria, streptomycetes, and fungi, is obviously quite different from soil-less culture. In the latter, roots only are in contact with the medium nutrients, whereas in submerged shaken culture both roots and leaves are in close contact with the liquid medium. In nature, only the growth of aquatic plants, in particular only those whose leaves are submerged in water, resembles the submerged culture of plants described above.

Riassunto. Viene descritto un metodo per la coltura sommersa sterile di piantine intere di graminacee, di *Ipomoea* sp. e di *Digitalis* sp. È stata studiata l'influenza dei vari zuccheri sulla crescita delle foglie e della radice. È stato trovato che le piantine crescono rapidamente in presenza di glucosio, fruttosio e saccarosio, mentre sono inibite in varia misura da altri zuccheri. L'influenza della luce sulla crescita si manifesta solo sul culmo e sulle foglie e non sulle radici. L'aereazione è un fattore determinante sulla crescita: in assenza di agitazione l'embrione non germina e le piantine non crescono.

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Methode zur kontinuierlichen Registrierung der Atembewegungen am freibeweglichen Krebs (*Potamobius astacus* Leach)

Die Atembewegungen, d.h. das Schlagen der Scaphognathiten, in den Kiemenräumen des Krebses konnten bislang nur durch Beobachten und Zählen bei eröffnetem Carapax, durch Hebel-Schreiber-Anordnungen oder mittels mechanisch-elektrischer Umformer indirekt oder direkt gemessen werden. Diese Methoden beinhalten Fehlerquellen, von denen hier nur die Trägheit der Messsysteme und die veränderten Strömungsverhältnisse bei geöffnetem Panzer erwähnt seien. Zudem musste das Tier während des Versuches festgeschnallt sein.

Bei einer Untersuchung über die Koordination und Steuerung der Scaphognathitenbewegung beim Flusskrebs wird hier eine Methode verwendet, die es erlaubt, die Schläge beider Scaphognathiten kontinuierlich und nahezu ohne mechanische Belastung am (wieder) geschlossenen Kiemenraum bei relativ freier Beweglichkeit des Tieres aufzuzeichnen. Ausgenutzt wird der Hall-Effekt, mit dem sich Veränderungen eines magnetischen Feldes messen lassen[1,2]. Dieses Feld stammt von einem auf dem Scaphognathiten befestigten Magneten (Krupp Koerflex 300, Durchmesser 0,3 mm, Länge ca. 2,5 mm, Gewicht 1,5–1,8 mg) und wird mit einem Hall-Generator (Siemens Axialfeldsonde RHY 11) registriert.

In dem Carapaxbereich über dem Scaphognathiten wird dem Krebs ein Loch von 5 mm Durchmesser durch den Panzer gefräst und der Magnet mit einer Platindrahtschlinge an der Gliedmasse befestigt. Eine über der

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