Table I. Lipid content, glyoxylate cycle enzymes and proteins in seeds (a) and in seedlings (b) of *Gingko biloba*

a) Seeds		
Total lipid	Triglycerides	Phospholipids
19.1	14.6	1.7
b) Seedlings		
Isocitrate lyase	Malate Syntase	Proteins
3.7	28.2	12.2

Total lipid, triglycerides and phospholipids are expressed as mg/g fresh wt. Two enzymes as μmoles of substrate transformed per h × g fresh wt.; proteins as mg/g fresh wt.

Table II. Fatty acid composition of the triglyceride fractions of 3 species that use the glyoxylate cycle

Fatty acids	*Ginkgo biloba* seeds (%)	*Pinus pinea* seeds[6] (%)	*Abies alba* seeds[6] (%)
16:0	7.2	6.6	3.8
16:1	4.7	0.4	0.7
18:0	0.9	3.4	2.1
18:1	36.0	37.5	30.3
19:0	2.3	—	5.0
18:2	43.0	46.8	42.1
20:0	0.6	0.7	13.1
18:3	3.5	1.4	0.6
18:2 / 18:1	1.1	1.2	1.4

existence of some correlation among the operativity of cycle and the levels of oleic and linoleic acids, these can probably provide the main carbon source; from these results it is evident that the glyoxylate cycle is operative during germination of *G. biloba* seeds. Finally from a comparative point of view, the presence of the cycle in *G. biloba* ancestral plant and its absence in Mammalia[15,16] in Graminacee[17] could confirm that his cycle represents a primitive metabolic pathway for lipids utilization.

Riassunto. Si è dimostrata la presenza del ciclo del gliossilato durante la germinazione di semi di *Ginkgo biloba*. Isocitrico liasi e malato sintasi, e due enzimi chiave del ciclo, sono stati messi in evidenza in pianticelle di 8 cm. Le attività dei due enzimi sono invece assenti nel seme dove elevato è il contenuto in lipidi. Tra gli acidi grassi i più rappresentati sono l'oleico e il linoleico.

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Trace Elements in Human Hair

It has been known for many years that human hair contains a complex mixture of trace mineral elements[1], but little is known of the physiological and pathological processes that determine the concentration in hair of a particular element. We have therefore determined the concentration of copper, iron and zinc in hair from a large group of people, then analyzed our results to determine the effects, if any, of age, sex, ethnic origin, diet, pregnancy, health, and pharmaceuticals on each element.

Approximately 1.0 g scalp hair from the occipital region was taken from 222 persons living in the Lusaka area. Each person was interviewed to obtain full personal and medical details. The hair was washed in the laboratory with nonionic detergent or purified diethylether[2], dried overnight at 110 °C, then ashed at 520 °C for 8 h. The ash was dissolved in the minimum amount of concentration HCl and the copper, iron and zinc concentrations of the solution measured by atomic absorption spectrometry (Unicam SP900A). Recoveries were 95 to 102% and reproducibility ± 3% for each element. Not all elements were measured on each hair specimen, but 222 results were obtained for zinc, 192 for copper, and 133 for iron.

The Table gives a breakdown of our findings for each element, expressed as mean and standard deviation of particular groups, divided by age, sex, ethnic origins, health status, etc. *T*-tests were conducted to assess the significance of any apparent differences.

For copper in hair, females are higher than males ($P < 0.002$), and caucasians higher than negroes ($P < 0.002$). Healthy subjects have higher values than hospitalized patients ($P < 0.002$), irrespective of the type of illness. Women taking oral contraceptives had values strikingly higher than other adult women ($P < 0.001$).

The only factor apparently influencing iron in hair was the taking of anti-malarials ($P < 0.002$ when compared to the rest of the study and $P < 0.001$ when compared with a matched group of similar people not taking these drugs). This result may be a reflection of better iron stores, for Lusaka is a malaria region and anemia due to this disease is common in unprotected people.

Ethnic origin influenced zinc in hair ,with asiatics giving the highest results and negroes the lowest ($P < 0.05$ for this difference). Hair zinc content is low in pregnancy; a fact reported by another worker[3]. This is probably a reflection of the lowered plasma zinc level during pregnancy[4].

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Group of subjects	Concentration of trace elements in hair (μg/g)					
	Copper No.	Mean ± S.D	Iron No.	Mean ± S.D.	Zinc No.	Mean ± S.D.
1 Male subjects	97	16± 9	74	31±17	97	184±66
2. Female subjects	95	22±18	59	34±21	125	205±93
3. Caucasian subjects	55	24±22	46	35±19	57	209±98
4. Negro subjects	123	16±10	79	30±17	147	186±78
5. Asiatic subjects	14	19± 8	8	39±28	18	228±63
6. Subjects under 14 years	115	19±13	78	31±15	136	190±78
7. Subjects 14 years or more	77	18±18	54	35±23	86	205±90
8. Hospital patients	42	13± 7	20	26±16	44	195±69
9. Apparently healthy subjects	150	20±16	113	34±19	178	196±86
10. Subjects taking anti-malarials	10	23±13	10	53±12	10	192±61
11. Subjects not taking anti-malarials	182	19±13	126	31±18	195	200±84
12. Pregnant women	27	18±14	17	25± 6	27	158±85
13. Non-pregnant adult women	33	19±12	24	30±17	65	198±82
14. Women taking oral contraceptives	16	38±16	15	32±12	16	194±65
15. Non-pregnant adult women not taking oral contraceptives	17	18±10	13	31±15	41	207±95
16. Hospitalized negro children with malnutrition.	12	13±11	11	30±16	12	152±38
17. Healthy negro children	43	16± 9	38	30±16	59	198±85
18. Healthy caucasian children	44	20±11	32	33±19	52	217±58

Malnourished negro children had lower levels in hair than healthy negro children ($P < 0.02$) and very much lower levels than healthy caucasian children ($P < 0.002$).

Considering the results on all three elements, it is apparent that a large number of factors influence the hair concentration of trace elements, though each element is affected by different factors. Copper is influenced by sex, ethnic origins, health, malnutrition, or the taking of oral contraceptives. Iron is significantly changed only by the taking of anti-malarials (usually pyrimethamine), while zinc is influenced by ethnic origin, malnutrition, or pregnancy. Individual variations within a group are large for all three elements and it is doubtful if measurements of trace elements in hair could be of any value as a diagnostic aid, though they could provide information in surveys of large groups.

Zusammenfassung. Es werden Korrelationen zwischen dem Spurelementgehalt des menschlichen Haares und verschiedenen physiologischen und pathologischen Faktoren hergestellt.

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Sur l'absence de biosynthèse des stérols et du squalène chez un coelentéré (anthozoaire), l'anémone de mer *Calliactis parasitica*

Il est connu que les insectes n'effectuent pas de biosynthèse «ex novo» des stérols à partir de l'acétate[1]; le cholestérol qui leur est indispensable provient soit de leur nourriture, soit de la dégradation de la chaîne latérale des phytostérols[1,2]. Cette situation ne peut cependant être généralisée à tous les invertébrés. Plusieurs mollusques (*Helix pomatia, Arion rufus, Planorbius corneus, Limnea stagnalis, Patella coerulea,* etc.) seraient capables de synthétiser le cholestérol[3,4]. Récemment[5], il a été montré que les gonades et l'hépatopancréas de *Aplysia depilans* synthétisent le cholestérol à partir de l'acétate et peuvent le transformer en corticostéroïdes. Les étoiles de mer *Asterias rubens* et *Solaster papposus* incorporent le mévalonate dans le squalène, le lanostérol et le 5α-cholestène-7 ol-3β[6]. Dans d'autres cas[3,4], une biosynthèse du squalène a été observée alors que l'animal ne parait pas capable de le transformer en cholestérol. Notons que le nombre des espèces étudiées est très restreint et qu'une généralisation en fonction des familles ou des classes n'est pas encore possible. Nous avons précédemment constaté l'absence de synthèse des stérols et du squalène chez l'Holothurie *Stichopus japonicus*[4]; nous reportons ici les résultats d'un travail parallèle effectué avec l'anémone de mer *Calliactis parasitica*. Rappelons que cet animal contient un pigment azoté particulier, la calliactine[7]. L'absence de biosynthèse du cholestérol et du squalène a été établie chez un autre coelentéré mais appartenant à une classe différente, la méduse *Rhizostoma* (scyphozoaire)[8].

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