ramifiée), puis mises à l'obscurité pendant 5 jours. La croissance est alors totalement bloquée. Après ce délai, les Algues sont reportées sous un éclairement de 500 lux. Chaque cellule engendre alors un filament non ramifié (Figure). Cette morphologie n'est pas sans rappeler les thalles hétérotriches décrits chez les Chaetophorales[10]: un filament prostré à croissance lente se ramifie intensément et chaque cellule engendre des filaments dressés peu ou pas ramifiés. Dans notre cas il s'agit plutôt d'un phénomène de convergence car les deux catégories de filaments sont en contact avec le substrat. Mais nos résultats permettent peut-être d'aborder le mécanisme de l'hétérotrichie chez les Algues.

Si chez les champignons le phénomène de ramification est sous le contrôle de corrélations d'inhibition dont certaines sont comparables à la dominance apicale décrite chez les végétaux supérieurs[11], la formation des ébauches latérales est bien plutôt, dans le cas des Chaetophorales étudiées, la conséquence d'une rupture, plus ou moins totale, des liens intercellulaires. Un filament normalement peu ou pas ramifié, comme le *Stigeoclonium*, peut alors former de nombreuses branches latérales, si un choc a rendu les celluses indépendantes, faisant perdre l'orientation habituelle des mitoses. Le phénomène de ramification n'est alors pas sous le contrôle de corrélation d'inhibitions du type de celles décrites pour les Champignons[12].

Summary. All inhibitors or any modifications of the cultural conditions lead to partial or total isolation of the cells of filaments of *Stigeoclonium farctum*. The suppression of the intracellular correlation leads to the ramification of the filaments.

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The in vivo Membrane Potential Change by Light and by Reducing Agents

Recently, the participation of an electrogenic component in the ionic transport is under discussion[1–3]. Therefore, it is of interest to know in which way the membrane potential difference between the vacuole and the medium measured with microelectrodes is influenced by light. With photosynthetic organisms a light effect on the membrane potential can be observed[4]. The direction of the potential change (depolarization or hyperpolarization) depends on the special object investigated[5]. Further the light-dependent potential change can be influenced by variation of the test conditions and therefore of the physiological state[6,7].

With green plants, the action spectra for the light-dependent potential change resembles the absorption spectrum of chlorophyll a[9]. The action spectrum of the light-dependent potential change for the red alga *Griffithsia* shows a prevailing participation of phycoerythrine and a slight participation of chlorophyll (Figure 1). Therefore this action spectrum corresponds to the action spectrum of photosystem II of red alga[10,11]. This means that light influences the membrane potential by way of the noncyclic electron transport.

In *Griffithsia* the experiments with uncouplers, CCCP ($3 \times 10^{-6} M$) and DNP ($10^{-4} M$), show no inhibition of the light effects. That means that no phosphorylating mechanism takes part in the reaction system investigated. The non-inhibiting feature of the uncouplers makes improbable the participation of a proton gradient in the sense of the Mitchell's hypothesis, too. This does not generally exclude the participation of protons in the mechanism investigated.

By variation of the redox potential in the medium with *Griffithsia*, an effect can be observed on the light-dependent potential change[12]. At 100 mV (related to H_2) the light effect can be reversed to a hyperpolarization. With this effect and its specific inhibition by inhibitors of the electron transport of photosynthesis, it is suggested that the change of the redox level of plastoquinone influences the membrane potential.

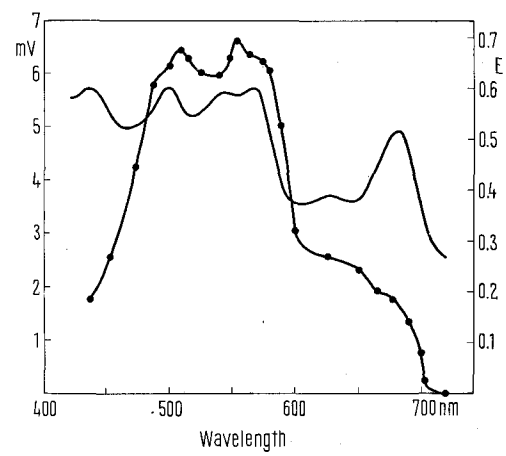

Fig. 1. Action spectrum of the light-dependent potential change (circles) for 1,335 nEinstein/cm²sec. Standard error of the mean potential difference: ±0,4 mV. Ordinate: potential change in mV.– In vivo absorption spectrum according to the SHIBATA method (solid line). Ordinate: absorbance E. Abscissa: wave length in nm.

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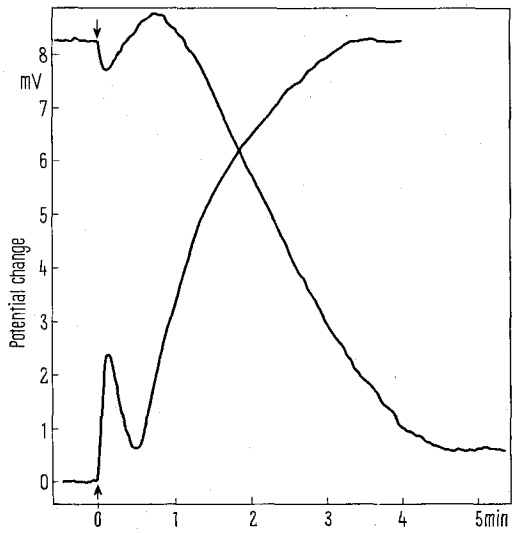

Fig. 2. Kinetics of the light-dependent potential change. The upward pointing arrow marks light on: upward going curve. The downwards pointing arrow marks light off after 4 min in light: downward going curve. Abscissa: time in min. Ordinate: potential change in mV.

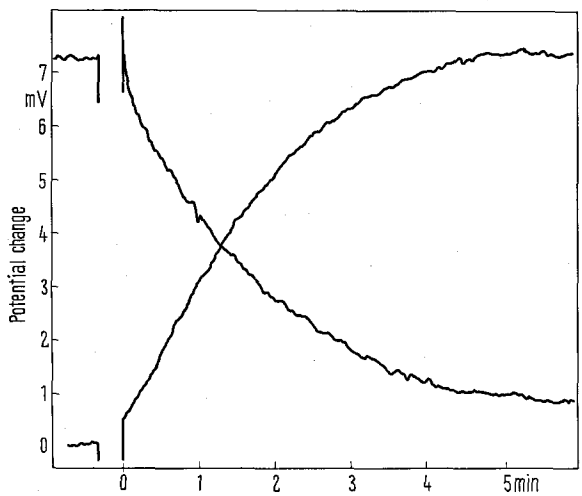

Fig. 3. Kinetics of the redox potential-dependent change of the membrane potential. Upward going curve: after addition of DCPIP ($10^{-4}M$) and ferricyanide ($10^{-4}M$) with ascorbate ($10^{-3}M$) at the time '0'. Downward going curve: change from reduced to oxydized DCPIP and ferricyanide at the time '0'. The gap before time '0' results from the change of the medium. Abscissa: time in min. Ordinate: potential change in mV.

According to this hypothesis, it should be possible to cause a similar effect on the membrane potential by light and by a change in the redox level in the dark. Figure 2 demonstrates the kinetics of the potential change for *Griffithsia* by light on and off. With the current hypothesis, the depolarization by light is equivalent to a reduction of plastoquinone.

Equivalent to this effect, after addition of DCPIP + ferricyanide ($10^{-4}M$) with ascorbate ($10^{-3}M$), $E_h = +121$ mV (related to H_2), a depolarization of the membrane potential can be observed (Figure 3). By change of the medium and addition of oxydized DCPIP + ferricyanide, $E_h = +434$ mV (related to H_2), this effect is completely reversible. But there is a difference in the height of the reaction, the effect by light being smaller in the mean.

Thus the redox change in the dark could directly influence the redox level of plastoquinone. The further reaction mechanism for the change of the membrane potential could be a pure ionic transport function. An alternative possibility would be the effect on a redox component consecutive to plastoquinone or a direct redox effect on the plasmalemma.

Zusammenfassung. Das Aktionsspektrum der lichtabhängigen Potentialänderung entspricht dem von Photosystem II. Mit Entkopplern kann die Beteiligung einer Phosphorylierungsstelle ausgeschlossen werden. Die Redox-Abhängigkeit weist auf die Beteiligung von Plastochinon. Die Depolarisierung des Membranpotentials kann sowohl durch Licht als auch durch reduziertes DCPIP + Ferricyanid im Dunkeln ausgelöst werden.

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Manganese in *Pinna nobilis*

It has been known since long that some marine and fresh water bivalve molluscs are able to accumulate manganese in their tissues[1–4]. Recently this ability has been utilized for detecting radioactive contamination in the environment when ^{45}Mn is at levels not otherwise measurable[5,6].

In 1892 GRIFFITHS[7] claimed that a protein containing manganese and having the property of binding oxygen reversibly, is present in the blood of *Pinna*. He called it Pinnaglobin. This finding has been reported in textbooks until recently; however, since 1938 SUTO[8] was not able to detect any manganese in the blood of this animal.

Our determinations have been carried out on *Pinna nobilis* by chemical and X-ray Fluorescence spectrografic methods. The animals were collected from the Adriatic sea during the summer of 1970; the organs were immediately dissected and kept frozen until use. Manganese was determined spectrophotometrically as permanganate after destruction of the organic material with sulfuric and nitric acids followed by oxidation with periodate; the X-ray fluorescence spectrography was made on samples of pressed powder using a Siemens SRS Spectrometer. As reported in Table I, only the kidney of *Pinna* has consistent amounts of manganese, followed at