Recovery of the Electroretinogram in Rabbits After Argon Laser Photocoagulation

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Argon laser is widely used to coagulate the diabetic retina in order to inhibit the proliferative stage of diabetic retinopathy. Ten pigmented rabbits underwent retinal photocoagulation with argon laser. Retinal function was assessed electroretinographically before treatment and at different time intervals after treatment. The ERG responses measured 4–7 days after treatment were reduced in amplitude by a degree which was proportional to the number of laser applications. In five eyes that were treated with at least 1000 applications the ERG responses were very small when measured 4 days post-treatment. However, a gradual recovery was observed and within 2 months the ERG responses approached the normal pretreatment amplitudes. Histological findings from light and electron-microscopy suggested that the ERG recovery could not be solely explained by healing of the coagulated areas. Structural differences were seen in the pigment epithelial layer between a retina obtained immediately after treatment and one studied after ERG recovery. It is suggested that changes in the electrical resistance of the pigment epithelium may contribute to the ERG reduction seen immediately after laser treatment in the rabbit and to the increase in the ERG amplitude observed during the apparent functional recovery of the retina. Invest Ophthalmol Vis Sci 28:1605–1613, 1987

Pan-retinal photocoagulation (PRP) is generally assumed to be the most effective treatment for diabetic retinopathy. The intention of this procedure is to destroy a substantial portion of the peripheral retina in order to reduce the oxygen demand of the entire retina. The stimulus for neovascularization is therefore reduced and the macula can be preserved for an extended period of time. The extent of retinal destruction by the PRP treatment can be objectively assessed by measuring the electroretinogram, which is a transient potential change of the entire retina evoked by a light stimulus. However, the amplitude of the corneally measured ERG responses, recorded along extraretinal current pathway, depends not only on the stimulus parameters and retinal function but also on the structural integrity of nonretinal tissues. Thus, changes in the electrical resistance of the pigment epithelium may strongly affect the amplitude of the corneal ERG.

In a previous report we have shown that PRP of the diabetic retina produced a substantial reduction in the ERG amplitude and in the relationship between the b-wave and the a-wave. At longer time intervals after the laser treatment a partial recovery of the ERG amplitude was observed (Fig. 2 in Ref. 7) while the ERG pattern (b-to-a-wave relationship) remained relatively constant at a subnormal level (Fig. 4 in Ref. 7). These findings can be explained by changes in the electrical resistance of ocular tissues induced by the laser treatment in addition to the retinal damage. Impaired retinal function is expressed in the reduction of the ERG amplitude and of the b-to-a-wave relationship. Changes in the electrical resistance of structures located in the ERG current pathway will affect the amplitude of the corneal ERG but not its shape.

In order to directly study the relationship between retinal coagulation and the electroretinogram for an extended period of time after treatment we coagulated the retina of pigmented rabbits with argon laser. It was found, in agreement with a previous report, that the ERG responses measured shortly after laser treatment (4–7 days) decreased in proportion to the number of laser applications. Treatment with about 1000 laser applications produced, in our preparation, a severe reduction in the ERG responses to an almost nonrecordable level. However, within 2 months after treatment the ERG responses gradually recovered and approached the normal, pretreatment amplitudes. This recovery was not due to healing of the
coagulated retinal areas as revealed by the fundus appearance and light-microscopy. Electron-microscopic examination indicated that structural changes in the pigment epithelium might have contributed to the ERG reduction seen immediately after treatment and to the subsequent ERG recovery observed at longer time intervals after the laser treatment.

Materials and Methods

Animals

Ten pigmented rabbits were studied, each weighing about 3 kg. The rabbits were kept in the animal facility at 12/12 hr light/dark cycle.

Electroretinogram

ERG responses were recorded from each eye before and at various time intervals after laser treatment. The rabbit was anesthetized by intraperitoneal injection of sodium pentobarbital (50 mg/kg body weight). The pupils were maximally dilated with 0.5% cyclopentolate hydrochloride and 2.5% phenylephrine hydrochloride. The ERG signals were recorded differentially between a Henkes-type contact lens electrode (Medical Workshop, Gromigen, The Netherlands) and a reference electrode attached to the ear. The ground electrode was placed on the other ear. Uniform retinal illumination was achieved by —100 diopter lens attached to the contact lens electrode. Light stimuli, of 30 µsec duration, originated from an electronic camera flash attenuated by “neutral” density filters (Schott, Mainz, West Germany). The light source was located 18 cm above the rabbit’s eye. Uniform retinal illumination was achieved by a factor of 10,000 (Grass P5, Quincy, MA), displayed on the oscilloscope screen (Tektronix, Beaverton, OR) and photographed for later analysis. The bandpass of the amplifier was set at 0.3–300 Hz.

ERG analysis consisted of comparing the amplitudes of the a- and b-waves measured after the laser treatment to the values recorded before treatment. The a-wave was measured from the baseline to the trough of the negative wave. The amplitude of the b-wave was measured from the trough of the a-wave to the peak of the b-wave.

Photocoagulation

Pulsed blue-green (486,518 nm) argon laser (Britt Corp., Los Angeles, CA) was used for photocoagulation. For each rabbit the laser beam was slightly adjusted to produce similar retinal burns. Typical laser parameters used in this study were as follows: energy 1 Watt; duration 0.05 sec and spot size of 700 µm. The spot size used was larger than the one typically used for human patients (200–500 µm) in order to reduce the number of laser applications needed for PRP treatment. For the photocoagulation session the rabbit was anesthetized with sodium pentobarbital (50 mg/kg body weight) administered intraperitoneally. The need for anesthesia caused us to limit the laser treatment to one session. Different degrees of coagulation were achieved by varying the number of laser applications in different eyes from 200 to 1000. In our systems a treatment with 1000 laser applications was found sufficient to mimic PRP treatment in the human retina as judged by the ERG data.

Light Microscopy

After enucleation, the eyes were fixed in buffered formalin, then embedded in paraffin and stained with hematoxylin eosin solution.

Electron Microscopy

The cornea, lens and vitreous were dissected away from the enucleated eye. The remaining eyecup was rinsed for 15 min in cold phosphate buffer and then immersed in a fixative solution containing 1.2% glutaraldehyde in 0.15 M phosphate buffer (pH 7.0) for 20 hr at 4°C. Following fixation, the retina was removed from the posterior eyecup. The photoreceptor cell tissue with adherent pieces of pigment epithelium was cut into small strips and rinsed in 0.15 M phosphate buffer. In order to assess the integrity of the pigment epithelial layer as a barrier between the choroid and the retina, the strips were incubated for 60 min in 0.15 M phosphate buffer solution containing Cationized Ferritin (Miles Yeda, Rehovot, Israel) at a concentration of 1000 µg/ml. The preparation was then osmicated with 1% OsO4 in 0.15 M phosphate buffer for 60 min, dehydrated in ethyl alcohol and embedded in Epon. Thin sections of about 500–700 Ångstroms were cut with a LKB Ultratone III (Bromma, Sweden). These sections were stained with Uranyl and Lead salts and viewed in a JEOL 100B microscope (Tokyo, Japan).

All of the procedures and treatments used in this study conform to the ARVO Resolution on the Use of Animals in Research.

Results

In Figure 1, fundus pictures of a rabbit retina are shown which were photographed 4 days (A) and 2 months (B) after treatment with 1000 laser applications. As is evident from Figure 1, the laser applications produced typical white lesions which later turned into black areas due to retinal degeneration and migration of pigment.
In order to assess the effect of the laser treatment on retinal function, the dark-adapted ERG responses were recorded before and after the laser treatment. The ERG responses shown in Figure 2 were recorded from a rabbit before (left column) and 4 days after (right column) treatment with 580 laser applications. The intensity of the test flash used to evoke these responses is denoted to the left of each row and is given by the density of the “neutral” filter interposed in the light path. In our experience the ERG responses of the rabbit were relatively small; maximal b-wave amplitude of about 300–400 μV and maximal a-wave of 80–150 μV. These values are in agreement with previous reports.9 The relatively small size of the a-wave and the variability between consecutive responses did not allow reliable measurement of its amplitude. Therefore, the relationship between the b- and a-waves could not be used to evaluate retinal function. The functional integrity of the retina was estimated by the b-wave response ratio. This parameter was calculated only from responses elicited by bright stimuli because the b-wave was relatively large and could be reliably measured. For each intensity, the b-wave measured post-treatment was divided by the corresponding pretreatment value. Five ratios were calculated for each eye from ERG responses evoked by five different flash intensities. One-way analysis of variance with repeated measures was performed on all the b-wave ratios calculated for all the eyes studied. For each eye, no statistically significant differences were found between the b-wave ratios. Therefore, the five b-wave ratios calculated for an eye were averaged to obtain a single parameter which described the effect of the laser treatment on that eye. No consistent effects of the laser treatment on the latency of the b-wave were observed and, therefore, this parameter was not considered in the present analysis.

In Figure 3 the b-wave ratio (mean ± SD) is plotted as a function of the number of laser applications delivered during the treatment session. The figure contains data from 15 eyes of 9 rabbits. Each data point represents one eye of a rabbit. All the ERG responses

![Fig. 1](image1.png)

**Fig. 1.** The fundus appearance of the retina of the pigmented rabbit. Pictures were taken 4 days (A) and 2 months (B) after treatment with 1000 applications of argon laser.

![Fig. 2](image2.png)

**Fig. 2.** Corneal electroretinographical responses measured from the pigmented rabbit eye in the dark adapted state. ERG responses were measured before laser treatment (first column) and 4 days after treatment with 580 laser applications (second column). The intensity used to evoke each set of responses is denoted to the left of each row and is expressed by the density of the “neutral” filter interposed in the light path. The horizontal calibration denotes 40 msec and the vertical one is of 100 μV.
Fig. 3. The effect of laser treatment on the rabbit retina as a function of the number of laser applications. ERG reduction is expressed by the b-wave ratio. This parameter was calculated for each eye from 5 ERG responses elicited by light stimuli of different intensities. The b-wave ratio was obtained by dividing the b-wave amplitude measured after treatment by the corresponding pre-treatment value. These five ratios were averaged to give a single value which described the reduction in retinal function. All the ERG responses used to calculate the data shown in this figure were measured 4-7 days after treatment. Fifteen eyes from nine rabbits were used to construct this figure. Each data point describes the b-wave ratio (mean ± SD) of one eye of a rabbit.

used to calculate the data presented in Figure 3 were recorded 4-7 days after the laser treatment to allow recovery from retinal edema induced by the laser applications. The corneal electroretinogram, elicited by a full-field stimulus represents the sum of electrical currents generated in each small retinal area. It was therefore expected that the b-wave ratio, which reflected the fraction of uncoagulated retina, would be inversely related to the number of laser applications. A linear regression test performed on the data of Figure 3 gave an R value of -0.874 which was statistically significant at the level of \( P < 0.005 \). It was concluded that the laser treatments had significant effects on retinal function assessed from the b-wave ratio. Retinal damage increased as the number of laser applications was raised, probably due to the increased area of the coagulated retina. When a treatment of 1000 applications was performed, retinal damage was most severe and in some cases no typical ERG responses could be recorded even with the brightest test flash.

The therapeutic effect of the laser treatment in diabetic retinopathy arises from its damaging effect on the retina. It is therefore most desirable to keep this effect permanent. We measured the ERG responses in rabbits, which were treated with about 1000 laser applications for a longer period of time in order to verify the long-lasting effects of the laser on the retina. A gradual recovery of the ERG responses with time was seen. Figure 4 illustrates such recovery observed in two rabbits (upper and lower parts of the figure). The open and solid circles describe the right and left eye respectively. In each rabbit, laser treatment of the two eyes was separated by at least 3 weeks. Therefore, we could obtain normal ERG data from one eye of each rabbit during several sessions. These data served as controls to evaluate the normal fluctuations of the b-wave ratio. Statistical comparison between the different ERG sessions was done using a Newman-Kuels test. No difference was found between the ERG data, measured at different times, from the nontreated eye (OD-open circles) of the
Fig. 5. Light microscopy sections illustrating the range of retinal lesions seen in the pigmented rabbit retina after ERG recovery from laser treatment of 1000 applications. Some areas appear normal (a). In other parts, damage to the photoreceptor layer and pigment migration into the inner retinal layers are evident, though the proximal retina appears more normal (b). In some retinal areas severe damage is observed throughout almost the entire retinal depth with pigment migration (c). All sections have a length of 800 μm and were photographed at magnification ×40.

In the lower part of the figure the last two data points (solid circles) did not differ from each other but were significantly different from the pretreatment data, indicating that despite the significant recovery some permanent damage had been induced. A similar phenomenon of significant ERG recovery within 2–3 months after an extensive laser treatment was observed in five out of six eyes treated with 1000 laser applications. The sixth eye was not followed long enough (15 days) because the rabbit died during the ERG recording session.

In order to further investigate the functional recovery of the retina in the pigmented rabbit we examined retinas immediately and 2 months after laser treatment using light- and electron-microscopic techniques. Representative pictures from light-microscopic sections, obtained from the posterior pole of an eye after almost complete recovery of the ERG responses (about 2 months after the laser treatment), are shown in Figure 5. Different degrees of retinal damage were observed in the pigmented rabbit presented in the lower part of Figure 4. The data describing the nontreated eye in the upper part of the figure (OS–solid circles) were not statistically different between the first two sessions. The values measured during the third session differed from the first two at the level of $P < 0.05$. The consistency of the ERG responses measured from the same eye (the nontreated one) at different sessions separated by an extended period of time proved the reliability of the b-wave ratio, defined here, as an index for retinal function. The statistical test (Newman-Kuels) showed a significant difference ($P < 0.01$) between each pair of ERG sessions performed after the laser treatment in both rabbits. Thus, a severe reduction in retinal function was immediately after treatment and was followed by a significant recovery as a function of time after treatment. The data in the upper part of Figure 4 show complete recovery and the ERG responses measured in the last session did not differ significantly from the pretreatment values.
damage could be identified. Some parts appeared normal (Fig. 5a), probably because they were not hit by the laser. Mild damage was characterized by loss of the photoreceptor layer and migration of pigment into the inner retinal layers (Fig. 5b), while severe damage (Fig. 5c) was evident throughout almost the entire retinal depth. The portion of the coagulated retina was roughly estimated by measuring in each section of the eye the length of all damaged areas and dividing this sum by the total retinal length in the section. Using this method, we measured a total of 15 sections from the posterior pole of one eye that showed ERG recovery from the laser treatment and estimated the coagulated retina to occupy 30–40% of the total retina. The fraction of coagulated area was also estimated from the number of laser applications delivered during treatment. The retinal area of the rabbits used in this study was about 480 mm². The diameter of the laser beam was set at 700 μm, therefore, a treatment of 1000 applications was expected to coagulate an area of about 385 mm². However, it was estimated that about 15% of the laser applications were not effective in producing retinal lesions. Thus, the actual area of coagulation was 327 mm², which was 68% of the total retinal area. This value represented an upper limit because some of the applications overlapped and because the effective size of the laser was probably smaller than 700 μm (a 10% reduction in the effective diameter of the laser spot will reduce the estimated fraction of coagulated retina to 55%). Comparing the estimate of 68% coagulation to the value measured from the light-microscopic sections (30–40%), we concluded that even if there was some recovery of retinal structures it was not substantial enough to account for the observed ERG recovery.

Electron-microscopic examination of a retina obtained shortly after the laser treatment and of a retina studied about 2 months after treatment did not show any significant differences with regard to retinal lesions and structure of non-damaged photoreceptors. However, structural differences in the pigment epithelium layer were evident. Figure 6 shows representative pictures of retinal areas which were not directly hit by the laser and, therefore, intact photoreceptors could be seen. These pictures were taken from retinas obtained either immediately (Fig. 6a, b) or 2 months (Fig. 6c, d) after treatment with 1000 applications of argon laser. Immediately after treatment the pigment epithelial cells are disorganized, swollen and many phagosomes can be identified, pointing to very active cells (Fig. 6b). Rod outer segment can be seen opposed to the pigment epithelium. A higher magnification of the basal membrane shows very few disorganized folds (Fig. 6a). In contrast, the cells in the pigment epithelium layer of an eye prepared 2 months after the laser treatment (Fig. 6d) are indistinguishable from those seen in normal nontreated eyes. The basal membrane in these pigment epithelial cells (Fig. 6c) is characterized by many organized and closely packed infoldings. The larger dark grain seen in the basal side of the basal membrane (Fig. 6a, c, d, arrows) is due to Ferritin granules which were applied to assess the role of the pigment epithelium layer as a barrier between the choroid and the retina. No leakage to the apical side was seen in nontreated areas of either retina and all the granules of Cationized Ferritin were bound to the Glycocalyx of the Bruch’s membrane.

Discussion

The data presented here from pigmented rabbits agree with previous reports on humans7-11 and monkeys14 in showing the deleterious effects of argon laser on the retina. The reduction in the ERG responses measured shortly after the laser treatment was proportional to the number of laser applications (Fig. 3). Larger areas of coagulated retina were correlated with smaller ERG responses. However, the reduction in the b-wave amplitude was considerably larger than the fraction of coagulated retina (with a treatment of 1000 applications the b-wave was reduced by about 90%, while the upper limit estimate of the coagulated area was 68%). Thus, the ERG data could not be used to estimate the degree of coagulation. This conclusion is in agreement with previous coagulation studies of rabbits,9 humans11-13 and monkeys.14 When the ERG was followed for longer time intervals after an extensive laser treatment (about 1000 applications), a significant recovery in the amplitude of the ERG responses was observed within 2 to 3 months (Fig. 4).

Several possibilities may explain the recovery observed in the ERG responses after the laser treatment:

1) The laser applications were of too low energy and therefore did not produce permanent retinal damage. This possibility could be rejected by the appearance of the fundus, showing numerous retinal lesions. Pigment invasion to the destroyed retinal areas was evident when the fundus was examined 2 months after the laser treatment (Fig. 1). Furthermore, the light-microscopic sections indicated severe and permanent damage in retinal areas hit by the laser applications (Fig. 5).

2) The retina of the pigmented rabbit used in this study had the ability to recover from retinal insults such as laser burns. The histological sections obtained 2 months after the laser treatment showed damage to retinal areas hit by the laser applications. This retinal
Fig. 6. Electron microscopy of the distal retina (photoreceptors and pigment epithelium) obtained from presumably nontreated areas. Retina obtained 4 days after treatment with 1000 laser applications (a, b). (a) Very few folds characterized the basal membrane of the pigment epithelial cell (magnification ×60,000). (b) Pigment epithelial cell with many phagosomes. Rod outer segment can be seen (magnification ×9000). Retina obtained 2 months after the laser treatment (1000 applications) when ERG recovery was evident (c, d). (c) Well-organized and closely-packed infoldings of the pigment epithelium basal membrane (magnification ×60,000). (d) Normal appearance of the pigment epithelium cells. The microvilli are in contact with the rod outer segment (magnification ×12,000). The layer of dark grain seen in (a, c, d) (arrows) is formed from granules of Cationized Ferritin bound to the Glycocalyx of the Bruch’s membrane.
damage was either restricted to the photoreceptor layer or extended throughout most of the retinal layers (Fig. 5). The fraction of the damaged retinal area was roughly estimated from the histological sections to be 30–40%, compared to a value of 68% which was an upper value calculated from the number of laser applications and their size. It was therefore concluded that even if there was some recovery from the laser treatment it was too small to account for the ERG recovery.

(3) The laser treatment induced changes in the resistance to current flow in retinal or nonretinal tissues, which may affect the magnitude of the currents responsible for the ERG. The electrical response of the retina to a light stimulus may be simplified as a current source activated by the flash. This current divides between many different pathways which can be reduced to two major ones. The extraretinal circuit represents all the currents which originate and terminate in the retina, but flow across nonretinal tissues such as the vitreous, lens, cornea and pigment epithelium. The intraretinal circuit is confined to the retina itself. According to Ohm's law, the current generated by a light stimulus divides between these circuits in a way which is inversely related to the total electrical resistance in the pathways. The corneal ERG is measured along the extraretinal current pathway and, therefore, its amplitude depends on the magnitude of the current and on the resistance between the measuring electrodes. A change in the magnitude of the extraretinal current may be caused by either a change in retinal function or a change in the total electrical resistance of the extraretinal pathway relative to the intraretinal one. In the latter case, a given retinal current will divide differently between the two pathways, producing a change in the amplitude of the corneal ERG which does not reflect a change in retinal function. The best example supporting the above analysis is the reduction of the corneal ERG observed after the vitreous humour has been replaced by oil. This procedure raises the total electrical resistance of the extraretinal circuit. As a result, most of the current elicited by a light stimulus flows through the intraretinal pathway and only a small fraction flows along the extraretinal one. Thus, the observed decrease of the corneal ERG amplitude reflects the reduction in the magnitude of the extraretinal current and not an impairment of retinal function. In the extraretinal pathway, the major contribution to the resistance to current flow is offered by the pigment epithelium. Thus, an abnormal increase in the resistance of this layer will result in a proportional reduction in the extraretinal current. Since the electrical resistance between the ERG electrodes does not change, a reduction in the ERG amplitude will be recorded. The opposite phenomenon will occur if the resistance of the pigment epithelium decreases. Numerical analysis of the ERG shows that changes in the conductance of the R-membrane may produce considerable changes in the amplitude of the corneal ERG. On the other hand, reducing the conductivity (increasing resistance) of the vitreous by three-fold due to vitreous hemorrhage does not result in ERG reduction because the vitreous contribution to the total electrical resistance of the extraretinal pathway is relatively small. Reduction in the ERG is calculated to occur only after the resistance of the vitreous is raised by at least five-fold above the normal value.

It is suggested that structural changes induced by the laser treatment in the pigment epithelium may contribute to some of the observed changes in the ERG responses. Electron microscopy showed significant differences between a retina obtained shortly after treatment (very small ERG) and one prepared 2 months after treatment (close to normal ERG). We examined only retinal areas which were not directly hit by the laser treatment and were identified by the presence of photoreceptors with normal morphology (Fig. 6b, d). In the retina fixed immediately after laser treatment the pigment epithelium had an abnormal appearance. The cells were markedly swollen and vacuoles could be identified at both the basal and apical sides. The basal membrane was very irregular and very few folds could be identified (Fig. 6a). These changes may have been induced by heat conduction from surrounding treated areas or from low levels of heat production in the outer borders of the laser spots. In the retina studied after ERG recovery from the laser treatment, the pigment epithelium layer (Fig. 6c, d) appeared normal and was indistinguishable from the one obtained from an untreated eye. Although the above morphological changes could not be directly linked to changes in the electrical resistance of the pigment epithelium, it is hypothesized that such changes play a major role in the ERG findings reported here. According to the above model, it is suggested that the resistance of the pigment epithelium increases immediately after the laser treatment and thus contributes to further reduction in the ERG amplitude, in addition to the reduction due to retinal damage. At longer time intervals after treatment, the pigment epithelium layer recovers and its resistance decreases, maybe even to below the normal value, resulting in augmentation of the corneal ERG. This increase in ERG amplitude does not reflect recovery of retinal damage but rather changes in the electrical resistance of the pigment epithelium. This hypothesis is in agreement with previous data obtained from diabetic patients. It was found that the laser treatment reduced the ERG more than expected from the coagulated retinal area. Increase in the resistance of the pigment epithelium may contribute
partially to these findings. Furthermore, it was reported that the amplitude of the ERG partially increased as a function of time after the PRP treatment while the shape of the responses (b-to-a-wave relationship) did not change compared to those recorded immediately after treatment. This phenomenon can also be explained by events occurring in the pigment epithelium. The amplitude of the ERG wave may be affected by the pigment epithelium but the relationship between the b- and a-wave amplitudes depends only on the functional integrity of the retina. The ERG recovery after PRP treatment in human subjects was only partial and could be noticed only by repeating the ERG measurements in the same subjects over an extended period of time after the treatment. In most other human studies ERG was measured once or at most the twice after the laser treatment. In our human study ERG was measured twice during treatment and three times after the treatment over a period of 6 months. In one study it was mentioned that no change in ERG was observed 3 months after treatment. In this work the laser treatment was relatively mild, producing about 50% reduction in the ERG amplitude compared to the 80–90% reductions measured in our patients. Since the ERG recovery in the human retina after photocoagulation is small, it is possible that it is apparent only after extensive treatments. Despite the recovery seen in our ERG study of diabetic patients, a permanent significant deficit was evident in everyone followed. It should be noted that the rabbit’s retina, unlike the human’s, is nonvascularized and therefore depends exclusively on the choroidal circulation. The characteristics of the pigment epithelium may be significantly different between these species and may account for the substantial ERG recovery seen in the rabbits compared to the much smaller one observed in patients.

Morphological changes in the pigment epithelium were also implicated to affect the corneal ERG in albino rats that were exposed to bright light for an extended period of time. It was noted that the first histological signs of type I light damage were seen in the pigment epithelium. The cells were moderately swollen and vacuolized even in areas where photoreceptors were still preserved. The reduction in the ERG amplitude was therefore partially attributed to loss of retinal cells and partially to structural changes in the pigment epithelium occurring even in undamaged retinal areas. It is therefore suggested that the corneal ERG may be affected by factors of retinal pigment epithelial cell origin. These factors will affect only the ERG amplitude and not its shape and must be considered when the ERG is used to assess retinal function.

Key words: electoretinogram, photocoagulation, retina, rabbit, pigment epithelium

References