

8 Literaturverzeichnis

1. Agaki Y, Kador PF, Kuwabara T, Kinoshita JH: Aldose reductase in human retinal mural cells. *Invest Ophthalmol Vis Sci* 24 (1983) 1516-1519
2. Al- Ghoul KJ, Costello MJ: Morphological changes in human nuclear cataracts of late- onset diabetics. *Exp Eye Res* 57 (1993) 469-483
3. Alt A: A case of transitory lenticular opacity in both eyes in a diabetic patient. *Am J Ophthalmol* 23 (1906) 294-298
4. Ansari NH, Awasthi YG, Srivastava SK: Role of glycosylation in protein disulphide formation and cataractogenesis. *Exp Eye Res* 31 (1980) 9-19
5. Argento C, Zarate J: Study of the lens epithelial cell density in cataractous eyes operated on with extracapsular and intracapsular techniques. *J Cataract Refract Surg* 16 (1990) 207-210
6. Asano N, Schlötzer- Schrehardt U, Dörfler S, Naumann GOH: Ultrastructure of contusion cataract. *Arch Ophthalmol* 113 (1995) 210-215
7. Baghieri S, Garner MH: Na, K- ATPase and phospholipid degradation in bovine and human lenses. *Curr Eye Res* 11 (1992) 459-467
8. Bellows JG: Linse. In: Francois J, Hollwich F (Hrsg): *Augenheilkunde in Klinik und Praxis*. Georg-Thieme-Verlag, Stuttgart, New York, 1981, Band II, S. 3.2-3.94
9. Belpoliti M, Maraini G: Sugar alcohols in the lens epithelium of age- related cataract. *Exp Eye Res* 56 (1993) 3-6
10. Bermbach G, Mayer U, Naumann GOH: Human lens epithelium in tissue culture. *Exp Eye Res* 52 (1991) 113-119
11. Bernth-Petersen P, Bach E: Epidemiologic aspects of cataract surgery, III: Frequencies of diabetes and glaucoma in a cataract population. *Acta Ophthalmol* 61 (1983) 406-416
12. Bleckmann H, Khodadadyan, Schnoy N: Licht- und Elektronenmikroskopie der humanen, anterioren Kataraktkapsel. *Fortschritt Ophthalmol* 86 (1989) 556-560
13. Bloemendaal H: Aging of the lens and senile cataract. Topics in aging research in Europe 4 (1984) 47-50
14. Bloemendaal H: Disorganization of membranes and abnormal intermediate filament assembly lead to cataract. Proctor Award Lecture. *Invest Ophthalmol Visual Sci* 32 (1992) 445-455

15. Böke W: Chirurgie der Linse. In: Mackensen G, Neubauer H (Hrsg.): Augenärztliche Operationen. Springer, Berlin, Heidelberg, 1989, Teil 2, S. 87-93
16. Bron AJ, Sparrow J, Brown NAP, Harding JJ, Blakytny R: The lens in diabetes. Eye 7 (1993) 260-275
17. Brown CA, Burman D: Transient cataract in a diabetic child with hyperosmolar coma. Br J Ophthalmol 57 (1973) 429-433
18. Caird FI, Pirie A, Ramsell TG: Diabetes and the eye. Blackwell Scientific, Oxford, 1969, S. 131
19. Caird FI: Problems of cataract epidemiology with special reference to diabetes. Ciba Fdn Symp 19 (1973) 281-301
20. Chen TT, Hockwin O, Dobbs R, Knowles W, Eckerskorn U: Cataract and health status: a case-control study. Ophthalmic Res 20 (1988) 1-9
21. Chylack LT Jr, Henriques H, Tung W: Inhibition of sorbitol production of human lenses by an aldose reductase inhibitor. Invest Ophthalmol Vis Sci 17 ARVO Suppl (1978) 300
22. Clayton RM, Cuthbert J, Seth J, Philips CI, Bartholomew RS, Reid JM: Epidemiological and other studies in the assessment of factors contributing to cataractogenesis. Ciba Fdn Symp 106 (1984) 25-47
23. Collins JG, Corder CN: Aldose reductase and sorbitol dehydrogenase distribution in substructures of normal and diabetic rat lens. Invest Ophthalmol Vis Sci 16 (1977) 242-246
24. Deussen A, Pau H: Nucleotide levels in human lens: regional distribution in different forms of senile cataract. Exp Eye Res 48 (1989) 37-47
25. Dolin PJ: Ultraviolet radiation and cataract: a review to the epidemiological evidence. Britisch J Ophthalmol 78 (1994) 478-482
26. Duncan G, Marcantonio JM, Tomlinson J: Lens calcium and cataract. In Obrecht G, Stark LW (Hrsg): Presbyopia research. Plenum Press, New York, 1991. S. 33-39
27. Duncan G: Role of membranes in controlling ion and water movements in the lens. In: The human lens in relation to cataract. Ciba Foundation symposium, 1973, pp. 99-116
28. Ederer F, Hiller R, Taylor HR: Senile lens changes and diabetes in two population studies. Am J Ophthalmol 91 (1981) 381-395
29. Eggstein M, Luft D: Diabetes mellitus. In: Gross R, Schölmerich P, Gerok W (Hrsg): Lehrbuch der Inneren Medizin. Schattauer, Stuttgart, New York, 1987, S. 803-837

30. Ehrich D: Rasterelektronenmikroskopische und röntgenspektrometrische Untersuchungen des vorderen zentralen Linsenepithels bei Kataraktpatienten. Dissertationsschrift, Universität Halle-Wittenberg, 1996
31. Fournier DJ, Patterson JW: Variations in ATPase activity in the development of experimental cataracts. *Proc Soc Exp Biol Med* 137 (1971) 826-32
32. Fragerholm PP, Philipson BT: Human lens epithelium in normal and cataractous lenses. *Invest Ophthalmol Vis Sci* 21 (1981) 408-414
33. Francois J, Victoria-Troncoso V: Histology of the epithelium of the normal and cataractous lens. *Ophthalmologica* 177 (1978) 168-174
34. Friedburg D: Enzyme activity patterns and some intermediates in human senile cataract. *Ophthalmic Res* 3 (1972) 224-232
35. Garlick RL, Mazer JS, Chylack LT et al.: Nonenzymatic glycation of human lens crystallin. Effect of aging and diabetes mellitus. *J Clin Invest* 74 (1984) 1742-1749
36. Garner MH: Na, K- ATPase of the lens epithelium and fiber cell: Formation of catalytic cycle intermediates and $\text{Na}^+ : \text{K}^+$ exchange. *Exp Eye Res* 58 (1994) 705-718
37. Giles KM, Harris JE: The accumulation of ^{14}C from uniformly labelled glucose by the normal and diabetic rabbit lens. *Am J Ophthalmol* 48 (1959) 508
38. Goder GJ: Grundriß der Ophthalmologie. In: Velhagen K (Hrsg): Der Augenarzt. Thieme, Leipzig, 1985, S. 426-440
39. Gorden P: Non-insulin dependent diabetes-the past, present and future. *Ann Acad Med Singapore* 26 (1997) 326-330
40. Gorthy WC, Morril DJ, Anderson JW: Anterior polar cataract development in mutant Wistar rats: an ultrastructural study. In: Regnault F, Hockwin D, Courtis Y (edit): Aging of the lens. Elsevier/ North Holland, New York, 1980, S. 207-222
41. Guggenmoos- Holzmann I, Engel B, Henke V: Cell density in women higher than in men. *Invest Ophthalmol Vis Sci* 30 (1989) 330-332
42. Hara T, Hara T: Observations on lens epithelial cells and their removal in anterior capsule specimens. *Arch Ophthalmol* 106 (1988) 1683-1687
43. Harding CV, Susan SR, Lo W, Bobrowski WF, Maisel H, Chylack LT: The structure of the human cataractous lens. In: Maisel H (edit.): The ocular lens. Marcel Dekker Inc, New York, 1985, pp. 367-404
44. Harding JJ, Egerton M, Van Heyningen R, Harding RS: Diabetes, glaucoma, sex and cataract: analysis of combined data from two case-control studies. *Br J Ophthalmol* 77 (1993) 2-6

45. Harding JJ, Harding RS, Egerton M: Risk factors for cataract in Oxfordshire: diabetes, peripheral neuropathy, myopia, glaucoma and diarrhoea. *Acta Ophthalmol* 67 (1989) 510-517
46. Harding JJ: Cataract: biochemistry, epidemiology and pharmacology. Chapman and Hall, London, 1991
47. Harding JJ: The untenability of the sunlight hypothesis of cataractogenesis. *Documenta Ophthalmologica* 88 (1995) 345-349
48. Hartmann M, Aust W: Durchführung von Dickenmessungen an Fragmenten der zentralen vorderen Linsenkapseln kataraktöser Linsen. In: Wollensack R (Hrsg): Proc. 4th Cong. DGII. Springer, Berlin, Heidelberg, New York, 1990, S. 224-228
49. Haß C, Kohlmann H, Lommatzsch PK: Morphologische Veränderungen des Linsenepithels bei Patienten mit altersbedingter Katarakt, Strahlen- und Steroidkatarakt und Katarakt nach Contusio bulbi. *Ophthalmologe* 92 (1995) 741-744
50. Hayes BP, Fisher RF: The structure of the lens epithelium and its basement membrane in the diabetic state. *Curr Eye Res* 1 (1981) 317-326
51. Hayman S, Lou MF, Merola LO; Kinoshita JH: Aldose reductase activity in the lens and other tissues. *Biochem Biophys Acta* 128 (1966) 474-482
52. Hightower KR: The role of the lens epithelium in development of UV cataract. *Curr Eye Res* 14 (1995) 71-78
53. Hiller R, Kahn H: Senile cataract extraction and diabetes. *Br J Ophthalmol* 60 (1976) 283-286
54. Hiller R, Sperduto RD, Ederer F: Epidemiologic associations with cataract in the 1971- 1972 National Health and Nutrition Examination Survey. *Am J Ophthalmol* 118 (1983) 239-248
55. Hockwin O, Koch HR: Combination effects of noxious influences on the crystalline lens. In: Bellows JG (edit.): *Cataract and abnormalities of the lens*. Grune & Stratton, New York, 1975, pp. 243-254
56. Hockwin O, Okamoto T, Bergeder HD, Klein W, Ferrari L, Streit W: Genesis of cataracts. Cumulative effects of subliminal noxious influences. *Ann Ophthalmol* 1 (1969) 321-325
57. Iwata S: Calcium- pump and its modulator in the lens: a review. *Curr Eye Res* 4 (1985) 299-304
58. Jackson RC: Temporary cataracts in diabetes mellitus. *Br J Ophthalmol* 39 (1955) 629-631

59. Jacob TJC, Bangham JA, Duncan G: Characterization of a cation channel on the apical surface of the frog lens epithelium. *Quart J Exp Physiol* 70 (1985) 403-421
60. Jacob TJC, Karim AKA, Thompson GM: The effects of steroids on the human lens epithelium. *Eye* 1 (1987) 722-727
61. Javitt JC, Taylor HR: Cataract and latitude. *Documenta Ophthalmologica* 88 (1995) 307-325
62. Jedziniak JA, Chylack LT Jr, Cheng HM, Gillis MK, Kalustian AA, Tung WH: The sorbitol pathway in the human lens: aldose reductase and polyol dehydrogenase. *Invest Ophthalmol Vis Sci* 20 (1981) 314-326
63. Jensen OA, Laursen AB: Human senile cataract: light- and electron- microscopic studies of the morphology of the anterior lens structures, with special reference to anterior capsular/ subcapsular opacity. *Acta Ophthalmol.* 58 (1980) 481-495
64. Kaiser H, Specker H: Bewertung und Vergleich von Analysenverfahren. *Zeitschrift für Analytische Chemie* 149 (1956) 51-56
65. Kanski JJ: Erkrankungen der Linse. In: Kanski JJ: Lehrbuch der klinischen Ophthalmologie. Thieme, Stuttgart, New York, 1996, S.276-285
66. Karim AKA, Thompson GM: The human anterior lens capsule: Cell density/ morphology and mitotic index in normal and cataractous lenses. *Exp Eye Res* 45 (1987) 865-874
67. Kasai K, Nakamura T, Kase N: Increased glycosylation of proteins from cataractous lenses in diabetes. *Diabetologia* 25 (1983) 36-38
68. Kinoshita JH, Merola LO; Satoh K: Osmotic changes caused by the accumulation of dulcitol in the lenses of rats fed with galactose. *Nature* 194 (1962) 1085- 1087
69. Kinoshita JH: A thirty- year journey in the polyol pathway. *Exp Eye Res* 50 (1990) 567-573
70. Kleimann NJ, Spector A: DNA single strand breaks in human lens epithelial cells from patients with cataract. *Curr Eye Res* 12 (1993) 423-431
71. Klein BEK, Klein R, Moss SE: Prevalence of cataracts in a population- based study of persons with diabetes mellitus. *Ophthalmology* 92 (1985) 1191-1196
72. Klein R, Klein BEK, Moss SE: Visual impairment in diabetes. *Ophthalmology* 91 (1984) 1-8
73. Kobayashi Y, Suzuki T: The aging lens: ultrastructural changes in cataract. In: Bellows, JG (edit.): Cataract and abnormalities of the lens. Grune and Stratton Inc., New York, 1975, pp. 313-343

74. Konofsky K, Naumann GOH, Guggenmoos- Holzmann I: Cell density and sex chromatin in lens epithelium of human cataracts: Quantitative studies in flat preparation. *Ophthalmology* 94 (1987) 875-880
75. Koyama- Ito H: Elemental distribution in frozen- hydrated rat lenses with galactose cataract. *Lens and Eye Toxicity Research* 7 (1990) 577-591
76. Kreines K, Rowe KW: Cataract and adult diabetes. *Ohio Med J* 75 (1979) 782-786
77. Krumparszky HG, Klauss V: Epidemiology of blindness and eye disease. *Ophthalmologica* 210 (1996) 1-84
78. Kupfer K: Conquest of cataract: Global challenge. *Trans Ophthalmol Soc UK* 104 (1984) 1-10
79. Lee AY, Chung SK, Chung SS: Demonstration that polyol accumulation is responsible for diabetic cataract by the use of transgenic mice expressing the aldolase reductase gene in the lens. *Proc Natl Acad Sci USA* 92 (1995) 2780-2784
80. Leske MC, Chylack LT Jr, WuSY: The lens opacities case- control study: risk factors for cataract: *Arch Ophthalmol* 109 (1991) 244-251
81. Li W-C, Kuszak JR, Dunn K; Wang R-R, Ma W, Wang G-M, Spector A, Leib M, Cotliar AM, Weiss M, Espy J, Howard G; Linsky Farris R, Auran J, Donn A, Hofeldt A, Mackay C, Merriam J, Mittl R, Smith TR: Lens epithelial cell apoptosis appears to be a common cellular basis for non- congenital development in humans and animals. *J of Cell Biology* 130 (1995) 169-181
82. Liang JN, Hershorin LL, Chylack LT: Non- enzymatic glycosylation in human diabetic lens crystallins. *Diabetologia* 29 (1986) 225-228
83. Los LI, Jongebloed WL, Worst JGF: Lens- capsule material of human and animal origin, studied by SEM. *Doc Ophthalmol* 72 (1989) 357-365
84. Müller-Breitenkamp U, Ohrloff C, Hockwin O: Aspekte zur Physiologie, Pathologie und Epidemiologie der Katarakt. *Ophthalmologe* 89 (1992) 257-267
85. Nagata M, Matsuura H, Fujinaga Y: Ultrastructure of posterior subcapsular cataract in human lens. *Ophthalmic Res* 18 (1986) 180-184
86. Neilson NV, Vinding T: The prevalence of cataracts in insulin- dependent and non-insulin- dependent diabetes mellitus. An epidemiological study of diabetics treated with insulin and oral hypoglycaemic agents (OHA). *Acta Ophthalmol* 62 (1984) 595- 602
87. Nishi O, Saitoh J, Hitani H: Morphometry of lens epithelial cells of human cataracts. *Eur J Implant Ref Surg* 3 (1991) 245-248

88. Nordmann J, Klethi J: Der ATP- Gehalt der normalen alternden Linse beim Menschen. *Klinische Monatsblätter Augenheilkunde* 173 (1978) 476-480
89. Ohrloff C, Hockwin O, Olson R, Dickmann S: Gluthatione peroxidase, gluthatione reductase and superoxide dismutase in the ageing lens. *Curr Eye Res* 3 (1984) 109-115
90. Ohrloff C, Korte I, Doffin I, Elsing M, Hockwin O, Bartelomew RS, Clayton R, Cuthbert J, Phillips CI, Seth I: Studies of lens enzyme activities in relation to cataract type and plasma constituents. *Ophthalmic Res* 15 (1983) 138-142
91. Oimomi M, Maeda Y, Hata F, Kitamura Y, Matsumoto S, Baba S, Iga T, Yamamoto M: Glycation of cataractous lens in non- diabetic senile subjects and in diabetic patients. *Exp Eye Res* 46 (1988) 415-420
92. Palkovitz M, Fischer J: Karyometric investigations. Ak Kiado Budapest (1968) 31-166
93. Pande A, Garner WH, Spector A: Glucosylation of human lens protein and cataractogenesis. *Biochem Biophys Res Commun* 89 (1979) 1260-1266
94. Paterson CA, Zeng J, Husseini Z, Borchman D, Delamere NA, Garland D, Jimenez- Asensio J: Calcium ATPase activity and membrane structure in clear and cataractous human lenses. *Curr Eye Res* 16 (1997) 333-338
95. Pau H: Biologische Parameter bei den sogenannten „ Altersstaren“. *Fortschr Ophthalmol* 86 (1989) 197-199
96. Perry MM, Tassin J, Courtois Y: A comparison of human lens epithelial cells in situ and in vitro in relation to aging: an ultrastructural study: *Exp Eye Res* 28 (1979) 327-341
97. Philipson B: Changes in the lens related to the reduction of transparency. *Exp Eye Res* 16 (1973) 29-39
98. Pirie A, van Heyningen R: The effect of diabetes on the content of sorbitol, glucose, fructose and inositol in the human lens. *Exp Eye Res* 3 (1964) 124- 131
99. Robison WG, Houlder N, Kinoshita JH: The role of lens epithelium in sugar cataract formation. *Exp Eye Res* 50 (1990) 641-646
100. Romeis B: Fixierung histologischer Präparate. In: Romeis B: *Mikroskopische Technik*. Urban & Schwarzenberg, München, Wien, Baltimore, 1993, S. 69-75
101. Rossier BC, Geering K, Kraehenbuhl JP: Regulation of the sodium pump: how and why?. *Trends Biochem Sci* 12 (1987) 483-487
102. Saitoh J, Nishi O, Hitani H: Cell density and hexagonality of lens epithelium in human cataracts. *Nippon Ganka Gakkai Zasshi* 94 (1990) 176-180

103. Sakuragawa M, Kuwabara T, Kinoshita JH, Hukui HN: Swelling of the lens fibers. *Exp Eye Res* 21 (1975) 381-394
104. Sargon MF, Celik HH, Orhan M: Electron microscopy of the senile changes in lens epithelium. *Okajimas Folia Anat Jpn* 74 (1997) 75-79
105. Schaaf L, Usadel K-H: Endokrinologie. In: Zöllner N (Hrsg): Innere Medizin. Springer, Berlin, Heidelberg, 1998, S. 398-404
106. Schiebler TH: Sinnesorgane. In: Schmidt W (Hrsg.): Anatomie. Springer, New York, Berlin, Heidelberg, 1991, S.716-717
107. Schwab IR, Dawson CR, Hoshiwara I, Szuter CF, Knowler WC: Incidence of cataract extraction in Pima Indians. Diabetes as a risk factor. *Arch Ophthalmol* 103 (1985) 208-212
108. Seydewitz V, Ehrich D, Struck HG, Tost F: SEM- and EDXA- investigations on epithelia of disturbed ocular tissues. *Beitr Elektronenmikros Direktabb Oberfl* 27 (1994) 189-192
109. Shin DH, Mandel SS, Lee JH, Ernst B, Newman BL, Juzcych M: Increased glycosylation of human lens epithelial basement membrane in diabetes mellitus. *Korean J Ophthalmol* 8 (1994) 26-31
110. Spector A: The lens and oxidative stress. In: Sies H (edit): Oxidative stress, oxidants and antioxidants. Academic Press, London, 1991, pp 529-558
111. Straatsma BR, Lightfoot DO, Barke RM, Horwitz J: Lens capsule epithelium in age- related cataract. *Am J Ophthalmol* 112 (1991) 283-296
112. Struck HG, Ehrich D, Seydewitz V: Vergleichende morphologische Untersuchungen des Linsenepithels bei Kataraktpatienten. In: Wollensak J, Pham DT, Rochels R, Hartmann C (Hrsg): 8. Kongreß der DGII. Springer, Berlin, Heidelberg, New York, 1994, S. 392-397
113. Struck HG, Ehrich D, Seydewitz V: Zur Bedeutung des Linsenepithels für die Kataraktentwicklung: Ein strukturanalytischer Beitrag. In: Rochels R, Duncker G, Hartmann C (Hrsg): 9. Kongreß der DGII. Springer, Berlin, Heidelberg, New York, 1995, S. 435-440
114. Struck HG: Clinical Aspects of Cataracts. *Nova Acta Leopoldina NF* 75, 299 (1997) 9-17
115. Struck HG, Hammer U, Seydewitz V: Einfluß des Diabetes mellitus auf das vordere zentrale Linsenepithel bei Kataraktpatienten. *Ophthalmologe* 94 (1997) 327-331
116. Trayhurn P, van Heyningen R: The metabolism of amino acids in the bovine lens: their oxidation as a source of energy. *Biochem J* 136 (1973) 67-75

117. Tseng SH, Yen JS, Chien HL: Lens epithelium in senile cataract. *J Formos Med Assoc* 93 (1994) 93-98
118. Uemura YJ, Kuno Y, Koyama H, Yamazaki T, Kienle P: A new way of determining concentrations in P. I. X. E. trace element analysis. *Nucl Instr and Meth* 153 (1978) 573-579
119. Uga S, Tsuchiya K, Ishikawa S: Histopathological study of emory mouse cataract. *Graefe's Arch Clin Exp Ophthalmol* 226 (1988) 15-21
120. van Heyningen R, Harding JJ: Risk factors for cataract: diabetes, myopia and sex. *Colloq d'INSERM* 147 (1986) 381-385
121. van Heyningen R: The lens: metabolism and cataract. In: Davson H (edit) : The eye. Academic Press, London, 1969, S. 381- 488
122. van Heyningen R: The sorbitol pathway in the lens. *Exp Eye Res* 1 (1962) 396-404
123. Varma S, Schocket SS, Richards RD: Implications of aldose reductase in cataracts of human diabetes. *Invest Ophthalmol Vis Sci* 18 (1979) 237-241
124. Vasavada AR, Cherian M, Yadav S, Rawal UM: Lens epithelial cell density and histomorphological study in cataractous lenses. *J Cataract Refract Surg* 17 (1991) 798-804
125. von Sallmann L: The lens epithelium in the pathogenesis of cataract. *Am J Ophthalmol* 44 (1957) 159-170
126. WHO Study Group: Report on Diabetes. Technical Report Series WHO 727 (1985)
127. WHO (World Health Organization): Cataract. *Weekly Epidemiological Record* 68 (1993) 95
128. WHO (World Health Organization): Diabetes mellitus. *Weekly Epidemiological Record* 14 (1993) 95
129. Williams MR, Duncan G, Croghan PC, Riach R, Webb SF: pH regulation in tissue- cultured bovine lens epithelial cells. *J Membr Biol* 129 (1992) 179-187
130. Winkler BS, Riley MV: Relative contributions of epithelial cells and fibers to rabbit lens ATP content and glycolysis. *Invest Ophthalmol Vis Sci* 32 (1991) 2593-2598
131. Worgul BV, Merriam GR Jr., Medvedovsky C: Cortical cataract development- an expression of primary damage to the lens epithelium. *Lens Eye Toxic Res* 6 (1989) 559-571

132. Wu H, Shi ZR: Ultrastructures of the capsule and subcapsular epithelium of the senile cataractous lenses. Chung Hua Yen Ko Tsa Chih 26 (1990) 168-170
133. Zigman S, Datiles M, Torczynski E: Sunlight and human cataracts. Invest Ophthalmol 18 (1979) 462-467
134. Zimmet PZ, McCarty DJ, de-Courten MP: The global epidemiology of non-insulin-dependent diabetes mellitus on the metabolic syndrome. J Diabetes Complications 11 (1997) 60-68

9 Thesen

1. Die Rolle des Linsenepithels bei der multifaktoriellen Genese der alterskorrelierten Katarakt ist noch nicht ausreichend geklärt. In der Literatur wird diskutiert, ob primäre Veränderungen des Linsenepithels die Kataraktogenese induzieren können. Dysfunktion der membranständigen Ionenpumpen und eine resultierende Störung der Permeabilität des Linsenepithels sollen dabei zur Ausbildung von Linsentrübungen führen können.
2. Anhand rasterelektronenmikroskopischer und röntgenspektrometrischer Untersuchungen von Linsenepithelen von Patienten mit alterskorrelierten Katarakten, die während Phakoemulsifikationen durch Kapsulorhexis gewonnen wurden, können Veränderungen des Linsenepithels charakterisiert werden.
3. Für die Bewertung möglicher Alterationen des Linsenepithels bei der Entwicklung alterskorrelierter Katarakte können folgende Kriterien herangezogen werden: Beschreibung und Grading morphologischer Veränderungen der einzelnen Linsenepithelzellen sowie des Zellverbandes, die Bestimmung der Zelldichten, Zellkernvolumina und Zellkernoberflächeninhalte sowie der relativen intrazellulären Phosphorgehalte der Linsenepithelzellen.