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Continuing Education Course
 Approval Checklist

Title: Plaquenil Toxicity Screening

Provider Name: Macula and Retina Institute c/o Dr. Kent Small

- Completed Application
 - Open to all Optometrists? Yes No
 - Maintain Record Agreement? Yes No
- Correct Application Fee
- Detailed Course Summary
- Detailed Course Outline
- PowerPoint and/or other Presentation Materials
- Advertising (optional)
- CV for EACH Course Instructor
- License Verification for Each Course Instructor
 - Disciplinary History? Yes No



CALIFORNIA STATE BOARD OF OPTOMETRY

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CONTINUING EDUCATION COURSE APPROVAL APPLICATION

Cashiering and Board Use Only		
Receipt ID	Beneficiary ID	Amount
1-370	862996	862996 .58

\$50 Mandatory Fee

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule, a detailed course outline and presentation materials (e.g., PowerPoint presentation). Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title <u>PLAQUENIL TOXICITY SCREENING</u>	Course Presentation Date <u>08/22/2016</u>
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Course Provider Contact Information

Provider Name <u>KENT</u> (First) <u>SMALL</u> (Last) <u>WILSON</u> (Middle)
Provider Mailing Address Street <u>501 N ORANGE ST #250</u> City <u>Glendale</u> State <u>CA</u> Zip <u>91203</u>
Provider Email Address <u>JESSICA@MACULARETINA.ORG</u>
Will the proposed course be open to all California licensed optometrists? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name <u>KENT</u> (First) <u>SMALL</u> (Last) <u>WILSON</u> (Middle)
License Number <u>A53173</u> License Type <u>MD</u>
Phone Number <u>(818) 552 5040</u> Email Address <u>kentsmall@hotmail.com</u>

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

[Signature]
Signature of Course Provider

8-3-2016
Date



MACULA & RETINA INSTITUTE

— KENT W. SMALL, MD —

Innovative experienced and highly personalized retinal care

January 5, 2017

Kent W. Small, MD

Board-Certified:
American Board of
Ophthalmology

Fellowship:
Vitreoretinal
Diseases and Surgery,
Duke University Eye
Center, Durham, NC;
Molecular Genetics,
Duke University
School of Medicine,
Durham, NC

MD: Tulane University
School of Medicine,
New Orleans, LA

*Specialized care
for retinal diseases:*

- Macular degeneration
- Diabetic retinopathy
- Retinal tears & detachments
- Inherited retinal diseases
- Retinal vascular disease
- Macular holes
- Macular puckers
- Macular edema
- Proliferative vitreoretinopathy/scar tissue

*State-of-the-art
diagnostic exams:*

- Fluorescein & indocyanine green (ICG) angiography
- Fundus photography
- Scanning laser ophthalmoscopy (SLO)
- Ultrasound A & B scans
- Visual field testing
- Microperimetry
- Optical coherence tomography (OCT)

Re: "Plaquenil Toxicity Screening" Presentation

To whom it may concern,

I would like to extend my apology for not properly submitting the forms for the requested presentation listed above. Moving forward I will be emailing all requests to make the follow up process easier and not mail them in.

Regards,
Jessica Avetisian
Administrator
Kent W. Small MD

Cedars-Sinai medical towers | 8635 West 3rd Street, Suite 395-W, Los Angeles, CA 90048 | Tel: (310) 659-2200 | Fax: (310) 659-2822
Glendale Office | 501 North Orange Street Suite 250, Glendale, CA 91203 | Tel: (818) 552-5040 | Fax: (818) 552-5044

www.maculaandretinalinstitute.com

SUMMARY

The purpose of the presentation is to educate local optometrists on the proper care and management when they are seeing patients who are on or about to begin Plaquenil. Plaquenil is known to show retinal toxicity which can effect the vision and it is imperative to be able to spot any changes and to contact the patient's rheumatologist to notify them about the changes. The presentation goes over how to spot and what testing to perform to make sure there is no retinal toxicity. I have included an article from the American Academy of Ophthalmology that talks about retinal toxicity for your review.

January 2, 2017

OUTLINE "Plaquenil Toxicity Screening"

Kent W. Small MD

NPI 1861470783

License A53173

1. Introduction

- Retinal toxicity from chloroquine (CQ) and its analogue, hydroxychloroquine (HCQ), has been recognized for many years.
- The recent publication of a large demographic study has shown that toxicity is not rare among long-term users of the drug, and the risk is highly dependent on the daily dose by weight.
- The goal of screening for retinopathy is not to stop valuable drugs at the first borderline abnormality. o It is to recognize definitive signs of toxicity at an early enough stage to prevent a loss of visual acuity.
- Toxicity is of serious ophthalmologic concern because it is not treatable. o It has been demonstrated that central vision can be preserved if damage is recognized before there are changes in the retinal pigment epithelium (RPE)

2. Importance of Retinal Eye Exams

3. PROPER TESTING INCLUDES

- Fundus/Fluorescein Photography
- Multi-focal ERG
- Visual Field /Microperimetry
- Optical Coherence Topography (OCT)

4. Things to look out for

- Visual acuity usually is excellent with either pattern until severe stages of damage, and most patients who develop HCQ toxicity have no visual symptoms at all.
- A few perceptive patients may notice paracentral scotomas while reading.
- If drug exposure continues, the area of functional disturbance expands, the RPE becomes involved, and the maculopathy can encroach on the foveal center with eventual loss of visual acuity.
- Cystoid macular edema sometimes may develop, and advanced cases show widespread RPE and retinal atrophy with loss of visual acuity, peripheral vision, and night vision.

5. Statistical risk of toxicity

6. Risk factors

- Rationale for screening
- Screening Frequency

7. Conclusion

- Get your patients to see a Retina Specialist for baseline screening BEFORE they start medication
- Make sure you are receiving yearly reports for their annual follow-up

- Follow-up with documentation of their visit
- Don't take your patient's verbal "my eyes are fine" as proof
- SEND YOUR PATIENTS FOR A SCREENING WITH PROPER DIAGNOSTIC TESTING

SCREENING FREQUENCY

Below are guidelines and recommendations for screening that we deem a fair balance of risk and cost, but the exact timing and extent of screening relative to risk and prevalence, and to cost and legal considerations are judgments that individual physicians and health plans must ultimately determine (Table 2).

Table 2. Screening Frequency

<p>Baseline Screening: Fundus examination within first year of use. Add visual fields and SD OCT if maculopathy is present.</p> <p>Annual Screening: Begin after 3 yrs of use. Sooner in the presence of major risk factors.</p> <p>SD OCT = spectral-domain optical coherence tomography.</p>
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STATISTICAL RISK OF TOXICITY

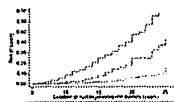


Figure 4. Kaplan-Meier curves showing the cumulative risk of toxicity over time with different levels of baseline retinal OCT. The curves represent the cumulative risk of toxicity over time for patients with normal, mild, and moderate maculopathy. The curves show that the risk of toxicity is significantly higher in patients with moderate maculopathy compared to patients with normal or mild maculopathy.

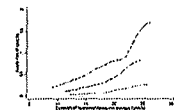


Figure 5. Kaplan-Meier curves showing the cumulative risk of toxicity over time with different levels of baseline retinal OCT. The curves represent the cumulative risk of toxicity over time for patients with normal, mild, and moderate maculopathy. The curves show that the risk of toxicity is significantly higher in patients with moderate maculopathy compared to patients with normal or mild maculopathy.

- Earlier literature on the prevalence of CQ or HCQ retinopathy included few patients on long-term therapy and only recognized severe toxicity (bull's-eye changes)
- These reports have been superseded now by a large study of 2361 patients who used HCQ for more than 5 years and were evaluated with 10-2 visual fields or spectral-domain optical coherence tomography (SD OCT) so that toxicity could be recognized before there were any visible signs on fundus examination.²
- The overall prevalence of toxicity in this study population was 7.5%, although it varied greatly with the daily dose and duration of use.

CONCLUSION

- Get your patients to see a Retina Specialist for baseline screening BEFORE they start medication
- Make sure you are receiving yearly reports for their annual follow-up
- Follow-up with documentation of their visit
 - Don't take your patient's verbal "my eyes are fine" as proof
- SEND YOUR PATIENTS FOR A SCREENING WITH PROPER DIAGNOSTIC TESTING

RISK FACTORS

The most important risk factors are listed in Table 1.

Table 1. Major Risk Factors for Toxic Retinopathy

Daily dosage	
HCQ	>5.0 mg/kg total weight
CQ	>2.5 mg/kg total weight
Duration of use	>5 Yrs, assuming no other risk factors
Renal disease	Subnormal glomerular filtration rate
Concomitant drugs	Tamoxifen use
Macular disease	May affect screening and susceptibility to HCQ/CQ

CQ = chloroquine; HCQ = hydroxychloroquine.

RECOMMENDED SCREENING TESTING

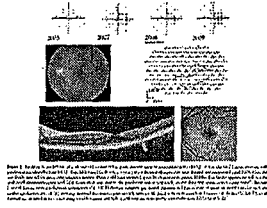
- Subjective, Functional: Automated Threshold Visual Fields.
- Subjective, Functional: Microperimetry
- Objective, Structural: Spectral-Domain Optical Coherence Tomography.
- Objective, Functional: Multifocal Electroretinogram
- Objective, Structural: Fundus Autofluorescence
- Subjective, Functional: Microperimetry
- Objective, Structural: Adaptive Optics Retinal Imaging.

RATIONALE FOR SCREENING

- Hydroxychloroquine and CQ retinopathy are not reversible, and cellular damage may progress even after the drugs are stopped.
- When retinopathy is not recognized until a bull's-eye appears, the disease can progress for years, often with foveal thinning and an eventual loss of visual acuity.
- When retinopathy is recognized early, before RPE damage, there is only mild and limited progression after discontinuing the medication, and the fovea is not threatened.⁵
- screening may not "prevent" damage, but if conducted properly it enables the detection of toxicity before vision is significantly affected.
- screening can be viewed as a means of helping patients to continue HCQ or CQ (by not stopping the drugs for uncertain findings) as much as a means of preventing serious retinal damage (by the early recognition of definitive findings).

PROPER TESTING INCLUDES

- Fundus/Fluorescein Photography
- Multi-focal ERG
- Visual Field /Microperimetry
- Optical Coherence Topography (OCT)



PLAQUENIL TOXICITY SCREENING

Kent W. Small MD

CLINICAL EXAMINATION TECHNIQUES

Screening techniques that are recommended or that should be avoided are listed in Table 3.

Table 3. Clinical Examination Techniques

Recommended Screening Tests
Thorough visual history (see text)
Visual field (preferably Goldmann field)
Microperimetry (when visual field is equivocal)
ERG
Fluorescein angiography (if visual field is equivocal)
ERG (if visual field is equivocal)
OCT
ERG (if visual field is equivocal)
OCT
ERG (if visual field is equivocal)
OCT

INTRODUCTION

- Retinal toxicity from chloroquine (CQ) and its analogue, hydroxychloroquine (HCQ), has been recognized for many years.
- The recent publication of a large demographic study has shown that toxicity is not rare among long-term users of the drug, and the risk is highly dependent on the daily dose by weight.
- The goal of screening for retinopathy is not to stop valuable drugs at the first borderline abnormality.
 - It is to recognize definitive signs of toxicity at an early enough stage to prevent a loss of visual acuity.
- Toxicity is of serious ophthalmologic concern because it is not treatable.
 - It has been demonstrated that central vision can be preserved if damage is recognized before there are changes in the retinal pigment epithelium (RPE)

THINGS TO LOOK OUT FOR

- Visual acuity usually is excellent with either pattern until severe stages of damage, and most patients who develop HCQ toxicity have no visual symptoms at all.
- A few perceptive patients may notice paracentral scotomas while reading.
- If drug exposure continues, the area of functional disturbance expands, the RPE becomes involved, and the maculopathy can encroach on the foveal center with eventual loss of visual acuity.
- Cystoid macular edema sometimes may develop,¹¹ and advanced cases show widespread RPE and retinal atrophy with loss of visual acuity, peripheral vision, and night vision.

IMPORTANCE OF RETINAL EYE EXAMS

- Before starting your patient on Plaquenil you should send to a Retina Specialist for baseline screening
- Annual visits are necessary to monitor changes
- Protect yourself and ask for documentation from the screening and file in patient's records.

PLAQUENIL
TOXICITY SCREENING

Kent W. Small MD

INTRODUCTION

- Retinal toxicity from chloroquine (CQ) and its analogue, hydroxychloroquine (HCQ), has been recognized for many years.
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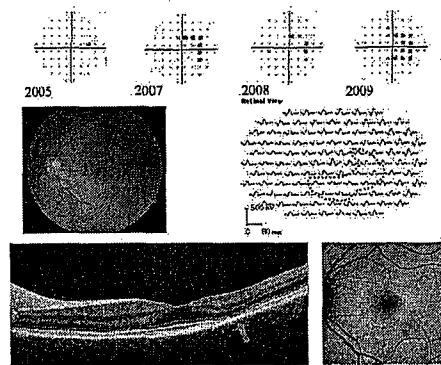


Figure 1. Findings in the left eye of a 48-year-old woman of European descent using hydroxychloroquine (HCQ) at 6 mg/kg for 27 years showing early functional maculopathy from HCV. Top: SD visual field over a 4-year period showing changes that were deemed inconsequential until 2009, when she was finally referred for more comprehensive testing. These could have triggered earlier consideration of HCQ. Middle: The fundus appears normal, but the multifocal electroretinogram (mfERG) shows weak responses in the peripheral region (especially in the third ring about center dot) (not shown). Bottom: Spectral-domain optical coherence tomography (SD-OCT) showing temporal parvocard thinning and loss of some retinal inner layers (arrow), and fundus autofluorescence (FAF) showing increased autofluorescence centrally (arrow). Medical advice provided from Marwan M, Kellner U, Lai T, et al. Revised recommendations on screening for chloroquine and hydroxychloroquine retinopathy. Ophthalmology 2011;118:413-21.

CLINICAL EXAMINATION TECHNIQUES

Screening techniques that are recommended or that should be avoided are listed in Table 3.

Table 3. Clinical Examination Techniques

Recommended Screening Tests
Primary tests: ideally do both
Automated visual fields (appropriate to race)
SD OCT
Other objective tests (as needed or available):
mERG
FAF
Newer tests of possible value in future
Microperimetry
Adaptive optics retinal imaging
Not Recommended for Screening
Fundus examination
Time-domain OCT
Fluorescein angiography
Full-field ERG
Amsler grid
Color testing
EOG

EOG = electro-oculogram; ERG = electroretinogram; FAF = fundus autofluorescence; mERG = multifocal electroretinogram; SD OCT = spectral-domain optical coherence tomography.

THINGS TO LOOK OUT FOR

- **Visual acuity usually is excellent with either pattern until severe stages of damage, and most patients who develop HCQ toxicity have no visual symptoms at all.**
- **A few perceptive patients may notice paracentral scotomas while reading.**
- **If drug exposure continues, the area of functional disturbance expands, the RPE becomes involved, and the maculopathy can encroach on the foveal center with eventual loss of visual acuity.**
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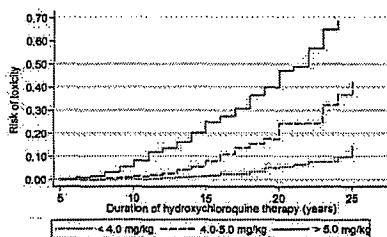


Figure 4. Kaplan-Meier curves showing the cumulative risk of retinopathy over time, with different levels of hydroxychloroquine (HCQ) use. When use is between 4.0 and 5.0 mg/kg, the risk is very low within the first 5 to 10 years, but it increases markedly thereafter. Reprinted with permission from Mielles RB, Marmor MF. The risk of toxic retinopathy in patients on long-term hydroxychloroquine therapy. *JAMA Ophthalmol* 2014;132:1453-60.

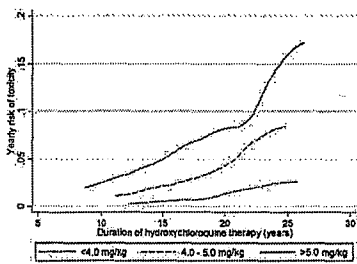


Figure 5. Incremental annual risk of toxicity for a patient at different levels of hydroxychloroquine (HCQ) use who is found to be free of retinopathy at a given point in time. The annual risk is low within the first 10 years of use, but increases with longer durations of therapy. Reprinted with permission from Mielles RB, Marmor MF. The risk of toxic retinopathy in patients on long-term hydroxychloroquine therapy. *JAMA Ophthalmol* 2014;132:1453-60.

- Earlier literature on the prevalence of CQ or HCQ retinopathy included few patients on long-term therapy and only recognized severe toxicity (bull's-eye changes)
- These reports have been superseded now by a large study of 2361 patients who used HCQ for more than 5 years and were evaluated with 10-2 visual fields or spectral-domain optical coherence tomography (SD OCT) so that toxicity could be recognized before there were any visible signs on fundus examination.²
- The overall prevalence of toxicity in this study population was 7.5%, although it varied greatly with the daily dose and duration of use.

RISK FACTORS

The most important risk factors are listed in Table 1.

Table 1. Major Risk Factors for Toxic Retinopathy

Daily dosage	
HCQ	>5.0 mg/kg real weight
CQ	>2.3 mg/kg real weight
Duration of use	>5 Yrs, assuming no other risk factors
Renal disease	Subnormal glomerular filtration rate
Concomitant drugs	Tamoxifen use
Macular disease	May affect screening and susceptibility to HCQ/CQ

CQ = chloroquine; HCQ = hydroxychloroquine.

RATIONALE FOR SCREENING

- Hydroxychloroquine and CQ retinopathy are not reversible, and cellular damage may progress even after the drugs are stopped.
- When retinopathy is not recognized until a bull's-eye appears, the disease can progress for years, often with foveal thinning and an eventual loss of visual acuity.
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SCREENING FREQUENCY

Below are guidelines and recommendations for screening that we deem a fair balance of risk and cost, but the exact timing and extent of screening relative to risk and prevalence, and to cost and legal considerations are judgments that individual physicians and health plans must ultimately determine (Table 2).

Table 2. Screening Frequency

Baseline Screening:

Fundus examination within first year of use.

Add visual fields and SD OCT if maculopathy is present.

Annual Screening:

Begin after 5 yrs of use.

Sooner in the presence of major risk factors.

SD OCT = spectral-domain optical coherence tomography.

CONCLUSION

- Get your patients to see a Retina Specialist for baseline screening BEFORE they start medication
- Make sure you are receiving yearly reports for their annual follow-up
- Follow-up with documentation of their visit
 - Don't take your patient's verbal "my eyes are fine" as proof
- SEND YOUR PATIENTS FOR A SCREENING WITH PROPER DIAGNOSTIC TESTING

RECOMMENDED SCREENING TESTING

- **Subjective, Functional: Automated Threshold Visual Fields.**
- **Subjective, Functional: Microperimetry**

- **Objective, Structural: Spectral-Domain Optical Coherence Tomography.**
- **Objective, Functional: Multifocal Electroretinogram**
- **Objective, Structural: Fundus Autofluorescence**
- **Subjective, Functional: Microperimetry**
- **Objective, Structural: Adaptive Optics Retinal Imaging.**

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1. Marmor MF, Kellner U, Lai TY, et al. Revised recommendations on screening for chloroquine and hydroxychloroquine retinopathy. *Ophthalmology* 2011;118:415–22.
2. Melles RB, Marmor MF. The risk of toxic retinopathy in patients on long-term hydroxychloroquine therapy. *JAMA Ophthalmol* 2014;132:1453–60.
3. Melles RB, Marmor MF. Pericentral retinopathy and racial differences in hydroxychloroquine toxicity. *Ophthalmology* 2015;122:110–6.
4. Lee DH, Melles RB, Joe SG, et al. Pericentral hydroxychloroquine retinopathy in Korean patients. *Ophthalmology* 2015;122:1252–6.
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6. Browning DJ. Impact of the revised American Academy of Ophthalmology guidelines regarding hydroxychloroquine screening on actual practice. *Am J Ophthalmol* 2013;155: 418–28.
7. Nika M, Blachley TS, Edwards P, et al. Regular examinations for toxic maculopathy in long-term chloroquine or hydroxychloroquine users. *JAMA Ophthalmol* 2014;132:1199–208.
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11. Kellner S, Weinitz S, Farmand G, Kellner U. Cystoid macular oedema and epiretinal membrane formation during progression of chloroquine retinopathy after drug cessation. *Br J Ophthalmol* 2014;98:200–6.
12. McChesney EW, Shekosky JM, Hernandez PH. Metabolism of chloroquine-3-14C in the rhesus monkey. *Biochem Pharm* 1967;16:2444–7.
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15. Lee JY, Luc S, Greenblatt DJ, et al. Factors associated with blood hydroxychloroquine level in lupus patients: renal function could be important. *Lupus* 2013;22:541–2.
16. Carmichael SJ, Day RO, Tett SE. A cross-sectional study of hydroxychloroquine concentrations and effects in people with systemic lupus erythematosus. *Intern Med J* 2013;43:547–53.
17. Costedoat-Chalumeau N, Dunogué B, Leroux G, et al. A critical review of the effects of hydroxychloroquine and chloroquine on the eye. *Clin Rev Allergy Immunol* 2015;49:317–26.
18. Jallouli M, Galicier L, Zahr N, et al. Determinants of hydroxychloroquine blood concentration variations in systemic lupus erythematosus. *Arthritis Rheumatol* 2015;67:2176–84.
19. Lee Y, Vinayagamoorthy N, Han K, et al. Association of polymorphisms of cytochrome P450 2D6 with blood hydroxychloroquine levels in patients with systemic lupus erythematosus. *Arthritis Rheumatol* 2016;68:184–90.
20. Leung LS, Neal JW, Wakelee HA, et al. Rapid onset of retinal toxicity from high-dose hydroxychloroquine given for cancer therapy. *Am J Ophthalmol* 2015;160:799–805.
21. Navajas EV, Krema H, Hammoudi DS, et al. Retinal toxicity of high-dose hydroxychloroquine in patients with chronic graft-versus-host disease. *Can J Ophthalmol* 2015;50:442–50.

Hydroxychloroquine-Induced Retinal Toxicity

BY MARK S. HANSEN, MD, AND STEFANIE G. SCHUMAN, MD

EDITED BY INGRID U. SCOTT, MD, MPH, SHARON FEKRAT, MD, AND MICHAEL F. MARMOR, MD

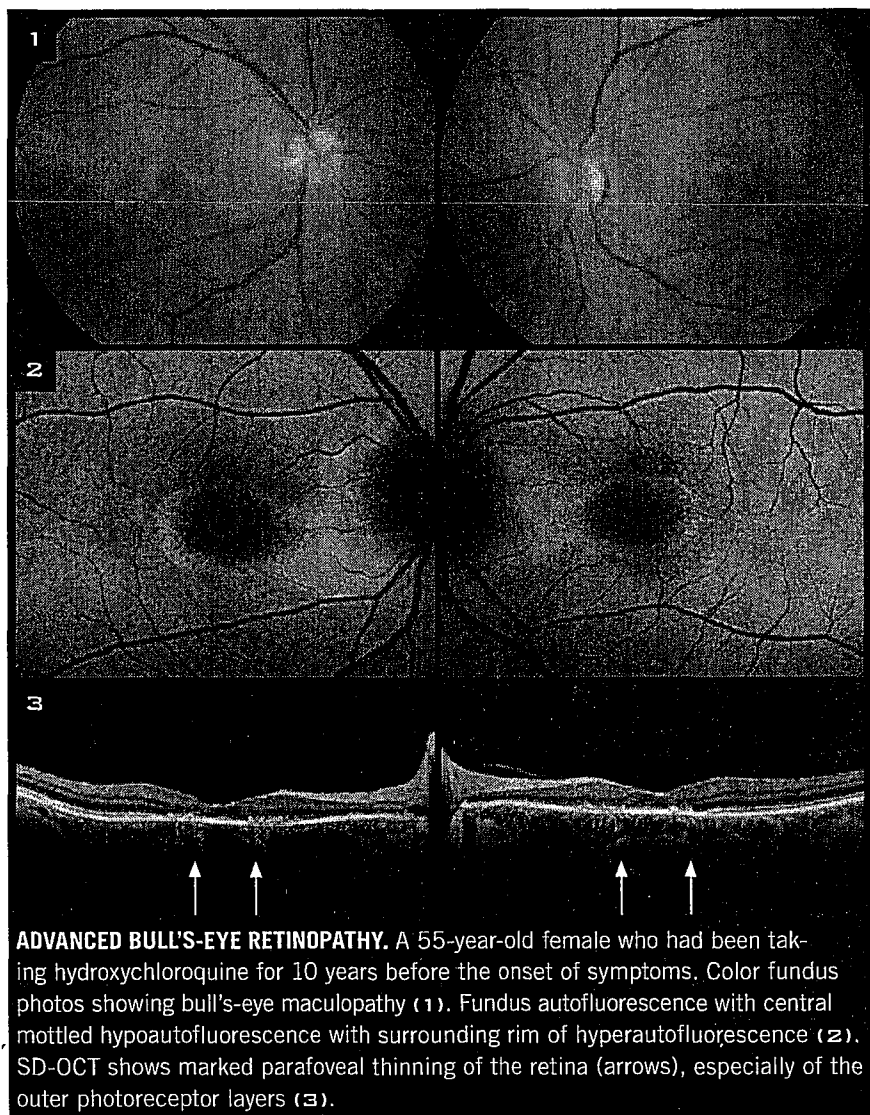
Many systemic medications may cause retinal toxicity. One such commonly used medication for dermatologic and rheumatologic inflammatory conditions is hydroxychloroquine (Plaquenil), a chloroquine derivative. It is used to treat many diseases including malaria, rheumatoid arthritis and systemic lupus erythematosus.

Retinal toxicity from hydroxychloroquine is rare, but even if the medication is discontinued, vision loss may be irreversible and may continue to progress. It is imperative that patients and physicians are aware of and watch for this drug's ocular side effects. And before treatment is initiated with hydroxychloroquine, a complete ophthalmic examination should be performed to determine any baseline maculopathy.

Ophthalmologists should also follow the most current screening guidelines established by the Academy,¹ recently revised in light of new findings. (For a broader look at drugs with ocular side effects, see last month's Clinical Update, "Rx Side Effects: New Plaquenil Guidelines and More.")

Symptoms and Signs

Symptoms. Patients in earlier stages of hydroxychloroquine retinal toxicity usually do not experience symptoms, though the rare patient may note a paracentral scotoma that causes trouble with reading as well as diminished color vision. However, most patients



ADVANCED BULL'S-EYE RETINOPATHY. A 55-year-old female who had been taking hydroxychloroquine for 10 years before the onset of symptoms. Color fundus photos showing bull's-eye maculopathy (1). Fundus autofluorescence with central mottled hypoautofluorescence with surrounding rim of hyperautofluorescence (2). SD-OCT shows marked parafoveal thinning of the retina (arrows), especially of the outer photoreceptor layers (3).

usually notice symptoms only after scotomas have become severe. When allowed to advance, hydroxychloroquine retinal toxicity leads to loss of

up to three visual functions: acuity, peripheral vision and night vision.

Signs. On examination, a telltale sign of hydroxychloroquine toxicity

is a bilateral change in the retinal pigment epithelium of the macula that gives the commonly described appearance of a bull's-eye (Fig. 1). This is a late finding, however, and too late for screening to be useful.

In early toxicity there are no visible signs, but field, OCT and mfERG changes can be detected. If abnormalities are present only unilaterally, investigate other causes besides hydroxychloroquine toxicity (see "Differential Diagnosis of Bull's-Eye Maculopathy").

Mechanism of Toxicity

The mechanism of hydroxychloroquine retinal toxicity has yet to be fully elucidated. Studies have shown that the drug affects the metabolism of retinal cells and also binds to melanin in the RPE, which could explain the persistent toxicity after discontinuation of the medication. However, these findings do not explain the clinical pigmentary changes causing a bull's-eye maculopathy.

Medication Dosage

Several factors have been associated with the risk of developing hydroxychloroquine retinopathy. One of the most important appears to be dosage—with debate over whether daily intake vs. cumulative dosage is most significant. Recent studies indicate that cumulative dosage may be a more important consideration than daily dosage.² However, since higher daily dosage will obviously lead to the toxic cumulative dose more rapidly, daily dosage is still important to consider. Higher daily dosage also leads to higher concentration of the drug in the RPE, which could lead to more aggressive tissue damage. Previous reports indicate that toxicity is rare if dosing is less than 6.5 mg/kg/day.² To avoid overdosage, especially in obese patients or those of short stature, dose should be based on height, which allows for an estimation of ideal body weight. (The drug clears slowly from the blood, so basing dosage on weight puts obese patients at risk.) The typical daily dos-

Systemic Medications That Can Cause Retinal Toxicity

Canthaxanthine	Isotretinoin
Chlorpromazine	Methoxyflurane
Deferoxamine	Rifabutin
Digoxin	Sildenafil
Ethambutol	Tamoxifen
Ethylene glycol	Thioridazine

age for most indications is 200 mg to 400 mg per day. Daily dosage is recommended not to exceed 400 mg.

Risk for Toxicity

Although it is not possible to predict which patients will develop retinal toxicity, high-risk characteristics include the following:

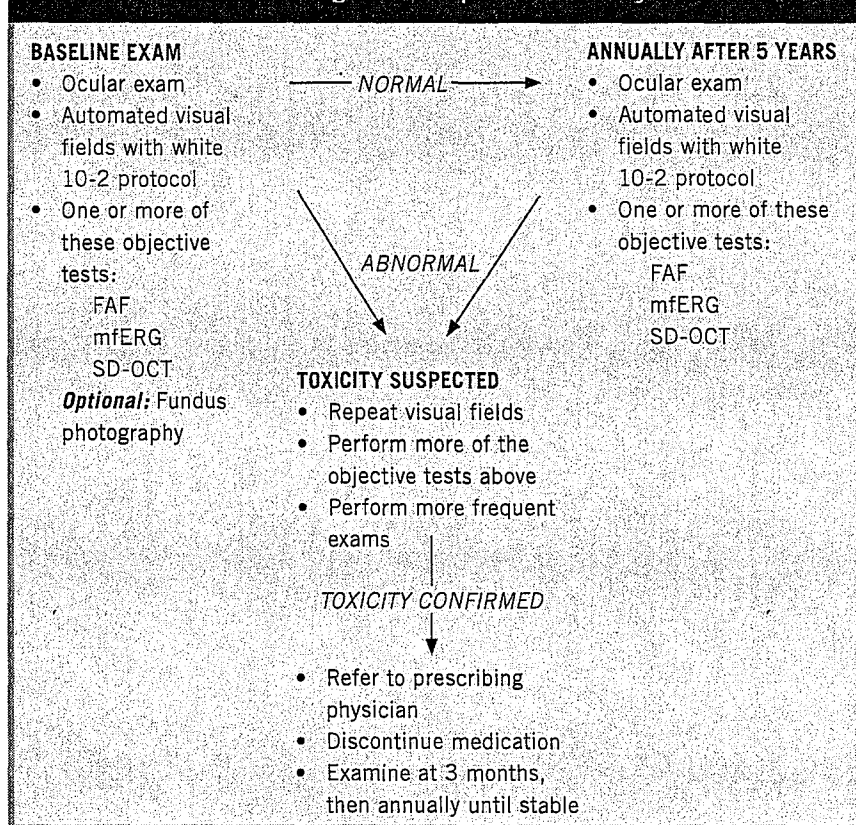
- daily dose greater than 400 mg (or, in people of short stature, a daily dosage over 6.5 mg/kg ideal body weight) or total cumulative dose of more than 1,000 g
- medication use longer than five years
- concomitant renal or liver disease (because the drug is cleared by both routes)
- underlying retinal disease or maculopathy
- age greater than 60 years.

Monitoring Guidelines

Guidelines on screening for retinopathy associated with hydroxychloroquine toxicity were initially published by the Academy in 2002. These guidelines were updated in February of this year, given the emergence of more sensitive diagnostic techniques and the recognition that risk of toxicity from years of hydroxychloroquine use is greater than previously believed.

The updated guidelines state that due to sensitivity, specificity and reliability issues, it is not recommended that Amsler grid testing, color vision testing, fundus examination and full-field electroretinogram or electrooculogram be used for toxicity screening. Fluorescein angiography may assist in visualizing early subtle changes in the RPE, but it is not considered a screen-

Watching for Plaquenil Toxicity



Differential Diagnosis of Bull's-Eye Maculopathy

Age-related macular degeneration
Benign concentric annular dystrophy
Central areolar choroidal dystrophy
Chloroquine/hydroxychloroquine retinal toxicity
Chronic macular hole
Cone and cone-rod dystrophies
Stargardt disease

ing tool for retinal toxicity.

It is critical to counsel patients about the benefits and limitations of screening, underscoring that it can catch toxicity at early stages and minimize vision loss but cannot necessarily prevent all toxicity and vision loss.

Baseline examination. At the initiation of treatment with hydroxychloroquine, the prescribing physician should refer the patient to an ophthalmologist. During the initial examination, it is recommended that the patient receive:

1) a thorough ocular examination documenting any preexisting conditions, 2) a Humphrey visual field central 10-2 white-on-white pattern, and 3) at least one of the following objective tests, if available:

- fundus autofluorescence (FAF)
- multifocal electroretinogram (mfERG) or
- spectral domain OCT (SD-OCT).

In fact, mfERG—a test that is typically available in large clinical centers—objectively evaluates function and can be used in place of visual fields. It's also worth considering the use of color fundus photographs to assist in documenting changes over time, especially if there is preexisting retinal pathology. However, the dilated fundus exam should not be considered a screening tool, as it only picks up relatively late toxic changes.

Ongoing monitoring. Encourage the patient to obtain an annual ophthalmic examination as part of the screening process. Since toxicity is rare within the first five years of treatment, ancillary testing is not necessary unless

abnormalities are noted on baseline examination. However, earlier, more frequent screening may be prudent for those at higher risk for toxicity. After five years of treatment, perform annual screenings, including an ocular examination, 10-2 threshold field testing, and one of the objective tests. In practical terms, SD-OCT is most widely available, and is very sensitive, so practitioners should look for subtle parafoveal abnormalities.

Toxicity: suspected and confirmed.

Whenever you note abnormalities, obtain additional testing. Repeat visual fields promptly if you see central or parafoveal changes, even if these appear to be nonspecific. If these findings are reproducible, follow up with objective testing. If toxicity is suspected, perform more frequent and detailed examinations. Once toxicity is confirmed, the prescribing physician should be notified and hydroxychloroquine discontinued unless it is medically critical and the patient has been informed of the visual risk. Before discontinuation, inform the patient that the drug clears slowly from the body and therefore visual function may continue to slowly deteriorate.

Conclusion

Patients and their physicians prescribing hydroxychloroquine need to be keenly aware of retinal toxicity risks and the importance of regular screening, and ophthalmologists who see these patients should keep retinal toxicity in the front of their minds. Adhering to the Academy's guidelines will help achieve the goal of identifying abnormalities with screenings and examination prior to the patient's visual complaints.

1 Marmor, M. F. et al. *Ophthalmology* 2011; 118:415-422.

2 Mieler, W. F. New Monitoring Guidelines for Hydroxychloroquine. Presented at Retina Subspecialty Day, Oct. 16, 2010, Chicago.

Dr. Hansen is a first-year ophthalmology resident, and Dr. Schuman is assistant professor of ophthalmology. Both are at Duke University Eye Center in Durham, N.C.

Coming in the next EyeNet

Feature

DALK, DSEK and DMEK Explained

Understand the rationale behind each approach, the criteria for patient selection and the concerns to watch for peri- and postoperatively.

Clinical Update

Cornea: New guidelines from the Blepharitis Working Group.

Glaucoma: Managing advanced disease.

Pediatrics: Surgical treatment for children with uveitis.

Destination Orlando

Preview some highlights of Subspecialty Day.

Blink

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CURRICULUM VITAE

NAME: Kent W. Small, M.D.

DATE: 12/2014

PRESENT POSITION AND ADDRESS:

Scientist: Cedars-Sinai Medical Center, Regenerative Medicine Institute
 President / Founder Kent W. Small, M.D. A Medical Corporation
 President / Founder Macula and Retina Institute
 President / Founder: Molecular Insight LLC, A Research Corporation
 President / Founder: Molecular Insight Research Foundation (501C3)
 8635 W. 3rd Street, Suite 395 W, Los Angeles, CA 90049 310-659-2200
 501 N Orange St. Suite 250, Glendale, CA 91203 818-552-5040

BIOGRAPHICAL: Date and place of birth: 19 October 1956, New Orleans, LA
 Citizenship: US
 Home address: 3134 Corda Dr., Los Angeles, CA 90049

EDUCATION:

Aug 1974 – Aug 1977, Zoology, None, Louisiana State University
 Aug 1977 – June 1981, Medicine, M.D., Tulane University
 May 1979 – Aug 1979, Cancer Research Externship during medical school, None, Tulane University
 Jul 1981 – Jul 1985, Resident in General and Cardiothoracic Surgery, None, Duke University
 Jul 1983 – Jul 1985, Research Fellow in Surgical Cardiac Electrophysiology, None, Duke University
 Jul 1985 – Jul 1988, Resident in Ophthalmology, None, Duke University
 Jul 1988 – Jan 1991, Fellow in Vitreoretinal Surgery, None, Duke University
 Jan 1989 – Jan 1991, Research Associate Neurogenetics

PROFESSIONAL WORK HISTORY AND TEACHING EXPERIENCE:

Jul 2004 – Sept. 2004 Professor and Chair, Department of Ophthalmology and Visual Sciences, UTMB, Galveston, Texas
 Jul 1998 – Jun 2004, Professor w/tenure, Jules Stein Eye Institute, UCLA, Los Angeles, CA
 Aug 1994 – Jun 1998, Associate Professor w/tenure, Jules Stein Eye Institute, UCLA, Los Angeles, CA
 Jun 1994 – Aug 1994, Associate Professor w/tenure, Department of Ophthalmology, Biochemistry, and Molecular Biology, University of Florida, Gainesville, FL
 Aug 1992 – Jun 1994, Assistant Professor tenure track, Department of Ophthalmology, Biochemistry and Molecular Biology, University of Florida, Gainesville, FL
 Jan 1992 – Aug 1992, Research Associate, Neurogenetics, Department of Medicine, Division of Neurogenetics, Duke University, Durham, NC
 Jan 1991 – Jan 1992, Assistant Professor tenure track, Department of Ophthalmology School of Graduate Studies, Medical University of South Carolina, Charleston, SC

RESEARCH ACTIVITIES:

A. Area of research: Molecular genetics of macular and retinal degenerations as

well as inherited corneal diseases, inherited eyelid dysmorphology, and inherited optic nerve abnormalities. Stem cells fetal cortical neural progenitor cells to treat macular and retinal degenerations.

B. Grant support:

Contracts and Grants:
 Previously Funded

1. NRSA (National Research Service Award / NEI) Amount: \$40,000. Duration: 2 years. Title: The effect of total body irradiation on corneal neovascularization. Principal Investigator.: Kent W. Small, M.D. 1985, was asked to decline by Duke Eye Center to begin residency in ophthalmology one year earlier.
2. Jacob Javits Fellow: National Institutes of Health/NINDS. amount \$60,000, duration: 1988-1989. Title: Genetics mapping of inherited diseases. Principal Investigator.: Kent W. Small, M.D.
3. K11 Physician Scientist Award, National Institutes of Health, National Eye Institute, EY00313. Principal Investigator.: Kent W. Small, M.D. Amount/Years Duration: 5 years, \$360,000; Title: Genetics Studies of North Carolina Macular Dystrophy. 1989-1994.
4. Jules and Doris Stein Research to Prevent Blindness Professorship. Amount: \$350,000; Duration: 5 years. Additional \$100,000 for equipment. Title: Molecular Genetics Studies of Ocular Diseases. 1993-1994. Principal Investigator: Kent W. Small, M.D.
5. Retinitis Pigmentosa Foundation.; Amount: \$50,000. Title: Cloning the Gene for Dominant Cone Degeneration. 1993-1995. Principal Investigator: Kent W. Small, M.D.
6. Division of Sponsored Research for University of Florida. Inherited Ocular Disease-gene mapping. Duration: 1 year, 1993, \$15,000, Principal Investigator: Kent W. Small, M.D.
7. National Institutes of Health, National Eye Institute RO-1 - EY10239 Duration: 5 years; Amount: \$987,000 Direct Cost. Title: Hereditary Macular Degenerations. 8/93-8/98. Principal Investigator: Kent W. Small, M.D.
8. The Foundation Fighting Blindness: 9/96-8/99, 180,000, Cloning the gene for autosomal dominant cone degeneration. Principal Investigator: Kent W. Small, M.D.
9. Ciba-Giegy Photodynamic Therapy for Age-related macular degeneration., \$10,000. 11/1/99-3/2000 Participating surgeon: Kent W. Small, M.D
10. National Institutes of Health, National Eye Institute, Submacular Surgery Trials (SST): age-related macular degeneration. participating surgeon 7/1998 – 6/2000.
11. Agouron Pharmaceuticals, Oral AG3340 for the treatment of choroidal neovascularization in age-related macular degeneration, PI at UCLA center, Principal -Investigator: Kent W. Small, M.D. \$100,000, 1998-2001
12. National Institutes of Health, National Eye Institute RO-1 – EY11645: Duration: 3 years; Amount: \$700,000 Direct Cost. Title: Cloning the blepharophimosis gene. 1998-2001. Principal Investigator: Kent W. Small, M.D
13. Lu-Tex Photodynamic Therapy for AMD, (Alcon Laboratories), A phase I trial, a dose – ranging study of Lutetium Texaphyrin injectable formulation in the photodynamic treatment of subfoveal choroidal neovascularization. Participating / treating physician: Kent W. Small, M.D.
14. Alcon Laboratories, Inc. An evaluation study on the safety and efficacy of Anergortave Acetate Sterile Suspension vs. placebo following sub-tenon's injections for the inhibition of Neovascularization in patients. C-98-03 (Schwartz, PI) 12/01/2000 – 12/01/2003 \$225,000 Kent W. Small, M.D. Role: Co-Investigator
15. RO1 EY11645 (Kent W. Small, PI) 08/01/2001 – 07/31/2004
 NIH/NEI \$200,000
 Cloning the gene defect causing blepharophimosis syndrome
 The major goals of this project are to identify the mutations causing the blepharophimosis syndrome
16. Muscular Dystrophy Association (Kent W. Small, PI) 07/01/2003 – 06/30/2006
 Hereditary and Motor and Sensory Neuropathy Type (CMT) IV, \$63,410
 Gene Mapping and Positional Cloning
 This project aims to identify the gene responsible for a specific neuromuscular disease that causes muscle weakness and optic nerve atrophy, Charcot-Marie-Tooth type 6 (CMT6).

17. The Foundation Fighting Blindness (Bok, Center Coordinator) 07/01/00 – 06/30/05
JSEI Center Core Grant \$121,137 (KWS Portion)
Module V: Cloning the gene for autosomal dominant cone degeneration (CORD5)
The major goals of this project are to identify the genetic basis of an inherited retinal degeneration, CORD5.
Role: Kent W. Small, M.D.: Principal Investigator of Module V
18. P 30 EY00331 (Hubbell, PI) 03/01/99-02/28/04
NIH/NEI \$291,029 (Core)
Core Center Grant for Vision Research
The major goal of this grant is to provide shared use of core facilities among 17 investigators.
Role: Kent W. Small, M.D.: Investigator
19. T32 EYE07026 (Farber, PI) 09/30/00-09/29/05
NIH/NEI \$248,248
Vision Research Training Grant, Biochemistry of Cone Visual Cells
This project funds predoctoral and postdoctoral fellows in vision science (fourteen mentors in Ophthalmology).
Role: Kent W. Small, M.D. Investigator
20. R01 MH63764-01A1 (Kumar, PI) 5/1/2002-4/30/2006
NIH/National Institute of Mental Health
Cerebrovascular Basis of Depression in Diabetes-NIDDM
Role: Kent W. Small, M.D.: Co-Investigator
21. CIRM (California Institute for Regenerative Medicine) Neural progenitor cells for the treatment of retinitis pigmentosa. 1/2015-1/2018
\$15,000,000
Role: Kent W. Small, MD Co- Investigator
accepted

CLINICAL TRIALS

- Amicus (Small sub-investigator)
Protocol GAU-CL-202 for the treatment of Gaucher's Disease 4/09-1/10
\$300
- SRFR-001 (Small PI) 9/07-9/09
Sirion Therapeutics Inc \$179,445
A Phase II Multicenter, Randomized, Double-Masked, Placebo-Controlled, Dose Comparison Study of the Safety and Efficacy of Fenretinide in the Treatment of Geographic Atrophy in Subjects with Age Related Macular Degeneration
- VGFT-OD-0605 (Small PI) 9/07-12/08
REGENERON INC \$272,890
A PHASE III Multicenter, Randomized, Double-Masked, Controlled, Dose Comparison Study of the Safety and Efficacy VEGF-TRAP (VGFT-OD-0605) in Subjects with Exudative Age related Macular Degeneration
- RADICAL (Small PI) 10/07-10/09
QLT INC \$287,500
A Phase III, Multicenter, Randomized, Double-Masked, Controlled, Dose Comparison Study of the Safety and Efficacy of Photodynamic Therapy in Combination with Intravitreal Lucentis Injections Compared to Lucentis Injections as Monotherapy.
- Brinzolamide / Timolol Study Group (Small PI) 10/06-10/07
ALCON RESEARCH LTD \$25,000

Efficacy of Brinzolamide 1% / Timolol 0.5% Fixed Combination Compared to Brinzolamide 1% and Timolol 0.5%.

- FVF2508g (Small PI) 05/15/2003 – 12/31/2004
Genentech, Inc. \$15,429
Protocol FVF2508g, "An Extension Study to Evaluate the Safety and Tolerability of Multiple-Dose Intravitreal Injections of rhuFabV2 in Subjects with Neovascular Age-Related Macular Degeneration Who Have Completed the Treatment Phase of a Genentech-Sponsored Phase I or Phase I/II rhuFab V2 Study"
- SMS995 804 (Small, PI) 11/13/2000 – 01/01/2006
Novartis Pharmaceutical \$359,562
Protocol SMS995804, "A Randomized, Controlled Study on the Efficacy and Safety of Sandostatin LAR in the Therapy of Patients with Moderately severe or non-proliferate retinopathy (NPDR) or low risk proliferate diabetic retinopathy (PDR).
- EOP1005C (Gonzales, PI) 9/6/2002-9/5/2004
EyeTech Pharmaceuticals, Inc. \$147,459.38
"A Phase II Randomized, Controlled, Double-Masked, Dose-Finding, Multi-Center, Comparative Trial, in Parallel Groups, to Establish the Safety and Preliminary Efficacy of Intravitreal Injections of EYE001 (Anti-VEGF Pegylated Aptamer), Given Every 6 Weeks for 12 to 30 Weeks to Patients with Clinically Significant Diabetic Macular Edema (CSME) Involving the Center of the Macula".
Kent W. Small, M.D. Role: Co-Investigator
- EOP1006B (Gonzales, PI) 2/6/2003-2/11/2004
EyeTech Pharmaceuticals, Inc. \$159,336.00
A Randomized, Double-Masked, Multi-Center Trial of the Safety, Tolerability and Pharmacokinetics of 1 Mg/Eye and 3 Mg/Eye Intravitreal Injections of Pegaptanib Sodium (Anti-VEGF Pegylated Aptamer) Given Every 6 Weeks for 54 Weeks in Patients with Exudative Age-Related Macular Degeneration (AMD). Kent W. Small, M.D. Role: Co-Investigator
- EOP1004 (Gonzales, PI) 10/16/2001-10/15/2003 (?)
EyeTech Pharmaceuticals, Inc. \$171,529.00
A phase II/III randomized, double-masked, controlled, dose-ranging multicenter comparative trial, in parallel groups to establish the safety and efficacy of intravitreal injections of EYE-001 (anti-VEGF pegylated aptamer) given every six weeks for 54 weeks in patients with exudative Age-Related Macular Degeneration. Kent W. Small, M.D. Role: Co-Investigator
- Submacular Surgery Trials (Schwartz, PI) 05/01/2003 – 04/30/2004
Johns Hopkins University/NIH/NEI \$56,180
A randomized, multicenter trial to evaluate submacular surgery for removal of subfoveal choroidal neovascular lesions in selected patients with Age-Related Macular Degeneration (AMD) compared to observation, patients with new, large and/or poorly demarcated subfoveal lesions.
KWS Role: Co-Investigator
- B7A-MC-MBCM (Schwartz, PI) 08/27/2001 – 03/01/2005
Lily Research Laboratories \$167,565
Protein Kinase C B Inhibitor – Diabetic Retinopathy Study 2(PKC-RS2), A Phase III Clinical Trial.
Kent W. Small, M.D. Role: Co-Investigator
- FVF2508g (Kent W. Small, M.D. PI) 05/15/2003 – 12/31/2004
Genentech, Inc. \$15,429
"An Extension Study to Evaluate the Safety and Tolerability of Multiple-Dose Intravitreal Injections of rhuFabV2 in Subjects with Neovascular Age-Related Macular Degeneration Who Have Completed the Treatment Phase of a Genentech-Sponsored Phase I or Phase I/II rhuFab V2 Study"
- SMS995 804 (Kent W. Small, M.D. PI) 11/13/2000 – 01/01/2006
Novartis Pharmaceutical \$359,562

Protocol SMS9950804, "A Randomized, Controlled Study on the Efficacy and Safety of Sandostatin LAR in the Therapy of Patients with Moderately severe or non-proliferate retinopathy (NPDR) or low risk proliferate diabetic retinopathy (PDR).

FVF2587g (Kent W. Small, M.D. PI) 02/10/2004 - 03/31/2006
Genentech, Inc. \$840,292.00
"A Phase III, Multicenter, Randomized, Double-Masked, Active Treatment-Controlled Study of the Efficacy and Safety of rhuFab V5 (Ranibizumab) Compared to Verteporfin (Visudyne) Photodynamic Therapy in Subjects with Predominantly Classic Subfoveal Neovascular Age-Related Macular Degeneration"

Iridex (PI: Kent W. Small, MD) 10/20/2000-4/20/2005
Transpupillary Thermotherapy of Occult Subfoveal Choroidal Neovascular Membranes in Patients with Age-Related Macular Degeneration (The TTT4CNV Clinical Trial)

Valeant, (PI Kent W. Small, MD) 2011-2014
Long lasting effects of photodynamic therapy as combination therapy with anti-VEGFs. \$10,000
Investigator Initiated Trial

CIRM (California Institute for Regenerative Medicine) (PI Shaomei Wang PhD) 2015-2018
IND-enabling study of subretinal delivery of human neural progenitor cells \$5,000,000
for the treatment of retinitis pigmentosa

Patents: U.S. Patent Application Serial No. 12/044,833 For: Suspended Slit Lamp Perkins Coie
Ref. No.: 65677.8001.US00

Other Research Interests: (NOT FUNDED)

1. Silicone oil clinical trial. Principal Investigator: Kent W. Small, M.D. 1992-93
2. Vitrectomy endophthalmitis clinical trial. Co-Investigator: Kent W. Small, M.D. 1992- 1993
3. Richard James Silicone Oil Investigation. Co-Investigator: Kent W. Small, M.D. 1994-1996
4. Intraoperative Use of Perfluorocarbon Liquids: Co-Investigator: Kent W. Small, M.D. 1994-1996
5. Gilead Sciences. duration 1 year. Intravitreal injection of cidifovir for recurrent CMV retinitis in AIDS patients. Principal Investigator: Kent W. Small, M.D. 1995-1996
7. Laser to Drusen Trial. Principal Investigator for the Jules Stein Eye Institute: Kent W. Small, M.D. 1994-1996
8. Surgical Repair of Macular Holes Research Study. Co-Investigator: Kent W. Small, M.D. 1994-present
9. The artificial retina. Principal Investigator: Kent W. Small, M.D., Co-Investigators William Dawson, Ph.D., and Kieth Rambo, Ph.D. (University of Florida) 1992- 1997
10. Surgical Repair of Macular Holes with Silicone Oil. Principal -Investigator: Kent W. Small, M.D. 1997-1999
11. Treatment of choroidal neovascularization from age-related macular degeneration with low dose external beam irradiation. AMDRT 1997-present. Principal Investigator: Kent W. Small, M.D.
12. The Effectiveness of a Reading Training Program in Low Vision Patients with Age-related Macular Degeneration. Principal Investigator: Melissa Chun, O.D., Co-Investigator Kent W. Small, M.D. 1/2000-12/20001, no funding
13. Vervet Research Colony as a Biomedical Resource , P40 Core support grant to NCRR, Lynn Fairbanks, PI, Kent Small, M.D., collaborator 2001- 2004

COMMITTEE RESPONSIBILITIES:

- A. National
- B. UTMB
- C. Departmental

D. Other

Administrative duties, University Governance and Service (Florida):

1. Search Committee for Department of Ophthalmology Chairman -1993-94.
2. Strategic Planning Committee for Center for Mammalian Genetics - 1992 - 94.
3. Residency Selection Committee, Department of Ophthalmology -1992-94.
4. Assistant Director of M.D./Ph.D. program at the University of Florida - 1993 - 94.
5. Member C.Q.I. (continuing quality improvement) Physician Facilitation team Shands Hospital (one of 12 selected physicians at U.F. to train other U.F. physicians in the C.Q.I. process - a new technique in assessing systems efficiencies) 1993- 94

Administrative duties, University Governance and Service (UCLA) Jul 1998 - Jun 2004:

1. Director of the Macula Center at the Jules Stein Eye Institute
2. Advisor: Low Vision Center at The Jules Stein Eye Institute
3. Dept. of Ophthalmology Clinical Committee: member
4. Dept. of Ophthalmology Research Committee: member
5. Dept. of Ophthalmology Committee (provides policies and procedures for the academic Senate): member
6. Dept. of Ophthalmology Appointment, Academic Advancement and Promotion Committee: member
7. Jules Stein Eye Institute Committee (for organized research units)
8. Quality Assurance Committee of the Ophthalmology Service, UCLA Medical Center Medical Staff: member
9. Dept. of Ophthalmology Quality Assurance Committee: member
10. Dept. of Ophthalmology, Ophthalmic Genetics Center: member
11. Jules Stein Eye STAR Program Committee: member
12. Vision Genetics Center: member

TEACHING RESPONSIBILITIES AT UTMB:

- A. Medical School
- B. GSBS, SAHS and SON as applicable
- C. Other

Presentations (abstracts presented at meetings)

Regional:

Annual Spring Cardiovascular Symposium, Duke University Medical Center "Changes in myocardial resistivity during global ischemia: On-line identification of the onset of severe but reversible ischemic injury." 10/85

North Carolina Medical Society Meeting 132nd Annual Scientific Session, Asheville, NC, "Vitamin A deficiency in American adults." 6/86

McPherson Hospital Scientific Presentations, Durham, NC "Pseudotumor oculi". 5/85

McPherson Hospital Scientific Presentations, Durham, NC "Fundus findings in primary oxalosis." 5/87

Jackson Mutant Mouse Lab, Bar Harbor, ME, "Genetics of macular degeneration" 7/89

North and South Carolina Ophthalmological Society, Charleston, SC "Electrophysiological Tests" 5/91

Duke University Alumni Meeting, Durham, N.C., "North Carolina Macular Dystrophy in Belize" 4/93
San Antonio Ophthalmological Society, "Ocular Genetics for the Clinician" 9/93

National

Christian Ophthalmology Society, Hilton Head, SC "Vitamin A and the eye" 7/88

Combined Retina Society and Macular Society Meeting, Boston, MA "North Carolina macular dystrophy: update" 5/89

Ophthalmologic Genetics Study Club, New Orleans, LA "North Carolina macular dystrophy: genetics studies." 10/89

International Society of Genetics Eye Diseases, Atlanta, GA, "Genetics exclusion map of North Carolina macular dystrophy" 10/90

Retina Society, Key Largo, FL. "Pigmented paravenous retinochoroidal atrophy, discordant expression in monozygotic twins." 10/90

Christian Ophthalmology Society Meeting. Callaway Gardens, GA "Ocular Genetics Update." 6/91

Ophthalmologic Genetics Study Club, Anaheim, CA, Oct. "Alstrom's, a case misdiagnosed as Bardet-Biedel's". 10/91

Ophthalmologic Genetics Study Club, Anaheim, CA, "Autosomal dominant cone degeneration, a large single family study" 10/91

Association of University Radiologists, Chicago, IL, Keuthe DO, Small KW, Blinder RA: Are large magnetic fields safe for patients with metallic retinal tacks? 5/89.

FASEB Summer Symposium, Copper Mountain, CO, 7/95 Small KW. High resolution genetic map of the MCDR1 locus

International

International Society of Ocular Pathology, New Orleans, LA "Primary oxalosis: a clinicopathologic study" 10/89

International Pediatric Nephrology Association, Paris, France: Scheinman JJ, Fallon MD, Small KW, Mahan JD, Letson RD, Klintworth GK: Primary hyperoxaluria (PHO): Common mitogenic effects on bone and retina. 6/89

Canadian Association of Physicists, Division of Medical and Biological Physics. Keuthe DO, Small KW, Blinder RA: Dynamic similarity to the Maxwell equations to determine if patients with metallic tacks in their eyes are safe in large magnets. 6/89

International Society of Genetics Eye Disease, Atlanta, GA. Small KW, Vance JM, Jones MA, Hung W-Y, Yamaoka L, Roses AD, Pericak-Vance MA: Genetics linkage analysis in North Carolina macular dystrophy. 9/90

Walsh Neuroophthalmology Society Small KW, Buckley EG: Recurrent unilateral ptosis. Vancouver, British Columbia, CAN 8/88

European Society of Human Genetics "Mutation screening of the BIGH3 gene in patients with Keratoconus". Strasbourg, France, May 25-28th 2002.

Human Genome Organization, HUGO "Characterization of mutations within the FOXL2 gene in Blepharophimosis Ptosis Epicanthus Inversus patients and its evolutionary conservation in Fugu". 2002, Shanghai, China April 2002.

International Congress Of Human Genetics "Identification and Characterization of mutations in families affected with Corneal dystrophy". 10th 2001 Vienna, Austria, May 15 - 19, 2001

American Society of Human genetics "Characterization of mutations in families affected with Corneal dystrophy". 50th ASHG, Pennsylvania, Philadelphia, 3-7 Oct 2000.

Human Genome Organization, "Physical map of North Carolina Macular degeneration - MCDR1 locus". HUGO'99, Brisbane, Australia 1999.

HUGO (Human Genome Organization) 2002, Shanghai, China April 2002., N. Udar , V. S. Yellore, M. Chalukya, S. Yelchits, R. Silva-Garcia, K. Small "Characterization of mutations within the FOXL2 gene in Blepharophimosis Ptosis Epicanthus Inversus patients and its evolutionary conservation in Fugu".

INTERNATIONAL CONGRESS OF HUMAN GENETICS 2001 Vienna, Austria, May 15 - 19, 2001, N. Udar , V. S. Yellore, M. Chalukya, S. Yelchits, R. Silva-Garcia, K. Small "Identification and Characterization of mutations in families affected with Corneal dystrophy".

10th HUGO '99, Brisbane, Australia 1999. N. Udar , V. S. Yellore, M. Chalukya, S. Yelchits, R. Silva-Garcia, K. Small "Physical map of North Carolina Macular degeneration - MCDR1 locus".

Invited Lectures:

Regional:

Braille Institute, Los Angeles, CA "Macular degeneration: there is hope", 3/97

Midway Hospital Medical Center, Los Angeles, CA, New Advances in Retina: "New techniques in the management of diabetic retinopathy and venous occlusive disease. 1/97

Braille Institute, Los Angeles, CA "Macular degeneration: new therapies", 3/98

Southern California College of Optometry, Fullerton, CA, Retina and Low Vision Symposium, 1/99, "Macular diseases" University of California , Berkeley School of Optometry. The Sixth Annual Continuing Education in Southern California Lectureship and Symposium. 2/99

Cedars-Sinai Medical Center, Genetic Disease and the Eye. "Genetics of Macular Degeneration" Los Angeles, CA 1/99

Foundation Fighting Blindness, Symposium on new research in macular degeneration. Invited Speaker, Los Angeles, CA 4/99

Visions 99'. Sponsored by The Foundation Fighting Blindness. "Age-related macular degeneration, Stargardt's disease and Best's disease." July 1999.

Los Angeles Research Study Club, Universal City, CA, invited speaker, "Genetics of age-related macular degeneration" 1/2000

Greater Los Angeles Coding Network (GLACN) and Southern California Health Information Association (SCHIA). Ophthalmology and coding issues. Los Angeles, CA 2/2001

Greater Los Angeles Coding Network (GLACN) and Southern California Health Information Association (SCHIA). Ophthalmology and coding issues. Los Angeles, CA 3/2002

California Academy of Ophthalmology: Age-related macular degeneration, update. Santa Monica, CA, 9/2002

Nebraska Academy of Ophthalmology: Age-related macular degeneration, update. Omaha, Nebraska 9/2002

Nebraska Academy of Ophthalmology: The macular dystrophies. Omaha, Nebraska 9/2002

Braille Institute, Los Angeles, CA "Macular degeneration: new therapies", 4/03

R and R: Retina and Rehabilitation. Invited keynote speaker "From Molecules to Magnifiers" 10/17/03 Point Clear AL

8th Annual UCLA Research Conference on Aging, "Age-related macular degeneration, from molecules to magnifiers" Los Angeles, 6/03

Braille Institute, Los Angeles, CA "Macular degeneration: update", 3/04

Braille Institute, Los Angeles, CA "Macular degeneration: update", 3/05

Discovery Eye Foundation: "Macular Degeneration: update" 10/09 Skirball Center, Los Angeles, CA

Blinded Veterans Association, Wadsworth VA Hospital, "Macular Degeneration: update" 3/14/2010

National

Association of Ophthalmic Photographers, Anaheim, CA "Using the hand held fundus camera". 10/91

University of Texas Southwestern, Dept. of Ophthalmology Dallas, TX, 1990, Hereditary macular degeneration.

University of Louisville, Dept. of Ophthalmology, Louisville, KY, 1990, Hereditary macular degeneration.

Washington University, Dept. of Ophthalmology, St. Louis, MO, 1990, Hereditary macular degeneration.

University of Texas, Dept. of Ophthalmology, San Antonio, TX, 1990, Hereditary macular degeneration.

Medical University of South Carolina, Dept. of Ophthalmology, Charleston, SC, 1990, Hereditary macular degeneration.

Medical College of Georgia, Dept. of Ophthalmology, Augusta, GA, 1990, Hereditary macular degeneration.

Hershey Medical Center, Dept. of Ophthalmology, Hershey, PA, 1990, Hereditary macular degeneration.

Johns Hopkins, Wilmer Eye Institute, Dept. of Ophthalmology, Baltimore, MD, 1991, Hereditary macular degeneration.

National Institutes of Health, National Eye Institute, Bethesda, MD, 1991, Hereditary macular degeneration.

University of West Virginia, Dept. of Ophthalmology, Morganton, W. Va., 1991, Hereditary macular degeneration.

Harvard Medical School, Massachusetts Eye and Ear Infirmary, Dept. of Ophthalmology, Boston, MA, 1991, Hereditary macular degeneration.

Pacific Medical Center, Dept. of Ophthalmology, Smith-Ketterwell Eye Research Institute, San Francisco, CA, 1991, Hereditary macular degeneration.

University of Nebraska, Dept. of Ophthalmology, Omaha, NE, 1991, Hereditary macular degeneration.

University of Minnesota, Dept. of Ophthalmology, Minneapolis, MN, 1991, Hereditary macular degeneration.

University of Cincinnati, Dept. of Ophthalmology, Cincinnati, OH, 1992, Hereditary macular degeneration.

University of South Florida, Dept. of Ophthalmology, Tampa, FL, 1992, Hereditary macular degeneration.

University of Florida, Dept. of Ophthalmology, Gainesville, FL, 1992, Hereditary macular degeneration.

University of Wisconsin, Dept. of Ophthalmology, Madison, WI, 1992, Hereditary macular degeneration.

Yale University, Dept. of Ophthalmology, New Haven, CT, 1992, Hereditary macular degeneration.

University of Texas, Houston, Dept. of Ophthalmology, Houston, TX, 1992, Hereditary macular degeneration.

Geisinger Medical Center, Dept. of Ophthalmology, Danville, PA, 1992, Hereditary macular degeneration.

University of Michigan, Dept. of Genetics, Ann Arbor, MI, 1992, Hereditary macular degeneration.

University of South Carolina, Dept. of Ophthalmology, Columbia, SC, 1992, Hereditary macular degeneration.

Texas Tech, Dept. of Ophthalmology, Lubbock, TX, 1992, Hereditary macular degeneration.

University of Minnesota, Dept. of Ophthalmology, Minneapolis, MN, 1992, Hereditary macular degeneration.

Tulane University School of Medicine, Dept. of Ophthalmology, New Orleans, LA, 1993, Hereditary macular degeneration.

Oschner Medical Center, Dept. of Ophthalmology, New Orleans, LA, 1993, Hereditary macular degeneration.

University of California, Los Angeles (UCLA), Jules Stein Eye Institute, Dept. of Ophthalmology. 1994, Hereditary macular degeneration.

University of South Carolina, Dept. of Ophthalmology, Columbia, SC, 1994, Hereditary macular degeneration, B. cereus endophthalmitis

University of Pennsylvania, Dept. of Ophthalmology, Philadelphia, PA, 1994, Hereditary macular degeneration.

University of Wisconsin, Dept. of Ophthalmology, Madison, Wisconsin, 1994, Hereditary macular degeneration.

University of California, Berkeley, Berkeley, CA, 1995, Genetics of Myopia

University of Alabama, Birmingham, AL, Dept. of Ophthalmology, 1996, Hereditary macular degeneration.

Vanderbilt University, Nashville, TN, 1997, Hereditary macular degeneration.

University of California, Davis, 1998, Hereditary macular degeneration.

Mid Winter Vitreo-retinal Surgery Course, Sarasota, FL, "Should we treat retinitis pigmentosa with vitamins?" 2/94

Mid Winter Vitreo-retinal Surgery Course, Sarasota, FL, "The future of molecular genetics in ophthalmology" 2/94

Retina Society, Santa Fe, NM. "Autosomal Dominant Cone Degeneration Maps to Chromosome 17p" 10/95

Macula Society, Tucson, Arizona "North Carolina macular dystrophy in Central America" 2/96

Western Retina Study Club, Yosemite, CA, "Autosomal Dominant Cone Degeneration Maps to Chromosome 17p" 3/96

WAVE (Western Association of Vitreo-retinal Education), Maui, Hawaii, "Wide angle viewing using the AVI contact lens system" 7/96

WAVE (Western Association of Vitreo-retinal Education), Maui, Hawaii, "Perfluorocarbon liquids: indications, techniques and complications" 7/96

WAVE (Western Association of Vitreo-retinal Education), Maui, Hawaii, "ICG and Digital Imaging Experience at the Jules Stein Eye Institute/UCLA" 7/96

Joint Commissions of Allied Health Professional Organization. Chicago, IL "Genetics of Eye Diseases" 10/96

Aspen Retinal Detachment Society, Aspen, CO, "Hereditary macular degenerations" 3/97

Aspen Retinal Detachment Society, Aspen, CO, "The artificial retina", 3/97

University of California at Davis, Sacramento, CA. 1/98 "Age-related macular degeneration and other inherited macular degenerations", grand rounds visiting professor

University of California, San Francisco, Dept. of Ophthalmology. 1998, Hereditary macular degeneration. grand rounds visiting professor

Medical University of South Carolina, Dept. of Ophthalmology, Charleston, SC, 4/99, "Hereditary macular degenerations" grand rounds visiting professor

Medical College of Virginia, Dept. of Ophthalmology, Richmond, VA. 3/2000 "Hereditary macular degenerations" grand rounds visiting professor

Small KW, Vu I, Glasgow B, Flannery J. Histopathologic study of North Carolina macular dystrophy. American Ophthalmological Society, Hot Springs, VA 5/2001 Abstract #24

University of Miami, Bascom Palmer Eye Institute, "North Carolina macular dystrophy". 3/ 2003

Louisiana State University Health Science Center. GUCY2D Gene Mutations in CORD5 Families and Evidence of Incomplete Penetrance 4 / 03

University of California, Irvine, GUCY2D Gene Mutations in CORD5 Families and Evidence of Incomplete Penetrance 5 03

University of California Irvine, "North Carolina macular dystrophy" 5/03

University of California Los Angeles, Center on Aging, invited Plenary speaker, "Macular Degeneration, from Molecules to Magnifiers" 6/03

International

First International Workshop of Human Chromosome 6, sponsored by HUGO (Human Genome Organization). Ann Arbor, Michigan, "North Carolina macular dystrophy maps to 6q14-q16.2". 6/92

University of Lille, France, 1998, North Carolina macular degeneration and the genetics of age-related macular degeneration

Hospital Evitar La Ciegueria, Mexico City, Mexico, 1996, Hereditary macular degeneration.

University of Iceland, Reykjavik, Iceland, 1998, Genetics of age-related macular degeneration.

ARVO (Association for Research in Vision and Ophthalmology) SIG (special interest group) Ft. Lauderdale, FL, 1995: "Hereditary macular degenerations" 5/95

American Academy of Ophthalmology, Atlanta, GA, ARVO Sponsored Special Symposium on "Advances in Molecular Genetics and Their Clinical Impact on Retinal and Choroidal Diseases" 10/95

Coloquio Manejo Medico Quirurgico del Trauma de Segmento Posterior sponsored by the La Sociedad Mexicana de Oftalmogia y La Association Mexicana de Retina, "Masa inflamatoria retineana subsecuente a trauma" 5/96

International European Union Meeting on "Genetics of Macular Degeneration", Amsterdam, Netherlands, "North Carolina macular dystrophy" 6/97

Macula Society, Florence, Italy, "North Carolina macular dystrophy in France" 6/97

Macula Society, Florence, Italy, Moderator: Inherited retinal and macular degenerations, 6/97

American Academy of Ophthalmology, 1997 Subspecialty Day, San Francisco, CA, "What to tell patients about the genetics of age-related macular degeneration" 10/97

American Academy of Ophthalmology, 1997 Subspecialty Day, San Francisco, CA, "Hereditary macular dystrophies" 10/97

The Retina Society Vancouver, British Columbia, CAN "North Carolina macular dystrophy (MCDR1) family in Texas maps to Chromosome 6q16" 9/97

American Academy of Ophthalmology, Vitreoretinal Update 1997. Invited Speaker "What do we tell our patients about the genetics of age-related macular degeneration?" San Francisco, CA, 10/97

American Academy of Ophthalmology, invited discussant, "Phenotype-genotype correlations of the keratoepithelin gene. 10/97

ARVO SIG (special interest group) Ft. Lauderdale, FL, "Hereditary macular degenerations", 5/97

American Academy of Ophthalmology, 1998, New Orleans, LA. Invited Speaker for ARVO symposium, "Inherited macular diseases."

Macula Society, San Diego, CA, Chair: Inherited retinal and macular degenerations, 2/99

Icelandic Ophthalmologic Society, invited speaker, "The genetics of age-related macular degeneration", Reykjavek, Iceland 3/99

Icelandic Ophthalmologic Society, invited speaker, "Inherited macular dystrophies", Reykjavek, Iceland 3/99

American Academy of Ophthalmology and the Pan-American Association of Ophthalmology. Course #602 "Surgical Management of Intraocular Infections" 1999, Orlando, Fl

Macula Society, Puerto Rico, "Histopathologic studies of dominant cone degeneration (CORD5)" 2/2000

33rd Panhellenic Ophthalmologic Congress, Thessaloniki, Greece, 5/24-27, 2000. "The genetics of age-related macular degeneration"

33rd Panhellenic Ophthalmologic Congress, Thessaloniki, Greece, 5/24-27, 2000. "Round table symposium new surgical methods in macular disease"

33rd Panhellenic Ophthalmologic Congress, Thessaloniki, Greece, 5/24-27, 2000. "Round table symposium photodynamic therapy in age related macular degeneration"

Retina Society, Coral Gables, FL, Silicon oil loss. 11/2000

Invited Speaker: Braille Institute, Los Angeles, CA 3/2001, "Update of macular degeneration"

American Ophthalmological Society : Small KW, Vu I, Glasgow B, Flannery J. Histopathologic study of North Carolina macular dystrophy. Hot Springs, VA 5/2001 Abstract #24

Volunteer Physician Lectures: Rotary Humanitarian Projects Sponsored Eye Clinic in Depensar, Indonesia 8/3-8/2001

2nd Updates in Ophthalmology, Singapore National Eye Institute, "Submacular Surgery for choroidal neovascularization" 8/12/2001

2nd Updates in Ophthalmology, Singapore National Eye Institute, Chaired session on Age-related macular degeneration. 8/12/2001

2nd Updates in Ophthalmology, Singapore National Eye Institute, "Clinical approach to macular dystrophies" 8/12/2001

Naples, FL, Macula Society, 3/ 2003. GUCY2D Gene Mutations in CORD5 Families and Evidence of Incomplete Penetrance

Queen's University, Belfast Ireland, invited speaker, "Age-Related Macular Degeneration, from Molecules to Magnifiers." 9/03

Anaheim, CA, Subspecialty Day, American Academy of Ophthalmology, invited speaker, "Genetic Testing in the Clinic" 11/03

Boulder, CO, siRNA Therapeutics, "Therapy of ocular diseases." 1/8/04 siRNA,

Barcelona, Spain, invited guest lecturer by Prof. Borja Cocomostegui MD, "North Carolina macular dystrophy" 6/05

Cape Town, South Africa, The Retina Society "Avastin (bevacizumab) for wet AMD, 6 month data" 10/06

San Diego, CA, The Retina Society, "New mutations in enhanced s-cone / Goldmann-Favre" 10/05

London, UK The Macula Society, "Combination therapy (anti-VEGFs with PDT) for wet AMD" 6/07

Oahu, Hawaii, PCOOS Pacific Coast Ophthalmology and Oto-Laryngology Society. "Combination therapy (anti-VEGFs with PDT) for wet AMD" 7/07

Marbella, Spain, 7th International Age-Related Macular Degeneration (AMD) Congress, "Combination therapy (anti-VEGFs with PDT) for wet AMD" 10/07

Indian Wells, CA, The Macula Society, "Combination therapy (anti-VEGFs with PDT) for wet AMD" 12/07

Hue, Viet Nam. ICEM (2nd Imperial City Eye Meeting) 2008. Macular Degeneration, examination techniques 6/08

Hue, Viet Nam. ICEM (Imperial City Eye Meeting) 2008. Macular Degeneration, special testing 6/08

Hue, Viet Nam. ICEM (Imperial City Eye Meeting) 2008. Macular Degeneration, medical treatments 6/08

Hue, Viet Nam. ICEM (Imperial City Eye Meeting) 2008. Macular Degeneration, surgical treatments 6/08

Nuku' Olafa, Tonga: Diabetic Retinopathy update 9/09

Kona, Hawaii, Hawaiian Eye Meeting, 2013 Presentation of fungal endophthalmitis outbreak following intravitreal injections of triamcinolone contaminated by a compounding pharmacy

Dana Point, CA, Macula Society, 2013, Presentation of fungal endophthalmitis outbreak following intravitreal injections of triamcinolone contaminated by a compounding pharmacy

La Jolla, CA, American Ophthalmological Society, 2013, Presentation of fungal endophthalmitis outbreak following intravitreal injections of triamcinolone contaminated by a compounding pharmacy

Toronto, Canada, American Society of Retinal Specialist, 2013, Presentation of fungal endophthalmitis outbreak following intravitreal injections of triamcinolone contaminated by a compounding pharmacy

Vienna, Austria. American Society of Retina Specialists. Aspirin use in age-related macular degeneration. 7/2015

Philadelphia, PA, Temple University Alumni Day: Invited Grand Rounds Speaker: Dealing with an outbreak of fungal endophthalmitis due to contaminated triamcinolone from a compounding pharmacy.

Philadelphia, PA: Temple University: Invited speaker for resident's day: North Carolina Macular Dystrophy: gene found!

MEMBERSHIP IN SCIENTIFIC SOCIETIES:

American Medical Informatics Association 12/03 - present
The American Academy of Ophthalmology: 1985 - present.
American Medical Association: 1985 - present.
The Association for Research in Vision and Ophthalmology (ARVO): 1985 - present.
American Society of Human Genetics: 1988 - present.
American Association for the Advancement of Science: 1988 -present.
Ophthalmic Genetics Study Club: 1990 - present.
Christian Ophthalmological Society: 1990 - present.
The Macula Society: 1994- present
The Los Angeles County Medical Society: 1994- present
California Ophthalmological Association: 1994-present
California Medical Association, 1995 - present
Western Retina Study Club, 1996 - present
The Retina Society, 1996 - present
Internet Ophthalmology Society, 1995-present
The American Ophthalmological Society Associate (AOS) 1998 - present www.aosonline.org
The American College of Physician Executives 1997 - present
Pan-American Association of Ophthalmology 1999 - present
National Association for the Visually Handicapped (NAVH <http://www.navh.org>), member Medical Advisory Board, 2000- present
Member program committee for The American Ophthalmological Society (AOS) 2003-2006

BOARD CERTIFICATION: American Board of Ophthalmology, 1989

LICENSURE INFORMATION:

Louisiana Board of Medical Examiners, license #16124 6/18/81 - 10/04
North Carolina Board of Medical Examiners License, license #28088 6/12/84 - present
South Carolina Board of Medical Examiners license #15175 10/5/90 - present
Massachusetts Board of Registration in Medicine license #75230 12/91-12/92
Maryland Board of Medical Examiners license #D42715 12/91 - 12/93
Florida, Department of Professional Regulation, license # ME 0065156 10/93-present
California Board of Medical Examiners license # A053173 issued 6/8/94- 10/31/05
Tennessee Board of Medical Examiners license # 30080 issued 4/98-4/99
Mississippi State Board of Medical Examiners License # 16564 issued 10/4/99

HONORS:

Top Doctors in Southern California: 2009 (LA Times)
Outstanding Scientist of the 21st Century, elected 11/14/2001
Life member of Kingston's National Registry of Who's Who in the 2002 edition:

American Ophthalmological Society, elected full member 6/2001
 American Ophthalmological Society, elected associate 6/98
 Honor Award from the American Academy of Ophthalmology, received 1998
 National Institutes of Health, National Eye Institute Visual Science C Study Section, temporary member. 10/97
 National Institutes of Health, National Eye Institute Visual Science B Study Section, Ad Hoc member. 8/97
 Who's Who in Diabetes Treatment, Education, and Research named 1996
 Best Doctors in Los Angeles, named by the Los Angeles Magazine, 1996
 American Men and Women of Science: named 1997
 Best Doctors in America, named in 1996 - present
 Best Doctors in America, Pacific Region. named in 1996
 Attending of the Year, 1992-93, elected by the residents, University of Florida
 Jacob Javits Fellow 12/88 - 11/90
 Diplomat, American Board of Ophthalmology: 11/14/1989 - present.
 The First Chief Resident in Ophthalmology at the Duke Eye Center 5/87 - 12/87
 Cabarrus Surgical Fellowship - 1984 - 1985
 Alpha Omega Alpha Honor Medical Society: initiated 1980 - present.
 American Cancer Association Research Externship 1979
 Alpha Omega Alpha: Elected 1980 Tulane University Medical School
 Phi Eta Sigma Honor Society - elected 1976 L.S.U.
 Phi Kappa Phi Honor Society - elected 1976 L.S.U.
 Alpha Epsilon Delta Honor Society - elected 1976 L.S.U.
 Dean's List L.S.U. - all seven semesters, 8/74 - 8/77

ADDITIONAL INFORMATION: Include pertinent information concerning your educational and scientific background, and activities that do not fit into the categories previously listed.

Consultations Outside the University (U.F. and UCLA):

Retina consultation at Veterans Administration Hospital, Gainesville, FL: 1992 - 94.
 Retina consultation at North Florida Eye Center in Lake City, FL. July 1993 - 94
 Retina consultations at The Valley Eye Center in Van Nuys, CA 4/95-5/97
 Retina consultations at Wadsworth Veterans Administration Hospital, Los Angeles, CA 6/95- present
 Agouron Pharmaceuticals, LaJolla, CA, Scientific Advisory Board - member, 1998-2000
 DeCode, Reykjavik, Iceland, Scientific Advisor, 1998

Editor of Scholarly Journal, Service on an Editorial Advisory Board, or Reviewer of a Scholarly Journal:

Editorial Board: Molecular Vision 2000-present
 Guest Editor: Investigative Ophthalmology and Visual Sciences 2001
 Guest Editor: Investigative Ophthalmology and Visual Sciences 1999
 Editorial Board: Ophthalmic Genetics 1995-2000
 Archives of Ophthalmology: Reviewer 1989 - present
 Investigative Ophthalmology: Reviewer 1989 - present
 Ophthalmology: Reviewer 1991 - present
 Canadian Research Council: Grant reviewer - 1991 present; reviews one grant per year.
 Canadian Retinitis Pigmentosa Foundation: Grant reviewer - 1991- present; reviews one grant per year.
 Foundation Fighting Blindness, grant reviewer, 1994-present
 Ophthalmic Genetics: Reviewer - 1992 - present
 Retina: 1995-present
 ARVO moderator 1994, Molecular genetics
 ARVO moderator 1995, Molecular genetics
 ARVO moderator 1996, Molecular genetics
 American Journal of Ophthalmology 95-present
 Genomics, 1996-present
 Retina, 1997-present
 Human Molecular Genetics 1998-present

American Journal of Human Genetics 1998-present
 Molecular Vision, 1998 - present
 Editorial Board member Molecular Vision 2000-present
 Journal of the American Association of Pediatric Ophthalmology and Strabismus: reviewer 2000- present
 Welcome Foundation: grant reviewer 2001- present
 Cornea: 2000 - present
 Health Psychology: 2004

International Activities:

Activity: moderator at ARVO (Association for research in vision and ophthalmology), June 1994,
Service: moderator: retinal genetics section

Activity: moderator at ARVO (Association for research in vision and ophthalmology), June 1995,
Service: moderator: retinal genetics section

Activity: moderator at ARVO (Association for research in vision and ophthalmology), June 1996,
Service: moderator: retinal genetics section

Activity: Studied families in Belize, Central America with inherited retinal degenerations.
Service: Performed eye examinations on indigent population in Belize, Central America.
Research: Ascertaining families with rare inherited eye diseases and performed molecular genetic studies.

Activity: Participation at the First International Workshop on Human Chromosome 6
Research: Develop genetics linkage map of chromosome 6 for HUGO (Human Genome Organization).

Activity: Studied families in northern France with inherited macular degeneration in collaboration with Professor Bernard Puech in Lille, France.
Service: Performed eye examinations on families
Research: Ascertained families with rare inherited eye diseases and performed molecular genetics studies

Activity: Representative of the Jules Stein Eye Institute and the Paul Kaiser Foundation of the Pan-American Ophthalmological Association to Mexico City, May 13-18, 1996.
Service: examined indigent patients with retinal diseases at The Hospital Evitar La Ciegeuria in Mexico City
Research: Set up collaborations for studying inherited ocular diseases in Mexican families.

Activity: WAVE (Western Association of Vitreo-retinal Education), Maui, Hawaii WAVE (Western Association of Vitreo-retinal Education), Moderator Wide Angle Viewing Session, Maui, Hawaii.
 7/96

Activity: Established the international consortium to map and clone macular degeneration genes. 1997

Activity For Last 10 Years:

	1999-94	1994-1993	1993-1992	1991-1990	1990-1989	1988-1989
Teaching	5 %	10%	10%	5%	5%	10%
Research	10%	10%	10%	75%	95%	10%
Service	85%	80%	80%	20%	0%	0%
Extension	0%	0%	0%	0%	0%	80%
	100%	100%	100%	100%	100%	100%

Teaching, Advising, and/or Instructional Accomplishments (UF):

Dr. Small actively participates in the advising of residents for post-graduate training and practice of ophthalmology and retinal/vitreous diseases. 1990 - Present

Dr. Small has participated in the teaching of a laser photocoagulation course (Skills Transfer Course) at the American Academy of Ophthalmology for the past 3 years as well. 1989 - 1992

1. Lecture to Residents - Monthly One Hour Lectures:
 - 1991
 - Jan: General Genetics 1
 - Feb: Ocular Genetics 1
 - Mar: Ocular Genetics 2
 - April: Electro-retinography 1
 - May: Electro- retinography 2
 - June: Inherited Retinal Degenerations 1
 - July: Inherited Retinal Degenerations 2
 - August: Inherited macular degeneration
 - Sept.: Uveitis 1
 - Oct.: Uveitis 2
 - 1992:
 - Aug.: Retinal Detachment 1
 - Sept.: Retinal Detachment 2
 - Oct.: Diabetic Retinopathy 1
 - Nov.: Diabetic Retinopathy 2
 - Dec.: Diabetic Retinopathy 3
 - 1993:
 - Jan.: Age-Related Macular Degeneration 1
 - Feb.: Age-Related Macular Degeneration 2
 - Mar: Inherited Retinal Degenerations
 - April: Electro-retinopathy
 - May: Uveitis 1
 - June: Uveitis 2
 - Aug.: Retinal Detachment 1
 - Sept.: Retinal Detachment 2
 - Oct.: Diabetic Retinopathy 1
 - Nov.: Diabetic Retinopathy 2
 - Dec.: Diabetic Retinopathy 3
 - 1994:
 - Jan.: Age-Related Macular Degeneration 1
 - Feb.: Age-Related Macular Degeneration 2
 - Mar: Inherited Retinal Degenerations
 - April: Electro-retinopathy
 - May: Uveitis 1
2. Lectures to Medical Students: 1992-present on:
 - Central Retinal Artery Occlusion
 - Hypertensive Retinopathy
 - Diabetic Retinopathy
 - Ocular Sarcoidosis
 - AIDS - Retinopathy
 - Macular Degeneration
 - Workshop on Molecular Genetics
3. Clinical teaching during retina clinic to 1st, 2nd, and 3rd year residents - every Monday, 8:00 am - 7:00 PM.
4. Clinical teaching during VA Retina Clinic to 1st, 2nd, and 3rd year residents - every Wednesday, 2:00 PM - 4:00 PM.
5. Surgical teaching to 2nd year residents 3-4 times per week and once every other week at the VA.
6. Lecture seminar to Center for Mammalian Genetics: "Hereditary Macular Degeneration" - 1992-93.

Teaching Evaluation

RESIDENT'S TEACHING EVALUATIONS (UF)		
(18 Residents/Year)		
Kent Wilson Small		
	1992-93	1993-94
	Dr. Small Dept. Avg.	Dr. Small/ Dept. Avg

Didactic Teaching, lectures & conferences

Punctuality & dependability	1.3/1.9	1.8/2.2
Teaching Skills	1.5/1.7	1.3/2.0
Provides useful clinical information	1.4/1.8	1.5/1.9
Gives sufficient lectures	1.5/2.1	1.3/1.9
Encourages questions/comments	1.5/2.1	1.7/2.1

Clinical Duties

Time spent teaching (in clinic)	1.7/2.2	2.1/2.3
Clinic run in orderly manner	2.3/2.3	1.2/1.8
Approachable for questions	1.2/2.0	1.3/2.0
Establishes patient rapport	1.6/1.9	1.3/1.9
Treats clinic staff respectfully	1.4/2.0	1.2/2.2
Avoids outbursts of anger	1.2/2.0	1.2/1.9
Allows resident participation	1.5/2.0	1.6/2.1
Fully available for call	1.3/2.0	1.3/2.0

Administrative/Research

Active in own research	1.2/1.8	1.0/2.2
Departmental duties	1.9/1.9	1.5/2.3
Active in political issues	2.0/1.9	1.6/2.2
Enhances Dept.	1.2/2.1	

Rating Scale:(1) Outstanding; (2) Above Average; (3) Average; (4) Unsatisfactory; (5) Totally Inadequate
 "No comparable college mean available" This was required

Teaching Evaluation

RESIDENT'S TEACHING EVALUATIONS (UCLA)

(21 Residents/Year) score =1 is poor, 10.0= best; note this is opposite scoring from UF

Dr. Small's score/dept. average

	Kent Wilson Small				
	94-95	95-96	96-97	97-98	98-99
Has command of the subject	7.0/6.5	6.3/6.3	7.0/6.6	6.8/6.4	6.5/6.6
presents material in organized, clear manner	7.0/6.3	6.0/6.2	6.7/6.5	6.8/6.3	6.5/6.0
Sensitive to response of students, house-staff	7.0/5.9	6.4/5.9	6.5/6.4	6.7/5.9	6.1/5.8
Available to and friendly towards house-staff	7.0/6.1	6.7/6.0	6.7/6.3	6.8/5.9	6.4/5.9
Enjoys teaching and is enthusiastic about the subject	7.0/6.2	6.5/6.1	6.5/6.5	6.8/6.1	6.4/6.0
deeply interested in patient care; often makes contributions	6.5/6.1	6.4/6.1	7.0/6.6	6.7/6.1	6.5/6.1
Meets appointments; punctual	7.0/6.1	5.3/6.0	7.0/6.3	6.5/6.1	6.0/6.0
How does the instructor compare with other clinical teachers you have had at UCLA	6.5/6.1	6.1/5.9	6.7/6.5	6.8/6.0	6.1/5.8

2nd Year Medical Student Evaluations

Teaching Evaluations (Approximately 100 Students)
 (Evaluations based 3 Lectures)

	1993
Department	1.84
Average	
Dr. Kent Small	1.80

Note: The Department of Ophthalmology concentrates its formal teaching of medical students into two weeks. The evaluation of our faculty occurs only for that lecture series. Their evaluations of Dr. Small's lectures are shown above.

Teaching, Advising, and/or Instructional Accomplishments (at UCLA):

Jules Stein Eye Institute, Clinical Teaching Conference, lecture: "vitrectomy for ocular toxocariasis" 1 hour, 11/94
 Jules Stein Eye Institute, Vision Genetic Meeting, lecture: "molecular genetics of macular degeneration" 1 hour, 11/94
 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/94
 Jules Stein Eye Institute, 1 hour discussion of retinal research activity with residents, 12/94
 Jules Stein Eye Institute, CMV retinopathy study group, presentation: "use of intravitreal cidofovir" 1 hour lecture, 1/95
 Jules Stein Eye Institute, Vision Genetics Meeting, lecture: molecular genetics of autosomal dominant cone degeneration maps to chromosome 17p" 1 hour lecture, 1/95
 Jules Stein Eye Institute, Retinitis Pigmentosa Study Group, presentation "positional cloning of the North Carolina macular dystrophy gene" 1 hour lecture, 4/95
 Jules Stein Eye Institute, Clinical Seminars Series, Moderator of Grand Rounds, 4/95
 Jules Stein Eye Institute, Basic Science Series Seminar, "selective hybridization cloning of the North Carolina macular dystrophy gene" 1 hour lecture, 6/95
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 6/95
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 9/95
 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/95 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/96
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 11/9 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/97
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 11/97
 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/98
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 11/98
 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/99
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 11/99
 Jules Stein Eye Institute, Clinical Science Series Seminar, administered the JSEI weekly quiz, 10/00
 Jules Stein Eye Institute, Clinical Science Series Seminar, Moderator of Grand Rounds, 11/00
 Jules Stein Eye Institute, Basic Science Series Seminar, "Ocular Genetics" 10/01
 Jules Stein Eye Institute, "The genetics of myopia" Myopia for the Year 2000: clinical and research perspectives, 2/96
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 9/94
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 2/95
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 9/95
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 2/96
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 9/96
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 2/97
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 10/97
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 4/98
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 4/99
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 11/2000
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 11/2001
 Jules Stein Eye Institute, Clinical Fundamentals Course M201 for Medial Students - Instructor 3 hours, 11/2002
 "Hereditary Macular Disease" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 "Laser to Drusen Trial" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 "Silicon Retina / Retinal Transplants" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 "Macular Hole Surgery" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 "Phototoxicity" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 Co-Moderator of The Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/96
 "Complications of perfluorocarbon liquids" The New Age of Perfluoron Liquids Course by Infnitec, Los Angeles, CA, 5/96

"New Age of Perfluoron Liquids" Course by Infnitec, Co-Moderator, 5/96
 "Hereditary retinal degenerations", Jules Stein Eye Institute Clinical Science Lectures Series: 3 hours, 10/96
 "Macular degeneration", Jules Stein Eye Institute Clinical Science Lectures Series: 3 hours, 10/96
 Initiated and maintained the macular degeneration support group at UCLA, 2/97- present
 UCLA Intercampus Medical Genetics Training Program, Graduate Course in Genetics: 3 hours lecture: "review of ophthalmic genetics" 4/97
 "Surgical macular diseases" Jules Stein / UCLA Post Graduate Seminar, Comprehensive Eye Care Update for the Practitioner, Los Angeles, CA, 4/98
 "The Aging Eye" Biology of Aging course (MCD Biology CM 149/Pathology M262) 4/98 2 hour lecture for senior undergraduates
 "Hereditary retinal degenerations", Jules Stein Eye Institute Clinical Science Lectures Series: 4/99
 "What's new in age-related macular degeneration" Jules Stein Eye Institute Clinical Science Lectures Series: 1/2001
 Moderator: Jules Stein Eye Institute Clinical Science Lectures Series: 1/2001
 "Update on macular degeneration" Jules Stein Eye Institute Clinical Science Lectures Series: 1/2001
 "Age-related macular degeneration: update" 10/2002 Invited Speaker Braille Institute, Los Angeles, CA 3/2001
 "Update on macular degeneration" Jules Stein Eye Institute Clinical Science Lectures Series: 10/2002
 Moderator: Jules Stein Eye Institute Clinical Science Lectures Series: 10/2002
 "Finding the genes of AMD" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 4/2003
 "Cone-Rod Dystrophies" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 3/2003
 "AREDS, new findings" Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 4/2003
 Moderator: Jules Stein / UCLA Post Graduate Seminar, Los Angeles, CA, 4/2003

Teaching Accomplishments in Laboratory Molecular Genetics

name	year	status
Kay Kelley, Ph.D.,	1992-1994	Biological Scientist UF
Anthony Sanchez, M.S.	1992-1994	Biological Scientist UF
Svetlana Yelchits, Ph.D.	1992-1997	Biological Scientist UF and UCLA
Lynne Mullen, BS	1992-1997	Biological Scientist UF and UCLA
Laetitia Fisher, BS	1992-1994	Medical Student UF
Mike Stalvey, BS	1992-1994	Graduate Student UF
Nitin Udar, Ph.D.,	1996-1997	UCLA post-doc
James Fink, BS	1995	UCLA medical student
Shiang Do	1995-96	UCLA undergraduate
Christine Chin	1996	UCLA undergraduate
Pamela Golchet	1996-97	UCLA undergraduate
Steven Mellul, BS	1996	Hanneman University medical student
Sara Gislison	1998	UCLA undergraduate
Gleitzman Medical Student Geriatric Scholars Program: took one student each year in the lab 1995-1999		
Nancy Padilla	1998-2000	UCLA undergraduate
Jessica Felipe	1998-2000	UCLA undergraduate
Tara Anderson	1998-2001	UCLA undergraduate
Allen Shirvanian	1998-2000	UCLA undergraduate
Liezel Morales	1998-present	UCLA undergraduate
Pranav Vyas	1998-2000	UCLA post-doc
Vivek Yellore	2000-present	UCLA post-doc

Graduate Faculty Status:

Department of Biochemistry and Molecular Biochemistry and Molecular Biology, University of Florida - Affiliate member: 1992 - 94.
 Faculty of School of Graduate Studies, Medical University of South Carolina, Charleston: 1991.

Graduate Committee Activities:

Member, School of Graduate Education, Medical University of South Carolina, Charleston, SC 1991
Assistant Director of M.D./Ph.D. program, University of Florida: 1993 - 94

Courses Attended (attended without giving a presentation)

Course in Mammalian Genetics, Bar Harbor, Maine, 1989
Genetic Linkage Analysis, Basic Course, Columbia University, by Jurg Ott, Ph.D. 1994
Leadership and Decision Making in Organizations, Anderson School of Business, UCLA, Los Angeles CA, 11/12-15/96

CPT Coding Course sponsored by The California Association of Ophthalmology 1995
CPT Coding Course sponsored by The California Association of Ophthalmology 1996
CPT Coding Course sponsored by The California Association of Ophthalmology 1997
UCLA Teaching Physician Regulations for Medicare and Medicaid compliance, 1997
UCLA CPT coding course, 1997
UCLA Anderson School of Business and Management 295A: New Venture Initiation, audited and completed, 1997

UCLA Anderson School of Business and Management 298D15: Business Plan Development and Writing, audited and completed 1997

The AUPO (Association of University Professors of Ophthalmology) Management Program, 1997
Advanced Genetic Linkage Analysis Course of Complex Traits, Rockefeller University, by Jurg Ott, Ph.D. 1997
UCLA Anderson School of Business and Management: Executive business course in finances 6/98
S.A.G.E. Course in genetic segregation analysis and non-parametric genetic studies. Given by Robert Elston, Costa Mesa, CA 1999

Summit Technology, Photorefractive Keratectomy and Toric PRK. 11/14/99

Summit Technology, Microkeratome Training. 11/14/99

Summit Technology, Photorefractive Keratectomy and Toric PRK. 11/14/99

Summit Technology, Photorefractive Keratectomy . 11/14/99

Ophthalmology Coding, sponsored by the California Ophthalmology Association, 6/2000
Ophthalmology Coding, sponsored by the California Ophthalmology Association, 6/1998
Ophthalmology Coding, sponsored by the California Ophthalmology Association, 6/1997
Ophthalmology Coding, sponsored by the California Ophthalmology Association, 6/1996
Ophthalmology Coding, sponsored by the California Ophthalmology Association, 1/2003
Publicity / Public Interviews

1992:

Associated Press release of mapping macular degeneration gene, published in many newspapers across the country.
Science News, The weekly Newsmagazine of Science. (International publication) July 18, 1992, vol. 142, pg. 37. Featured section on Dr. Small's mapping of the macular degeneration gene.

1993:

Gainesville Sun announcing Dr. Small's Jules and Doris Stein Research to Prevent Blindness Professorship.
WTVB TV channel 11, "Health Spot" interviewed Dr. Small on genetics of macular degeneration.
Friday Evening Post (University of Florida paper) announcing the Jules and Doris Stein RPB Award.
The Tulane Medicine, New Orleans, LA announcing Dr. Small's mapping of the macular degeneration gene
Duke University Eye Center Alumni 1992 Report: one page feature of Dr. Small's mapping of the macular degeneration gene
The University of Florida Health Science Center Annual Report 1992-93. Featured article on Dr. Small and The Center for Mammalian Genetics.
Visions, News and Views from the College of Medicine featured section on Dr. Small and his research. May 1993
The Research to Prevent Blindness Progress Report 1993, section on Dr. Small and his research.
The Research to Prevent Blindness Annual Report 1992, Featured section on Dr. Small and his research. pg. 10.
The Florida Physician Fall 1993, pg. 15, section on Dr. Small and his research

Associated Press release: Nov. 22, 1993, TV appearance describing research of locating the macular degeneration gene- this release was aired by many local and national news stations across the country (judging by the phone calls received) CNBC national cable news network "Medical Beat", WTVB 11 Gainesville and Ocala are some examples.

The Friday Evening Post Nov. 19, 1993, announcing the NIH grant (RO-1) \$1,000,000 which Dr. Small is PI on

The Gainesville Sun, Nov. 16, 1993, full page featured article on Dr. Small and his research

1994

KCAL radio station, San Francisco, CA., interview, Macular Degeneration

1995

Ophthalmology World News, The Independent Newspaper of the American Academy of Ophthalmology. volume 1, number 12, 1995, pg. 14-16 "The Genetics Key to AMD"

1996

KCAL-9 TV station 1/19/96. Macular Degeneration interview

"Researchers find an easy switch from manual to automated genetics analysis" Biosystems Reporter volume 1, 1996.

Asheville Citizen Times, Aug. 1996. "Researcher works with family with rare eye disorder".

Los Angeles Magazine, Kent Small, M.D. named as one of LA's best doctors Nov. 1996

1997

Senior World Newsmagazine vol. 11, May 1997, page 30. "Preventive care critical for aging eyes"

1999

"Genetic Eye Disease: Will you be prepared for the future?" in Ophthalmology Management April, 1999, pp105-108,

MDForum: Internet Macular degeneration forum 10/1999 <http://members.aol.com/danrob/MDpeople/clinic.html>
DNA.com internet chat interview "The genetics and treatment of degenerative retinal diseases" 8/17/2000
www.dna.com/event/transcript

KNBC: television interview about Stargardt disease and the American Olympic runner Marla Runyon. 9/29/2000

OCT (Orange County Times TV) Age-related macular degeneration and genetics of macular diseases 3/2001

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Publications:

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2. Ellenby MI, Small KW, Wells RM, Hoyt DJ, Lowe JE: Changes in myocardial resistivity during global ischemia: On-line identification of the onset of severe but reversible ischemic injury. Surgical Forum 36:1985,198-200.
3. Damiano RJ Jr, Smith PK, Tripp HF Jr, Asano T, Small KW, Lowe JE, Ideker RE, Cox JL: The effect of chemical ablation of the endocardium on ventricular fibrillation threshold. Circulation 74:1986,645-652.
4. Damiano RJ Jr, Tripp HF, Asano T, Small KW, Jones RH, Lowe JE: Left ventricular dysfunction and dilation resulting from chronic supraventricular tachycardia. Journal Thoracic and Cardiovascular Surgery 94:1987,135-143.
5. Small KW, Stefansson E, Hatchell DL: Retinal blood flow in normal and diabetic dogs. Investigative Ophthalmology and Visual Science 28:1987,672-675.
6. Small KW, Williams Sr. J, McCuen II BW, deJuan Jr E, Macherer RM: Vitrectomy in ocular toxocariasis. American College of Surgeons, Surgical Forum 38:1987,526-528.
7. Ellenby MI, Small KW, Wells RM, Hoyt DJ, Lowe JE: On-line identification of the reversible ischemic injury by measurement of myocardial electrical impedance. Annals of Thoracic Surgery 44:1987,587-597.
8. Pericak-Vance MA, Yamaoka LH, Vance JM, Small KW, Rosenwasser GOD, Hung WY, Alberts MJ, Hayes CS, Speer MC, Gilbert JR, Herbstreith M, Aylsworth A, Roses AD: Genetics linkage studies of chromosomes 17 RFLPs in Von Recklinghausen neurofibromatosis. Genomics 1:1987,349-352.

9. Small KW, Pollock SC, Scheinman J: Optic atrophy in primary oxalosis. *American Journal of Ophthalmology* 106:1988,96-97.
10. Small KW, Buckley EG: Recurrent ptosis secondary to a pituitary tumor. *American Journal of Ophthalmology* 106:1988,760-761.
11. Small KW, Buckley EG: Can cardiac surgery provoke vitreous hemorrhage in proliferative diabetic retinopathy? *Surgical Forum* 39:1988,517-519.
12. Alexander III E, Rossitch Jr E, Small K, Abson P: Merkel cell tumor metastatic to brain and choroid: Evidence for hematogenous spread and the implications for therapy. *Clinical Neurology and Neurosurgery* 91:1989,307-310.
13. Vance JM, Pericak-Vance MA, Yamaoka LH, Speer MC, Rosenwasser GOD, Small KW, Gaskel PC, Hung WY, Alberts MJ, Hayes CS, Gilbert JR, Aylsworth A, Roses AD: Genetics linkage mapping of chromosome 17 markers and peripheral neurofibromatosis (NF1). *American Journal of Human Genetics* 44:1989,25-29.
14. Small KW, Stefansson E, Hatchell DL: Coronary blood flow in insulin dependent diabetic dogs. *Acta Diabetol. Lat.* 26:1989,275-278.
15. Small KW, McCuen II BW, de Juan III E, Machemer R: The surgical management of retinal traction caused by toxocariasis. *American Journal of Ophthalmology* 108:1989,10-14.
16. Small KW: North Carolina macular dystrophy: revisited. *Ophthalmology* 96:1989,1747-1754.
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18. Small KW, Rosenwasser GO, Alexander III E, Dutton JJ: Presumed choroidal metastasis of Merkel cell carcinoma. *Annals of Ophthalmology* 22:1990,187-190.
19. Small KW, Letson R, Scheinman J: Ocular findings in primary hyperoxaluria. *Archives of Ophthalmology* 108:1990,89-93.
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21. Kuethle DO, Small KW, Blinder RA: Non-ferromagnetic retinal tacks are a tolerable risk in magnetic resonance imaging. *Investigative Radiology* 26:1991,1-7.
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 78. Parwar B, Small KW. Silicone oil through an Ahmed valve. *Retina* 22: 657-658, 2002
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MISC INFO.

Current Medicaid #: GR0058400 / California
 UPIN # C86490
 Current Malpractice Insurance: Medical Protective \$2,000,000 / 4,000,000
 Medicare California #: 18491A
 DEA # BS 2498548

Other Activities:

Blacknall Memorial Presbyterian Church, Durham,NC: member 7/82-10/95
 Bel Air Presbyterian Church, Los Angeles, CA: member 10/95-present
 Steering Committee member of Christian Family Fellowship Sunday School Class at Bel Air Presbyterian Church: 10/95-present
 Deacon: Bel Air Presbyterian Church, Los Angeles, CA: 1/09- 12/12

UCLA Master's Swim Team: member May 1996-present
 Medaled in 200 m butterfly in Nationals Meet 2009 Fresno, CA

Extra in feature film "Naturally Native", a film about modern Native American issues

Volunteer: Los Angeles Mission soup kitchen, 1998-present

Volunteer Physician: Rotary Humanitarian Projects Sponsored Eye Clinic in Denpasar, Indonesia
8/3-8/2001

Steering Committee member of Youth Ministry at Bel Air Presbyterian Church: 10/01-present

Medical Mission trip to Port Villa, Vanuatu through S.E.E. International to study families with inherited eye disease
and perform surgery 8/2002

Medical Mission trip: Volunteer Ophthalmologist / Retinal Surgeon, Nuku' Olafa, Tonga and Va'Vau, Tonga, 9 09,
with Surgical Eye Expedition and The Hawaiian Eye Foundation

Medical Service: Volunteer Ophthalmologist, Rescati Family Rescue Mission, San Fernando Valley, CA 2009-2012