

# Integrating Sphere to Mitigate Light Scatter and Study Retinoid Photodecomposition

<sup>1</sup> Federico Gonzalez-Fernandez and <sup>2</sup> Richard J. DeSa

<sup>1</sup> Departments of Ophthalmology and Pathology,  
University Mississippi Medical Center

<sup>2</sup> R&D Service, G.V. (Sonny) Montgomery Veterans Affairs  
Medical Center, Jackson, Mississippi

<sup>3</sup> Olis, Inc. Bogart, Georgia

## Financial Disclosures:

NEI RO1

VA Merit Award Biomedical Laboratory R&D

*Research! Mississippi* Incorporated

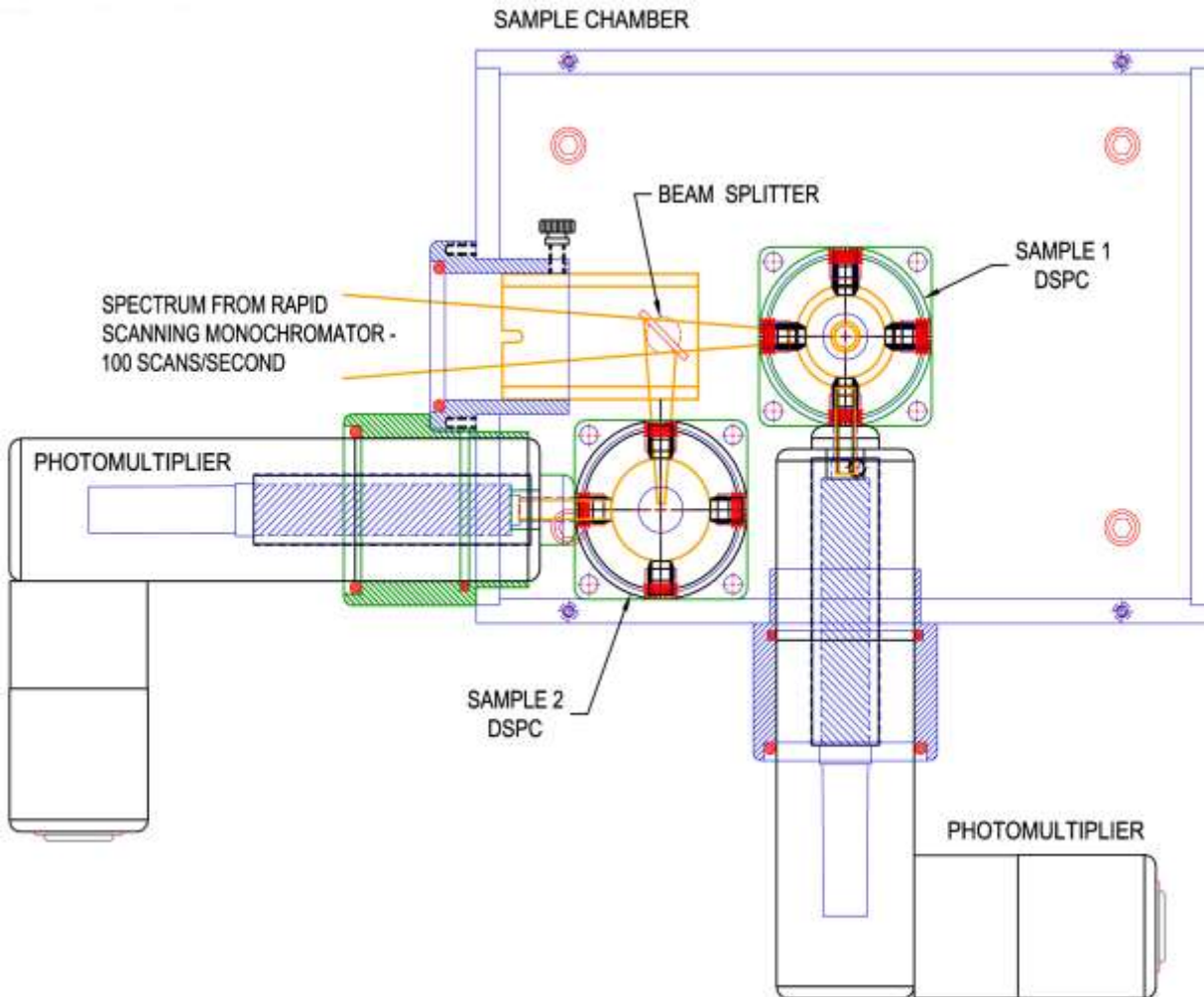
Olis Incorporated

**Motivation:** Understand function of Interphotoreceptor retinoid-binding protein (IRBP)

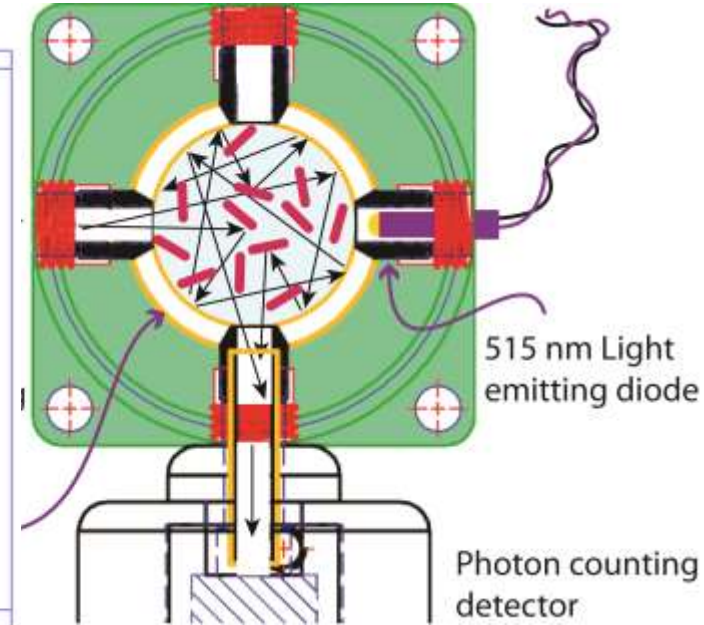
Platform: 1) Photoreceptor suspensions for physiological assays

2) System for photodecomposition assays

### Retinoid Trafficking



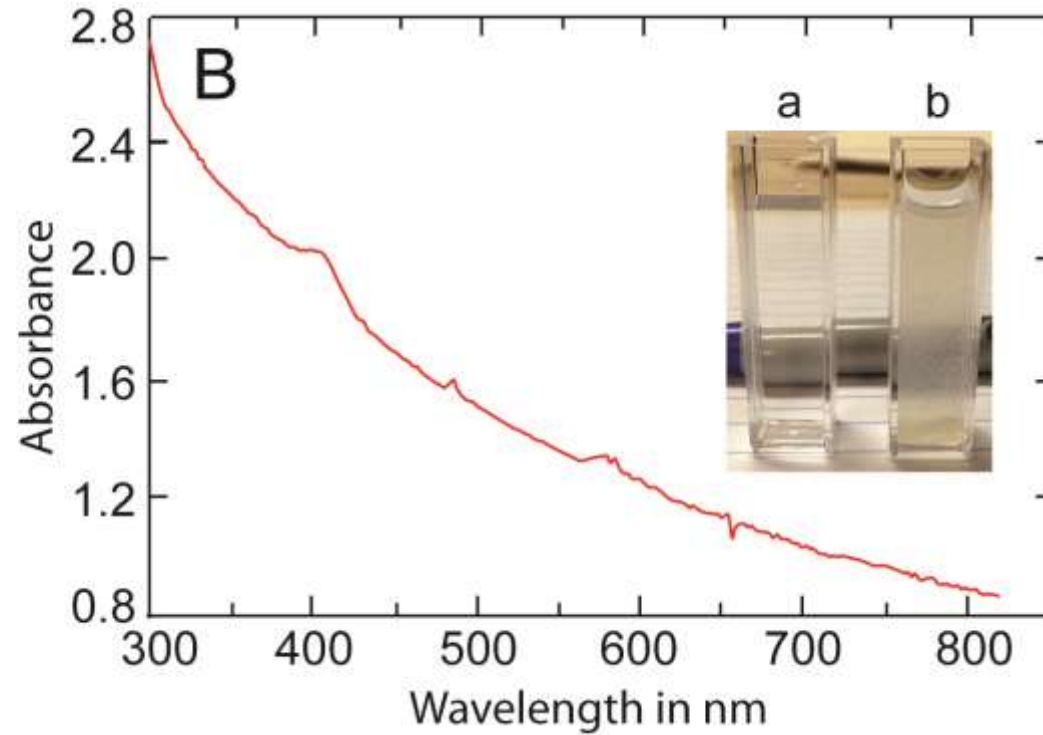
### Retinoid Protection



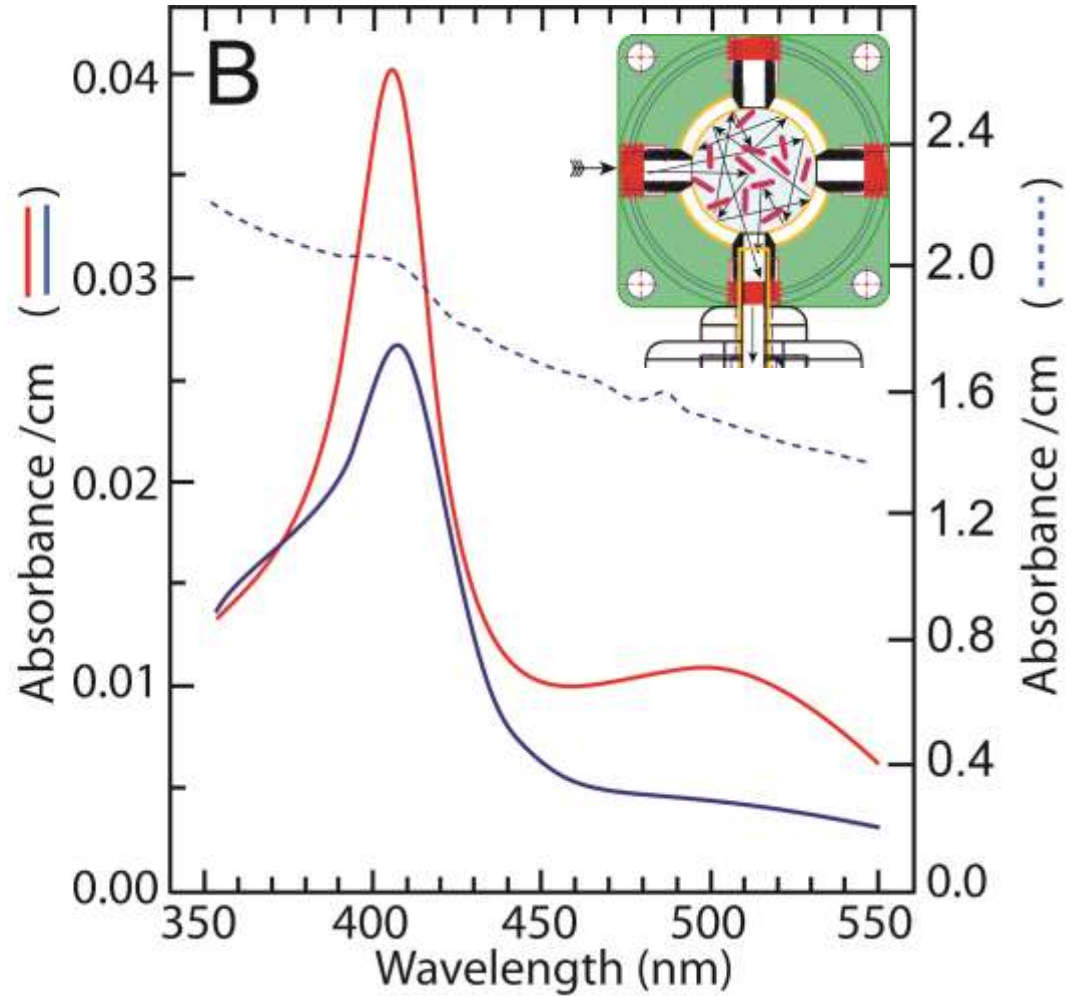
# Application #1

- Mitigate light scatter to obtain rhodopsin spectra in cell suspensions and intact retina.

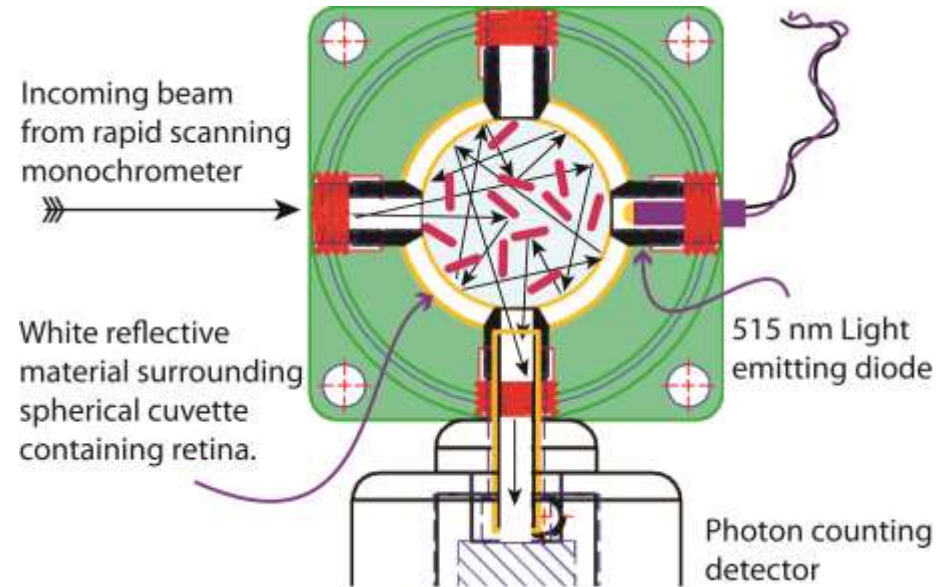
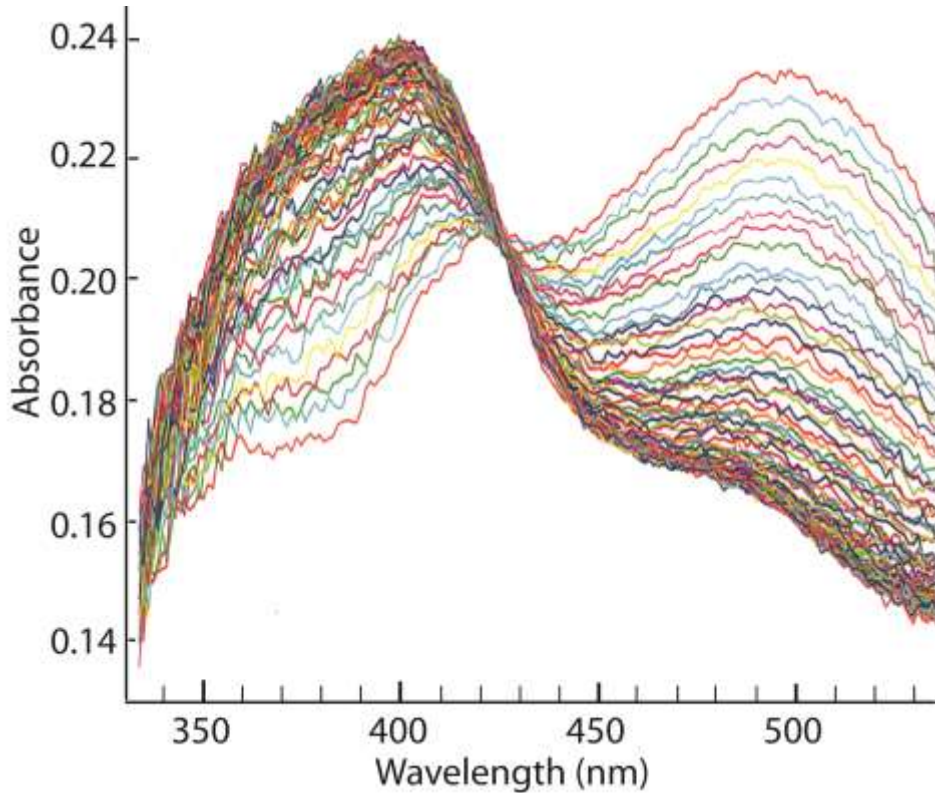
## Crude bovine outer segment preparation



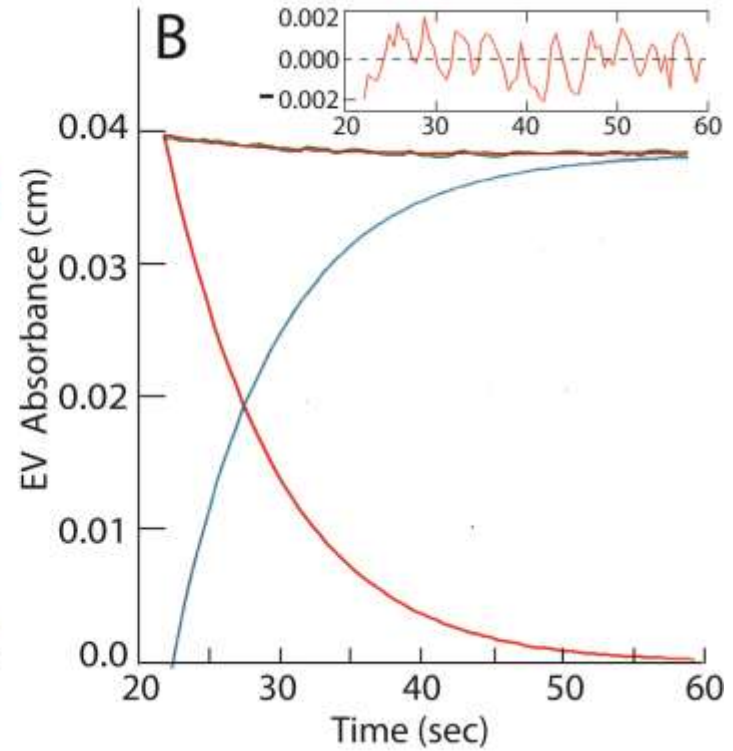
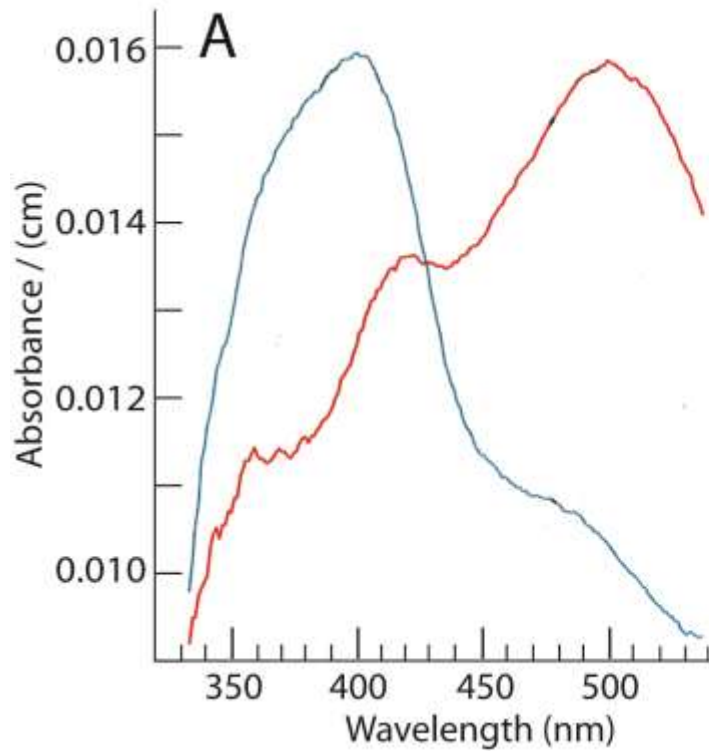
## Crude bovine outer segment preparation



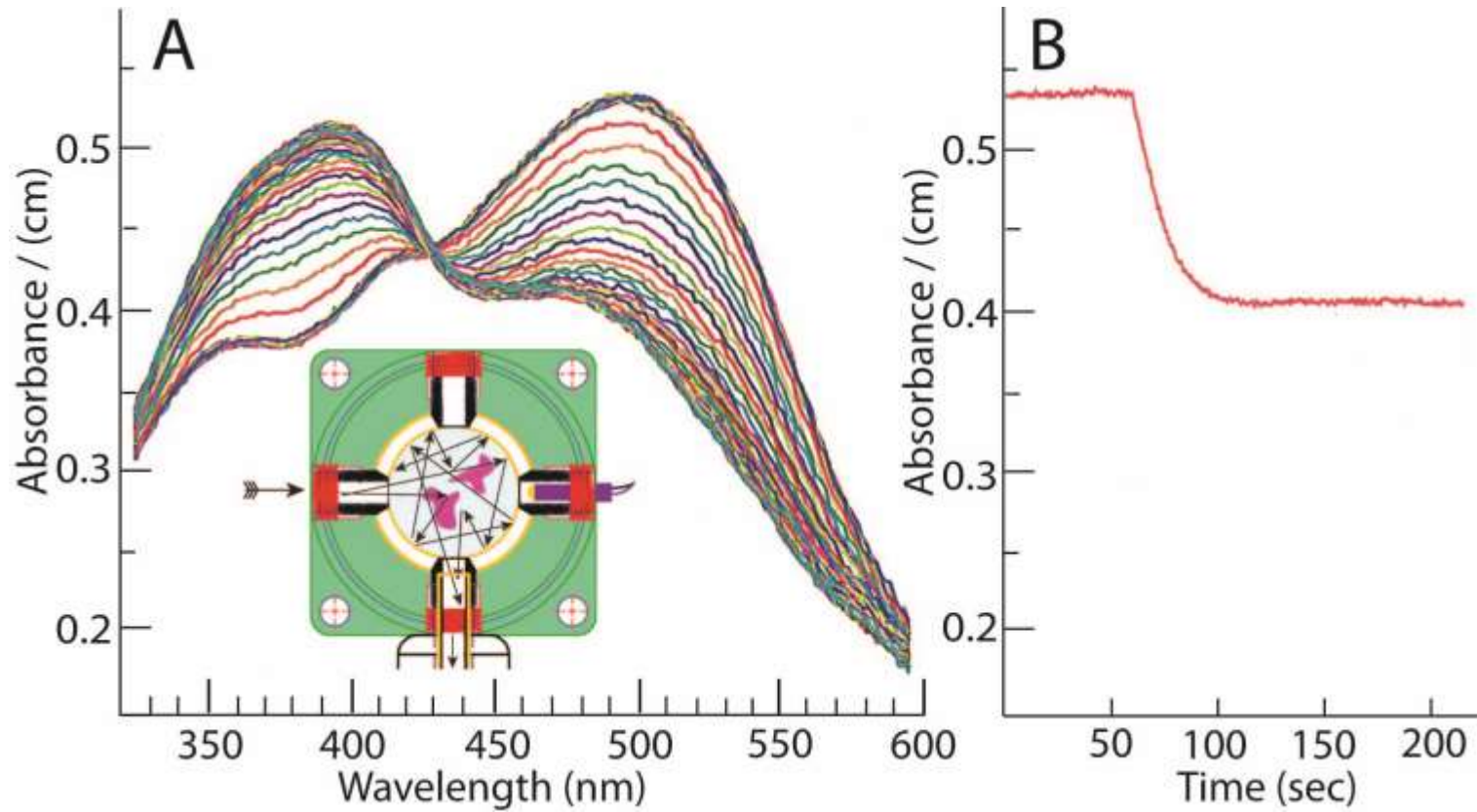
## Crude bovine outer segment preparation (With scan rate at 2.1 scans / second)



Crude bovine outer segment preparation  
(Scan rate = 2.1 scans / second)

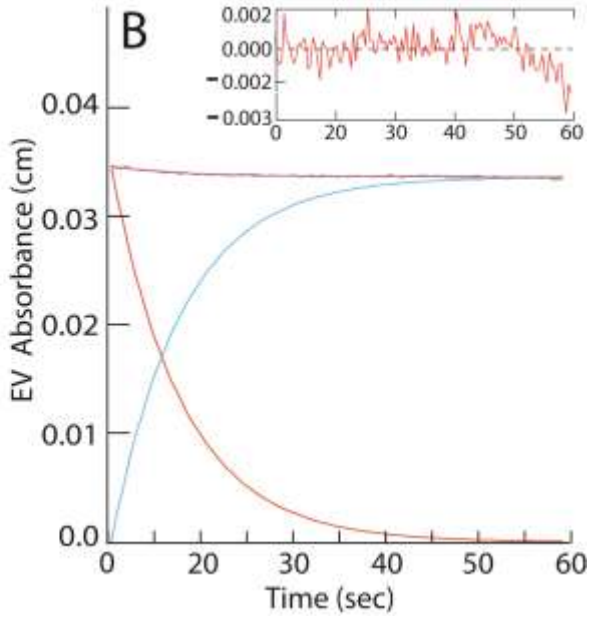
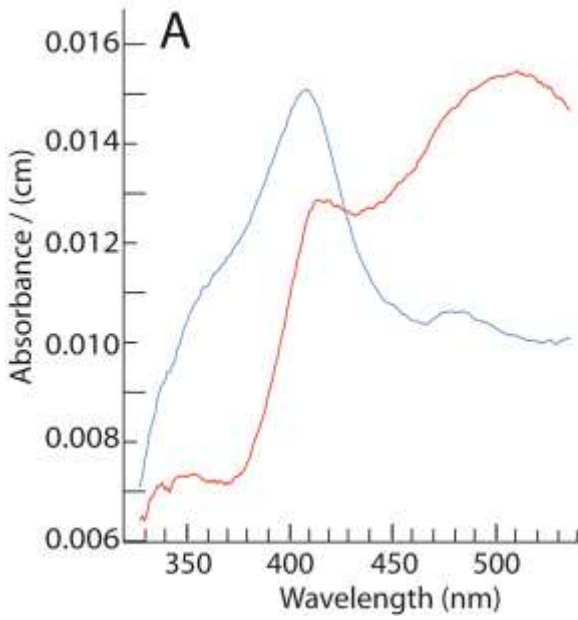
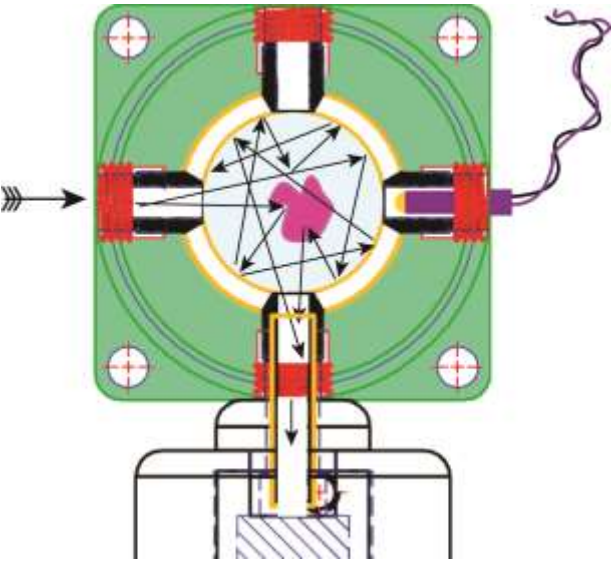


Living frog retina pieces - No effect of measuring beam

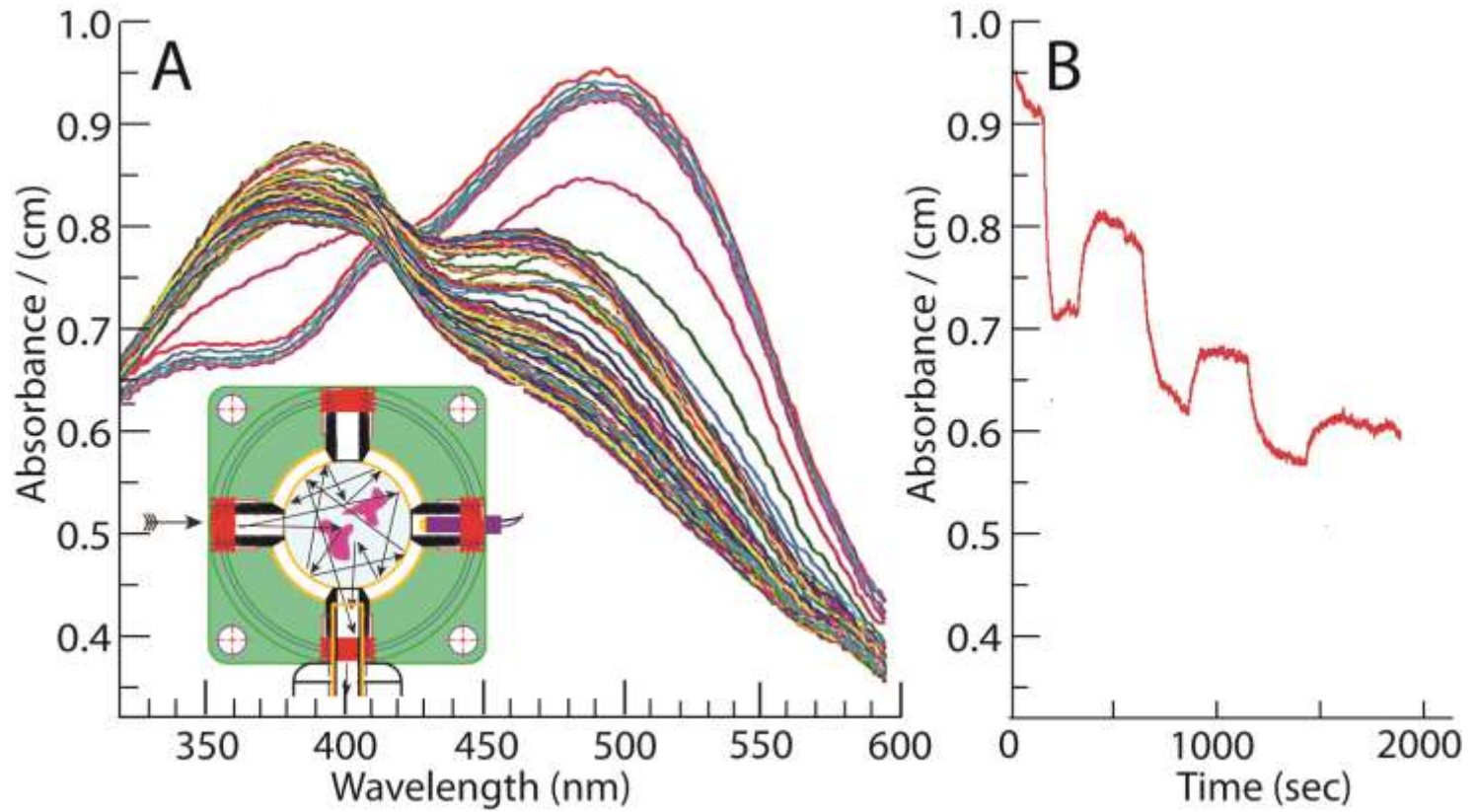




# Single intact living frog retina



## Regenerative ability in frog retina pieces

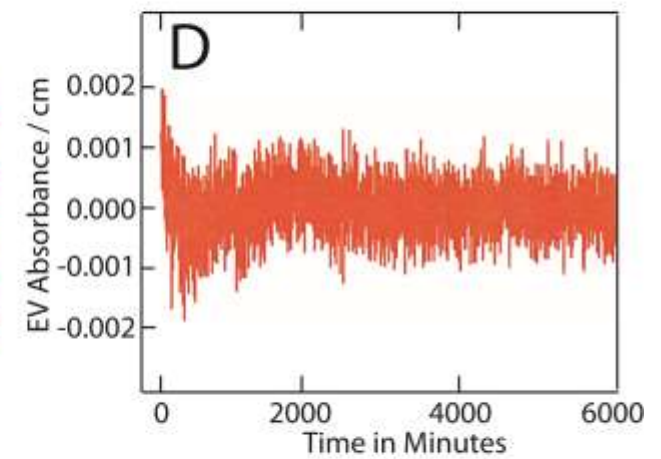
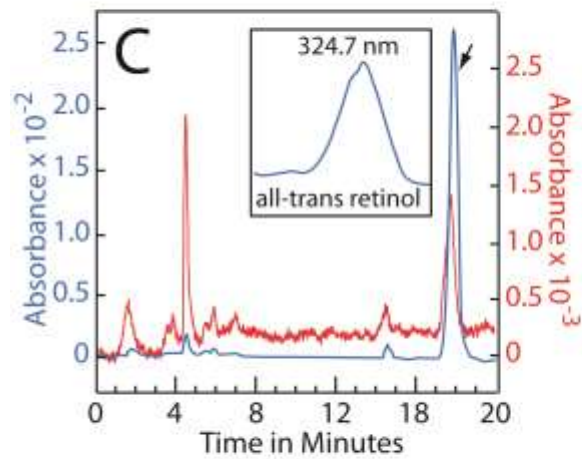
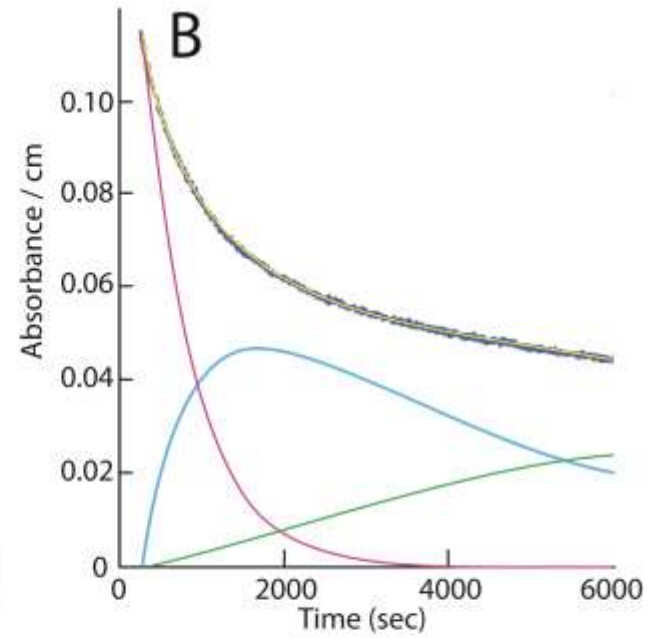
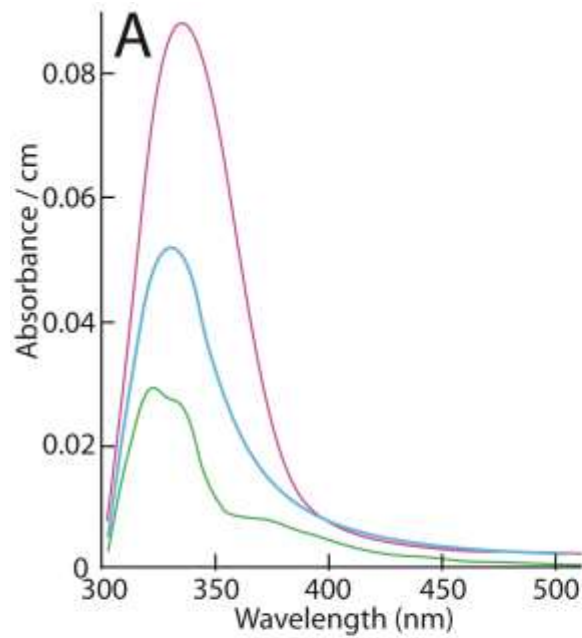
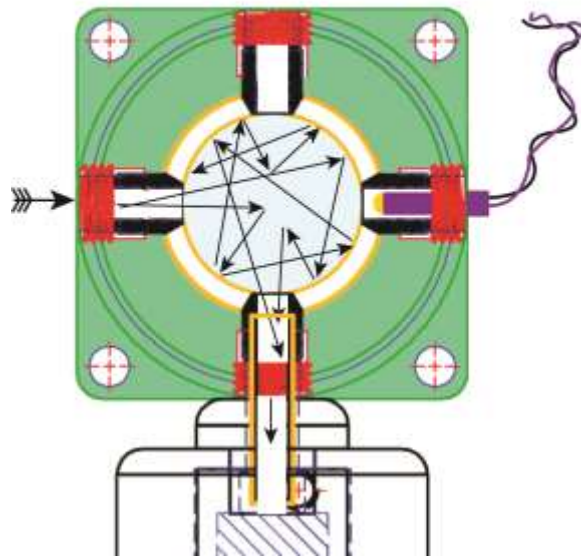


## Application #2

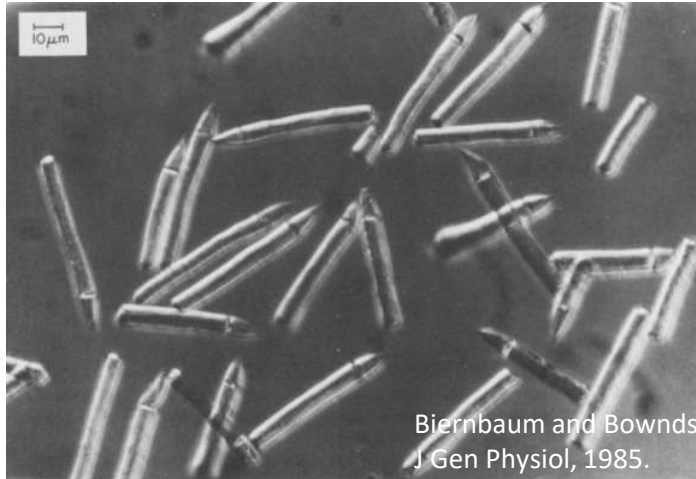
- Provide a controlled environment for photocomposition protection studies.

# Application to retinoid photodecomposition studies

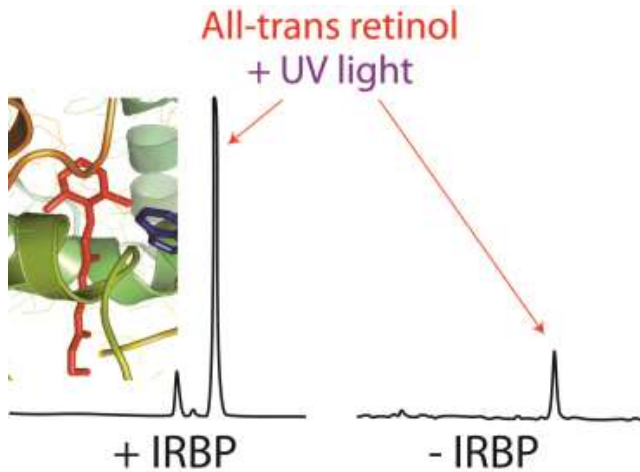
all-trans retinol



## Retinoid Trafficking

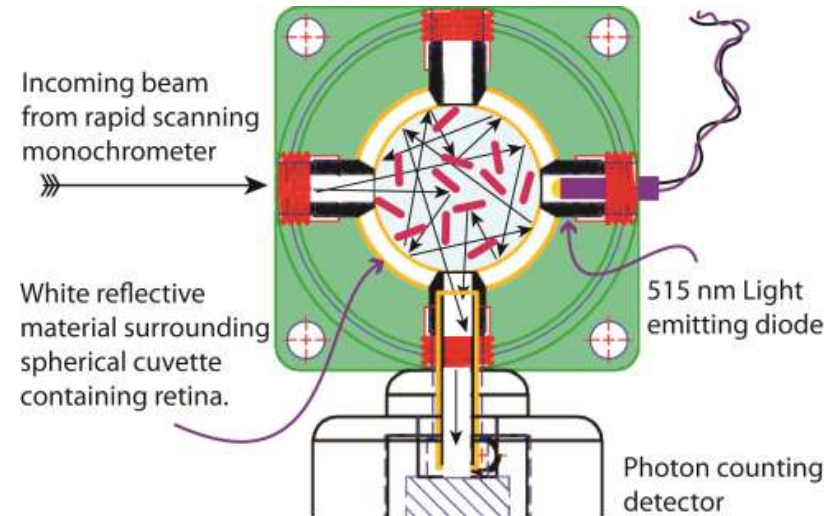


## Retinoid photodecomposition



Gonzalez-Fernandez *et al.*  
Photochem. Photobiol, 2015

## Summary



## Future plans

- Add a fluorescence capability
- Perform Structure / function studies

## Acknowledgments:

**Dr. Yiannis Koutalos (MUSC)**

**Julie Ann DeSa Lorenz and Dr. Paul Boxrud (Olis Inc.)**

Veterans Affairs Merit Review Award I01BX007080

NIH / REI RO1 Grant EY09412

Research Start-Up Award from:

**Research! Mississippi, Inc.**

Veterans Affairs Activation Award

Thank You !!