

## Vision Research at the Medical College of Georgia

**Current status of Vision Research at MCG.** 11 well-trained vision scientists and clinicians oversee 20 funded projects for a total of nearly 1.7 million dollars in grant support. These projects represent funding by NIH (88%) and other agencies. The researchers in this group have primary appointments in the departments of Biochemistry & Molecular Biology, Cellular Biology & Anatomy and Ophthalmology. Three PIs have two grants each and one has an NIH merit award. In the near future it is possible that an additional highly regarded vision scientist will join MCG if the recruitment of Dr. Sally Atherton as Chair of Cellular Biology & Anatomy comes to fruition. The vision scientists at MCG study all parts of the eye including the cornea, lens, iris, ciliary body and retina. Presently there is a strong motivation by these researchers to enhance interaction leading to increased extramural support for vision research. There is considerable interest among the members of the group to emphasize the research area of **diabetic complications of the eye**. Congress has set aside considerable funds for research in this area and NEI/Juvenile Diabetes Foundation International (JDFI) participate in an ongoing cooperative program of research in this area. It is an area of high program relevance for the NEI and several of the vision scientists at MCG have interest and expertise in this area. A second research focus is **age-related diseases of the eye**. Glaucoma and other age related changes of the retina are also areas of high program relevance in NEI.

**What is needed to achieve programmatic funding.** Our long range goal is to obtain NIH support in the form of a (1) Core Grant to provide research facilities and technical staff, (2) Training Grant to provide stipends for graduate students and research fellows, and (3) Program Project Grant to support collaborative research projects. NEI offers the first two mechanisms of support. A Program Project Grant could be supported by either NIDDK (diabetes complications) or NIA (age-related eye disease). The group estimates that five years of support is needed to accomplish these goals. Funds for three years are requested to support a Core Vision Research facility, with modest equipment upgrades and technical support. Three qualified technicians would carry out experiments using molecular biological, histochemical and cell culture methods. All members of the group would have access to the expertise of these technicians and the facility would provide common research space for collaborative interactions. Such a facility modeled upon the Core Grant design would position the group to compete successfully for an NEI Core Grant by 2002. Successful competition for a Core Grant would greatly increase competitiveness of our Training Grant application to be submitted in 2004. Institutional funds are also requested to support two post-doctoral slots for five years. These would be designated for collaborative projects on the program project grant topic. This will allow us to generate the necessary preliminary data needed for successful submission of a program project grant by 2005. We also request funds for 5 years for a seminar series in which six outstanding vision scientists (2 each semester) would visit the campus, present a seminar and interact with the group. The seminar series is needed to increase the groups' exposure to leaders in the field and increase our visibility as a collaborative team. We would like to combine some of our speakers' visits with a yearly Southeastern Vision Conference to begin in 2002. This would increase our groups' visibility and further establish our reputation as a cohesive group.

**What is needed to acquire translational funding?** Two very enthusiastic and qualified ophthalmologists participate in active research with other members of the vision research group. Their first hand knowledge of the diseases of the eye position them to translate research findings more quickly than would be otherwise reasonable. Regular interactions with these physicians via the facility we request will allow frequent dialogues between clinicians and basic scientists.

**Which areas have relevance to State of Georgia?** Diabetic retinopathy is the leading cause of blindness in working-age American adults. About half of the Nation's estimated 16 million people with diabetes have early signs of diabetic retinopathy. In Georgia, as of 1990, there were more than 300,000 diabetics over age 40; 125,000 of these had diabetic retinopathy. 1996 data indicate the same prevalence of diabetes in Georgia. Diabetes also impacts the lens and cornea and can lead to glaucoma. Age-related macular degeneration and glaucoma represent significant health care problems due to the aging of the population in Georgia as well as the US.

**What is needed for the program to be internationally recognized as an area of excellence?** MCG eye researchers are nationally and internationally recognized as leaders in their individual fields. Strong institutional support will enable us to be recognized as a cohesive research group. Our successful competition for NEI Core and Training Grants and a Program Project Grant will demonstrate our program as an area of excellence. Nearby institutions with active Vision Research programs focus largely on clinical research areas. Because of our strength

in both basic and clinical aspects of vision research, MCG is in an excellent position to emerge as a center of excellence for basic vision research with significant translational potential.

### **Addendum to the Document describing Vision Research Document at MCG. (27 Jan 2000)**

In October 1999 the current status of vision research was described and needs of the group to move forward were stated in a one-page document (attached). Since that time, the details of the early retirement program as well as the hiring of a new vision researcher to MCG have become known. Furthermore, the BMRC asked several questions regarding the needs of the vision research group. These issues have been discussed and the needs of the group are stated below.

Recruitment of Dr. Sally Atherton has been realized. Among her other accomplishments, Dr. Atherton is a trustee of ARVO and will be bringing to MCG two NIH funded grants. She will be on campus in the Spring of 2000 and is welcomed as a key player in the vision research group. Early Retirement: of the 11 scientists listed in the original document, 6 were eligible for early retirement and 5 have chosen to accept the package. Several of these individuals hope to continue to oversee their grants and to function at MCG as researchers. Their participation is valued as we recruit new faculty members. To maintain the reputation of MCG in the field of vision research and strengthen it toward becoming a center of excellence, there are needs for (1) recruitment, (2) support for translational research and new vision research initiatives, (3) support for a vision research seminar program, (4) support for a Southeastern Vision Research conference. These four needs are outlined below.

#### **1) Recruitment**

- a) Chair of Ophthalmology with a proven record of clinical and research excellence. A strong commitment to vision research by the chair of this critical clinical department will be of great importance in attracting other capable and talented vision researchers. The package offered such an individual must include support for the laboratory space and research effort. Estimate cost: \$500,000 for start up (plus salary).
- b) Seven – eight vision science researchers should be recruited over a period of two – three years to add to the existing vision research faculty and replace individuals who will retire. Four to five of these individuals could be promising new investigators, but 2-3 investigators with a proven track record should be recruited also to bridge the gap left by retiring individuals. Several basic science departments could recruit vision scientists who would participate in the teaching missions of the school. In addition, the department of Ophthalmology should recruit an additional clinician to participate in the clinical mission, but who has significant protected research time with adequate laboratory space. (The start-up packages offered to these individuals should be commensurate with qualifications and experience and could range from \$200,000-300,000 for assistant professor, 300,000-400,000 associate professor)

#### **2) Support for translational research and new vision research initiatives.**

- a) *Support for translational vision research*: Presently the vision research group has an outstanding opportunity for translational research (i.e. bench to bedside) in that two well-trained clinicians, Drs. Dennis Marcus and Steven Brooks, are very active in research and eager to expand their programs. Both have extramural support from vision research foundations. Neither has a laboratory and presently they share space with Dr. Ruth Caldwell. In addition, their protected research time is limited (1 afternoon/week at best). These clinician/scientists share a single technician, whose salary comes from the RPB (Research to Prevent Blindness) support awarded to the departmental chairman. These funds are subject to some variability and are not guaranteed. Drs. Marcus and Brooks have expressed a need to have access to laboratory space in which they could execute their ideas and projects. This laboratory must be managed by a highly skilled technician who had expertise particularly in studies of the eye. The present core facilities on campus (histology, molecular biology, imaging) are very attractive for these individuals, however there is a critical need for a person to manage the projects and to act as the liaison with these core facilities. Thus,

the request is for: **(1)** the salary of a skilled managing technician (Research Assistant III (\$25,515) or IV, salary (\$28,710) + benefits (34%); **(2)** salary for a technician (Research Assistant II, salary \$22,258 + benefits (34%) to prepare primary cultures of human ocular cells; **(3)** a small laboratory facility with tissue culture hood and bench space for use by the two technicians.

- i) Within this request for support of translational research is the dire need of the appropriate facility for culture of primary human ocular cells. At the present time, these cells must be obtained from other institutions, which severely limits availability and delays progress in research. This tissue culture core could be combined with the space requested above as it is likely that Drs. Marcus and Brooks would play a key role in acquiring the tissue for use by the vision research group.
- b) *Support for new research initiatives.* There are two new research initiatives in the vision research group that need support in form of funds for post-doctoral fellows.
- i) Dr. Rashid Akhtar, Professor of Biochemistry and Molecular Biology has been funded for 15 years in his studies of Receptors and phosphoinositide metabolism in the cornea. These studies focus on the corneal epithelium. He has become very interested in developing a second area of study involving the corneal stroma. These studies are designed to examine the effects of growth factors on signaling pathways that ultimately result in activation of transcription factors and DNA synthesis. Very recently, Dr. Akhtar has recruited a very capable post-doctoral fellow, Dr. Salman Muzammil to his laboratory. Dr. Muzammil has the skills and expertise needed to generate the preliminary data for a new NIH application in this area of corneal stromal research. The funds available to support Dr. Muzammil are quite limited however and will be exhausted by Dec. 2000. Dr. Akhtar would like to request 2 years of support for Dr. Muzammil to work with him to launch this new research initiative. He is confident that with adequate support he could submit the new proposal by June of 2001. Requested costs: \$30,000/yr X 2 yr = \$60,000.
  - ii) Dr. Swamy Mruthnti, Associate Professor of Biochemistry and Molecular Biology, is an expert in studies of diabetic complications of the lens. His current NIH funded project is on the role of advanced glycation end products (AGEs) in diabetic and age-related complications of the lens. Since AGEs and its receptors RAGEs (receptors for AGEs) increase in ocular tissues with age and in diabetes, the logical expansion his research would be to study their involvement in retinopathy and macular degeneration. Dr. Mruthnti is developing a new project studying advanced glycation endproducts in diabetic retinopathy, the leading cause of blindness among working-aged Americans. Diabetic retinopathy is an area of high program relevance in the National Eye Institute. Dr. Mruthnti has identified a post-doctoral level scientist, Dr. Nihat Dilsiz, whose background is in diabetic complications of the eye. Dr. Mrunthi would like Dr. Dilsiz join his laboratory as soon as possible to initiate these studies. This project will be a collaborative venture with Drs. Ruth Caldwell and Sylvia Smith, whose areas of expertise are in retinal cell biology. Support for this post-doctoral fellow should ensure that sufficient preliminary data is acquired to permit submission of an application by June or November 2001. Requested costs: \$30,000/yr X 2 yr = \$60,000.

Plans to cover the costs of post-doctoral fellows for new vision research initiatives in the future. It is recognized that successful launching of new research initiatives requires capable manpower. Typically, well-trained post-doctoral fellows meet this requirement most efficiently. It is the intention of the members of the vision research group to submit a "training grant" to NEI to provide support for post-doctoral research fellows and graduate students. Dr. Atherton, has directed such a grant previously and her knowledge and expertise in this area will be invaluable in obtaining a training grant at MCG.

- c) Funds are requested to support the use of core facilities (molecular biology, imaging, histology) in the amount of \$15,000 per year. These funds would be made available for use by any vision research group member in need of the use of these facilities *in the development of new research initiatives*. Note the costs of the use of these facilities vary dramatically from the Imaging facility (\$1,000/yr per investigator) to the Histology facility (rates are based upon tissues to be embedded and slides prepared (\$3.00/embedding and \$1.00/slide)).

### **3) Vision Research Seminar Series**

We request that \$12,000/year for three years be set aside for a vision research seminar in which outstanding vision scientists from around the nation can be invited to present a seminar of their research and meet with members of the MCG group. We anticipate inviting three individuals during the Fall Semester and three individuals during the Spring. We have estimated the costs of an honorarium, meals, and hotel expenses to be about \$2000/invited speaker. The group has begun generating a list of highly-regarded vision scientists to invite, many of whom serve on the Vision Study Sections. We hope that within three years, vision scientists can support this program through grants etc. Total requested costs: \$12,000/yr X 3 yr = \$36,000.

### **4) Southeastern Vision Research Conference**

In the original document, we had suggested a Southeastern Vision Research Conference. We wish to defer this request at the present time as we do not think it prudent to organize a conference during this period of transition of several key members. After a period of rebuilding the vision research group, we are very interested in organizing this conference and inviting researchers from neighboring states. Depending on the successful recruitment of new vision scientists, we hope to organize a conference for the year 2001 (or 2002). We have communicated with Dr. Gerald Chambers who organizes continuing education for MCG. He and his assistant, Katrinka Akesson are quite willing to assist us in planning this when we are ready to proceed with our plans.