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News Release

**GRADUATE RESEARCH CENTER OF THE SOUTHWEST
SOUTHWEST CENTER FOR ADVANCED STUDIES**

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RELEASE IMMEDIATELY



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**GRADUATE RESEARCH CENTER OF SOUTHWEST GETS FEDERAL GRANT FOR STUDIES OF
CELLULAR MECHANISMS FOR REPAIR OF DAMAGE PRODUCED BY ULTRAVIOLET RADIATION**

Dallas, Texas. The United States Public Health Service has granted the Graduate Research Center of the Southwest \$240,000 for a five-year program study of protection and recovery from ultraviolet damage in bacteria.

The principal investigator is Assoc. Prof. John Jagger of the Center's Division of Genetics.

Specifically, the research is aimed at studies of cellular mechanisms for the repair of damage produced by far ultraviolet radiation.

Such radiation acts primarily on genetic material. These repair systems, therefore, operate chiefly on genetic damage.

The phenomena to be studied are photoreactivation, photoprotection, and liquid holding recovery. The biological effect most commonly assayed will be bacterial survival. Some bacterial mutation work also is envisaged.

It now appears probable that all three of these recovery phenomena act upon the same primary ultraviolet damage, that photoprotection and liquid holding recovery do this by inducing delays in growth and division, and that photoprotection induces such delays through the destruction of essential respiratory quinones. The object of the five-year program of research is to test these conjectures and to obtain further information on the mechanisms involved. All three recovery phenomena will be studied concurrently, because they are interrelated in a variety of ways.

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Techniques will include action and absorption spectroscopy, radioactive tracer studies, growth studies, and chemical and photochemical studies of extracts and model compounds.

The research program has implications reaching even beyond the immediate aims. These implications involve the origin of life, the interaction of radiation and matter, evolution, and genetics.

"It seems of paramount importance that life on Earth evolved in an environment of light, that this light was almost certainly one of the major factors in the origin of life, is the sole source of energy for life, and controls many life processes", Professor Jagger says. "Knowledge of photobiological processes cannot fail to enlarge our understanding of the nature of life. The present research will add to our knowledge of photobiological reactions chiefly in the near ultraviolet, a spectral region rarely investigated, but clearly important, if only from energetic considerations. "

Ultraviolet radiation affects chiefly genetic material. Knowledge of how it does this will contribute to knowledge of the nature of genes, gene action, and mutation. The repair systems which Professor Jagger proposes to study repair ultraviolet and, therefore, genetic damage.

Professor Jagger's general approach is primarily cellular and only secondarily molecular.

"The recent great success of molecular studies in biology has tended to obscure the fact that cellular studies must precede, parallel, and follow molecular studies, if these are to remain pertinent, " Professor Jagger says.

He points out that another aspect of his approach is that it is diverse. Instead of concentrating on one repair phenomenon, he proposes to study three related ones in parallel.

The research is aimed at the following:

1. The nature of the initial events in photoprotection (the role of quinones or other molecules.
2. The nature of the initial events in liquid holding recovery, about which little is known.
3. The roles of growth delay and division delay in these phenomena.
4. Various aspects of photoreactivation at the cellular level, especially the kinetics of the process and the role of "indirect photoreactivation," a phenomenon recently discovered by Professor Jagger and his coworkers at Oak Ridge National Laboratory.

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