NEW TOOL AT U. C. CHANGES CELL STUDIES

Electron Microscope Seen As Boon to Medical Research

By WILLIAM BOQUIST

The electron microscope is slowly and quietly working a revolution in an important branch of medicine.

As a result, textbooks and other medical literature on the structure of human and animal tissue may have to be rewritten.

So believes Dr. James Rinehart, a University of California professor of pathology, one of only a small number of men who have been developing and refining electron microscope research techniques during the last five years.

PREPARATION OF CELLS.

Those techniques include the preparation of cells as well as the analysis of new information presented by the great power of the instrument.

Before its advent, body tissues and other materials to be examined under the microscope could be magnified only a thousand times.

With the electron microscope, California researchers and others are able to magnify up to 50,000 times. The results are often spectacular, showing details whose existence was never suspected.

NEW TECHNIQUES.

And with the new techniques for the preparation of the materials for 'scope study, the scientists are learning the biological functions as well as the makeup of the structures.

Until recently, scientists had to use stains to make individual biological structures stand out under microscopic examination.

They were limited by the need to use a different stain for each feature of a living cell and were unable to study several features at the same time.

The work thus handicapped them, oftentimes severely, since they were prevented from seeing the whole structure of a living cell and its relation to its separate parts.

The handicap may be likened to the proverbial man from Mars trying to find out what a baseball game is all about, and being forced to watch only the plate umpire, or batter, or left fielder, never seeing all the players and the park at once.

But a glass knife now slices tissues to the fine thickness of about 1/250,000th of an inch, or 1/150th the diameter of a red blood cell.

ENCASED IN PLASTIC.

The slice is encased in plastic and made firm. In a single picture it is possible to visualize all the components of a cell.

The recent developments growing out of the marriage of the tissue slicing techniques and electronics were cited yesterday by Doctor Rinehart.

In the first, previously unknown details of the filtration system of the kidneys was revealed, showing the existence of possible spongelike structures that may help pull waste products from the blood through kidney walls.

In the second, Doctor Rinehart and Dr. Marilyn G. Farquhar have helped identify the kinds of cells in the pituitary gland that produce its various hormones.

They studied pituitaries from normal rats and from rats whose thyroid glands had been removed. A particular type of cell from the rats without thyroids was enlarged.

GROW LARGER.

Ordinarily the pituitary stimulates the thyroid gland into producing thyrotropic hormone. When no thyroid existed the pituitary worked harder, and in trying to stimulate a gland that wasn't there the pituitary cells grew larger. The cells identified themselves by their size.

The UC pair has also been able to identify pituitary cells that cause hormones to stimulate the sex organs, particularly the female ovaries.

Identification of other cell functions may follow in amazing detail in the near future.

"The kind of work we are now able to do," Doctor Rinehart sums up, "will make it necessary to rewrite much of our body of knowledge on minute tissue structure."