

would," Potter asserts.

An estimated 2 million to 3 million people in the United States suffer from manic depression, characterized by periods of severe depression alternating with episodes of uncontrolled elation, restlessness, racing thoughts and delusions of grandeur. Periods of normal mood typically occur between manic and depressive episodes.

Goldberg's team evaluated 35 manic depressive patients and 35 depressed patients with no mania, initially treated in two psychiatric hospitals. The researchers assessed each patient 2½, 4½ and 7½ years after discharge to outpatient treatment, which usually included lithium in combination with psychotherapy and psychoactive drugs such as antipsychotics or antidepressants.

At the final follow-up, 12 of 35 manic depressives functioned well and generally lacked the psychiatric symptoms that had led to their hospitalization. Among patients hospitalized for depression only, 19 of 35 achieved that same level of functioning.

Another 19 manic depressives and 13 depressed individuals achieved "intermediate" functioning after 7½ years, with periodic returns of symptoms, difficulties in social situations, and occasional rehospitalizations. The researchers observed poor functioning and no improvement since the initial hospitalization in four of the manic depressives and in three of the depression patients.

A number of factors contributed to the poorest outcomes in the manic depressive group, they say. These include failure to take lithium or follow prescription instructions, occurrence of "mixed states" in which symptoms of mania and depression coexist, and rapid alternations between periods of mania and depression.

Further long-term lithium studies must examine a broader spectrum of manic depressives, with a special focus on those who do not get better, Potter says. Pharmaceutical firms should also direct their efforts toward identifying novel chemical compounds that can quell symptoms of manic depression, he contends.

Further research would also benefit from a redefinition of manic depression, maintains Frederick K. Goodwin, head of the Alcohol, Drug Abuse and Mental Health Administration in Rockville, Md. Goodwin argues that the current diagnostic manual of psychiatric disorders inappropriately separates manic depression from the various forms of depression without mania. People with manic depression and people with recurring severe depression share important qualities, he points out, such as the tendency to show symptoms by young adulthood, recurrence of psychiatric episodes every one to two years, and in many cases a family history that includes manic depression.

— B. Bower

Needle imaged in animal-tissue haystack

A figure silhouetted in bright sunlight casts a sharp shadow. In a thick fog, the figure and its shadow virtually disappear, smeared out by the way water droplets randomly scatter any light penetrating the fog.

Animal tissue also scatters light, making it difficult to use visible or infrared light as a probe to locate and characterize tumors within the body. However, researchers have now demonstrated that they can capture "shadowgraphs" of objects embedded in tissue by concentrating on the fraction of a light pulse that passes most rapidly through a tissue sample. With further development, this imaging scheme may offer an alternative to X-ray techniques for noninvasive screening of human breasts.

When a beam of light passes through a tissue sample or a milky fluid, a small fraction of the light travels in a nearly straight line. The remainder, scattered by the medium, follows a considerably more tortuous path before finally exiting the sample. Because this scattered light travels farther, it takes longer than the straight-line, or ballistic, light to pass through the material.

In other words, light traveling predominantly in the forward direction arrives at a detector first. Because only this early light produces a sharp shadowgraph of an embedded object, researchers need a way to isolate it from the rest of the light emerging from a sample.

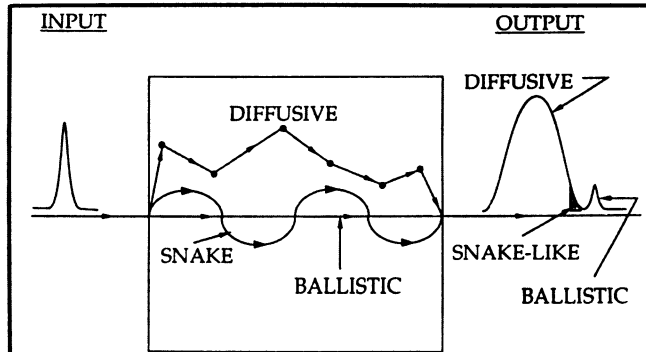
"We're looking for the shadow," says physicist Robert R. Alfano of the City College of the City University of New York. At last week's Conference on Lasers and Electro-Optics, held in Baltimore, several research teams developing visible-light imaging systems presented their progress reports.

The idea is to synchronize the opening and closing of an electronic or optical "gate" in front of a detector with the entry of a short laser pulse into a sample. To get sufficient contrast and spatial resolution in the resulting image, researchers try to use the shortest possible laser pulses and the fastest, most sensitive gates available.

At the University of Michigan in Ann Arbor, Janis A. Valdmanis, Emmett N. Leith and their colleagues use a holographic technique for capturing 100-

femtosecond slices of early light to produce a two-dimensional image. An electronic camera records the resulting holographic interference patterns, which are rapidly processed and averaged by a computer to generate an image on a video screen.

Using this system, the group has obtained clear images of two sewing needles, 0.5 millimeter in diameter, hidden behind 6 millimeters of raw chicken meat. Under continuous laser light and



A light-scattering medium lengthens the duration of any light pulse that travels through it. Forward-scattered light travels the shortest distance and comes out first.

without the gate in operation, the chicken meat completely obscures the needles.

"We have also demonstrated the capability of imaging . . . objects buried in diffusing [scattering] material several centimeters thick," the Michigan researchers report.

Alfano and his co-workers use an optical gate known as a Kerr shutter to snap images of various patterns viewed through a milky suspension of tiny polystyrene spheres in water. Using 10-picosecond laser pulses, they can pinpoint the location of a spot 200 microns in diameter and resolve a rectangular bar 400 microns wide. The New York group has also imaged such patterns through samples of chicken and human breast tissue about 3.5 millimeters thick.

"Our plan is to increase how deep we can go [into tissue] and to use shorter pulses to see if we can get better resolution," Alfano says.

Although these visible-light imaging techniques show promise, they remain in the research stage. In the May 10 MORBIDITY AND MORTALITY WEEKLY REPORT, the Atlanta-based Centers for Disease Control warns that the efficacy of such "transillumination" techniques for detecting early stages of breast cancer has not yet been demonstrated, and cautions that any transillumination devices now being marketed do not provide meaningful clinical information.

— I. Peterson

Alfano