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Letters

Diagnostic math

Raymond V. Damadian ("NMR patent: A matter of infringement," SN: 1/25/86, p. 59), in 1971, was the first to note that normal tissues, benign tumors and malignant tumors had different and characteristic T_1 and T_2 relaxation times. This was rapidly confirmed by Hazelwood, Weisman and others. Damadian then envisaged a scanning device to display different relaxation times (1972). Lauterbur (1973) suggested a three-dimensional display that was dependent on the T_1 and T_2 tissue differences described by Damadian. Most tissues have characteristic relaxation times, and this mathematical value is what is transferred to computers for the gross images now produced by magnetic imaging devices.

Cancer and other diseased tissues have different relaxation times, and many of us feel that tissue examination after excision may give

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Cover: Aglow in the cold light of the distant sun, one face of a vast chasm, perhaps 10 miles deep, stretches out into the night of Miranda, fifth largest but surely the strangest of the moons of Uranus. Photographed by the Voyager 2 spacecraft during its flyby of the Uranian system late last month, Miranda has scientists struggling to explain the details of its complex surface. (Photo: Jet Propulsion Laboratory)



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a mathematical dimension to pathological examinations. Relaxation times have differentiated experimental metastasizing tumors from identical tumors that do not metastasize. Oncocytoma (benign) can be differentiated from malignant renal tumors by such measurements. T_1 and T_2 relaxation times are the significant signals in magnetic imaging as we now know it. It can be compared to the penetration of the body by X-ray beams, with resulting pictures produced by varying degrees of densities of body tissues. It is still too soon to know if mathematical diagnoses can be made by these times, but this is a possibility and even now they can reinforce a diagnosis.

Kenneth B. Olson, M.D.
New Smyrna Beach, Fla.

Critters confused

Concerning my letter entitled "City critters" (SN: 1/18/86, p. 35), I must submit a very important correction regarding the animals consid-

ered to be in the high-risk groups for rabies. The letter reads, "In the Atlantic Coast region, these include raccoons, bats, squirrels and foxes." Squirrels are *not* considered to be a high-risk rabies group. The statement should read: "In the Atlantic Coast region, these include raccoons, bats, *skunks* and foxes."

I deeply regret the error and any misgivings this may have caused your readers.

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