Thirty-two areas of cartilage from nine osteoarthritic and four "normal" human femoral heads were studied morphologically and scored for "severity," for osteoarthritis by a specially designed grading system. For each site, the concentrations of DNA and hexosamine and in vitro incorporation rates of 14C-thymidine and 35S04 were assessed. The data demonstrated that human osteoarthritis is a highly local disorder, that proteoglycan concentration declines with advancing disease, and that a significant inverse relationship exists between synthetic activities and the severity of the process (strongly implying a "repairative" response). [The SC indicates that this paper has been cited in over 200 publications.]

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In the years 1966 to 1970, our Orthopaedic Biochemistry Laboratory at the Hospital for Joint Diseases in New York City was heavily engaged in research in the biochemistry of cartilage. During that period, Louis Lippielo, and I had been principally interested in chondrocyte metabolism but had had little opportunity to study the biochemical or metabolic features of osteoarthritic cartilage, chiefly because animal models were at the time considered not very useful, and human cartilage was difficult to obtain. During that period, however, several members of the staff at the hospital began to do total hip replacements, and we suddenly found ourselves with not only a sizable amount of material to study, but an interested and talented pathologist, Howard Dorfman, to help us with the morphological analysis. After an initial effort to establish that the cartilage did in fact seem to have an increased metabolic activity, we planned and carried out the study in about six months. Dorfman and I worked out the grading index and Lippiello, Zarin, and I did the chemistry. We also received a great deal of support and considerable incentive from the laboratory technical staff for several weeks before desktop computers were at Lawrence Rosenberg, at New York University, who was online with a statistical package.