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This Week's Citation Classic

Thomas E D, Storb R, Clift R A, Fefer A, Johnson F L, Neiman P E, Lerner K G, Glucksberg H & Buckner C D. Bone-marrow transplantation.
N. Engl. J. Med. 292:832-43; 895-902, 1975.
[Dept. Medicine, Div. Oncology, Univ. Washington Sch. Med., Providence Med. Ctr., and Fred Hutchinson Cancer Res. Ctr., Seattle, WA]

This paper reviewed studies of marrow transplantation in rodents, dogs, and primates. The experiences in man regarding histocompatibility typing, preparation of the recipient, the technique of marrow transplantation, and supportive care of the patient without marrow function were described. Clinical data were presented and problems associated with marrow engraftment, graft-versus-host disease, opportunistic infections, and recurrence of malignancy were summarized. [The *SCI*® indicates that these papers have been cited over 800 times in 539 papers since 1975.]

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"By the mid-1950s, it had become apparent that mice exposed to lethal irradiation could survive if given a marrow transplant. Initial clinical enthusiasm was soon tempered by an appreciation of the numerous major problems involved.[1] My colleagues and I spent the next decade working with the dog as an outbred model for studies of marrow transplantation biology. Initial encouragement came from the fact that some of our beagles given allogeneic marrow grafts survived to become excellent rabbit hounds. Progress on many fronts made it possible for several marrow transplant teams to attempt clinical application again by the end of the 1960s.

"In 1972, I wrote to my old friend Franz Inglefinger, editor of the *New England Journal of Medicine*, to criticize the quality of some articles that had been published in the journal. Franz responded with an eloquent dissertation about the variability of manuscript reviews presented to an editor by presumed experts in the field. Also, he invited me to submit an article on bone marrow transplantation for the Medical Progress section of the journal. I replied that I thought the time was not quite right. After some further correspondence we agreed on a submission date at the end of 1974 and in due time my colleagues and I submitted the article.

"In retrospect, the manuscript was a potpourri of topics including a brief history of the field, a review of the more significant advances based on work in animals, particularly the canine model, and a review of the developments that set the stage for marrow transplantation in man. Unlike most reviews, the article contained a great deal of clinical data and interpretation that had not been published previously.

"Because of all of these factors the article has provided a convenient reference for those who have subsequently written on the subject of marrow transplantation. Of even greater importance, perhaps, is the fact that this article appeared at that junction in time marking the emergence of marrow transplantation from an experimental laboratory procedure and/or a desperate clinical undertaking to an accepted form of therapy for selected patients with severe aplastic anemia or patients with acute leukemia who had failed combination chemotherapy. Indeed, many of the patients described in the article continue to be living and well and apparently cured of the disease.[2]

"At the time the article appeared, the Seattle Marrow Transplant Team had carried out 149 transplants. We have now done 1,179. There has been an impressive increase in the number of centers doing marrow transplants. Many problems still require solution, but investigations in many centers on the use of monoclonal antibodies, interferon, cyclosporin A, fractionated irradiation, and unrelated donors will undoubtedly provide insight into the basic principles of transplantation biology and will extend the success rate and the kinds of diseases that may benefit from marrow transplantation."

1. **Thomas E D, Lochte H L, Jr., Lu W C & Ferrebee J W.** Intravenous infusion of bone marrow in patients receiving radiation and chemotherapy. *N. Engl. J. Med.* 257:491-6, 1957.
2. **Thomas E D.** Bone marrow transplantation. (Burchenal J H & Oettgen H F, eds.) *Cancer: achievements, challenges, and prospects for the 1980s.* New York: Grune & Stratton, 1981. Vol. 2. p. 625-38.