LETTERS TO THE EDITOR

Canine and Rabbit Platelets Labeled with In-111 Oxine

Dr. Webber and colleagues in their Letter to the Editor (*1*) express doubt that the scintiphotographs shown by Knight et al. (*2*) represent localization of In-111-labeled platelets and not some other distribution of the In-111, since 95% of the In-111 platelets, which they labeled using our method (*3*), cleared from circulation within 10 min of administration.

In addition to the response to this letter by Welch et al. (*4*), we may state that since 1976 we have had extensive experience with labeled canine and rabbit platelets prepared by our initially described labeling procedure (*3*). At no time have we observed the early loss of labeled platelets from circulation reported by Webber et al. (*1*). To date we have completed two additional projects using In-111-labeled platelets. These involve (a) in vivo detection of experimental bacterial endocarditis (BE) in rabbits (*5*), and (b) in vivo detection of acute coronary artery thrombosis (CT) in dogs (*6*).

Pathogenesis of BE involves platelets and fibrin accumulation embedded in bacterial deposition adherent to damaged valvular endothelium. When platelets labeled with In-111 were administered to BE rabbits, images obtained at 24 hr after platelet injection showed only cardiac blood-pool activity with no valve localization. At 72 hr after injection, however, valvular lesions in all 17 animals were detectable by in vivo imaging. Histopathological examination of these lesions at 72 hr revealed bacteria as well as extensive platelet deposition. The radioactivity deposited in the lesion was 240 ± 41 times that in the normal myocardium. In this investigation two control groups were studied. The first consisted of healthy rabbits (n = 4) who received platelets labeled with In-111. Imaging of these animals showed only cardiac blood-pool activity. The second group of controls (n = 3) did have BE but received free In-111 oxine rather than labeled platelets. The in vivo cardiac images at 72 hr in this group also showed only cardiac blood-pool images, with no valve localization. The activity ratios for lesion-to-normal myocardium and lesion-to-blood in this group were only 1 ± 0.3 and 0.1 ± 0.04, respectively. The average in vivo survival time of In-111 platelets studied in three rabbits was 168 hr. This survival differs dramatically from that cited by Webber et al.

In an in vivo imaging study of acute canine coronary thrombosis (CT) (*6*), all scintigrams of 2-hr-old CT (n = 12) were positive. The clot accumulated 69 ± 10 times and 651 ± 135 times the radioactivity in equal weights of blood and myocardium, respectively. Histologically, extensive platelet aggregation in 2-hr-old thrombus was found. By 24 hr, intact platelets were no longer recognizable at the site of CT. In concordance, all animals (n = 4) who received In-111-labeled platelets 24 hr after induction of CT had negative scintigrams, and the clot accumulated only 1.4 ± 0.4 and 32 ± 10 times the radioactivity of equal weights of blood and myocardium, respectively.

We believe these data indicate that platelets labeled by our technique do localize in areas histologically proved to contain platelet aggregates. Furthermore, our control data indicate that In-111 oxine alone (or its degradation products) do not localize in the lesions studied. We have not seen platelets leave the circulation with the speed cited by Webber et al. (*1*), and would thus concur with Welch et al. (*4*) that it is probably not the labeling procedure per se, but other technical matters, that may be responsible for the results of Webber et al. (*1*).

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Reply

Drs. Thakur, Riba, Gottschalk, and Zaret in their letter dealing with indium-111-oxine labeling of canine and rabbit platelets take issue with our letter (*1*), which we submitted in response to the paper by Knight et al. (*2*). There is no doubt that Dr. Thakur has extensive experience with labeled platelets. Our work with labeled platelets was undertaken only to achieve results comparable with those described by Dr. Thakur's group and Dr. Knight's group. Our method in determining the platelet fraction recovered was based upon the reports of Harker (*3*) and Cohen (*4*). The method described by these authors is, to the best of our knowledge, accepted as a method of determining platelet survival using chromium-51 as a label. Our results are based on separation of the platelets from a blood sample, counting them, and estimating the amount of radiolabel on the platelets in the dog's entire circulation. An estimate of the total blood volume of the dog (*5*) was also used. The platelets were labeled in saline following the methods outlined in the paper by Thakur et al. (*6*). The only change was that a pre-prepared indium-111-oxine complex was obtained from Diagnostic Isotopes, New Jersey, instead of our preparing the complex.

In spite of the fact that our results are at variance with those described in the paper by Thakur et al. (*3*), it is our opinion that our results are valid and significant inasmuch as they represent a long-term effort to utilize the "In-oxine" method for the labeling of platelets. At least one other group has reported results similar