FREE COMMUNICATIONS I

Platelets: Clinical Disorders.


Patients with platelet storage pool disease have decreased numbers and contents (ATP, ADP, serotonin, calcium) of the dense granules. Our studies in 14 patients with this disorder suggest considerable clinical and biochemical heterogeneity. The most pronounced dense granule defect (lowest levels of ATP and ADP, undetectable serotonin) was found in the 5 patients with the Hermansky-Pudlak syndrome. One non-albinotic patient is unique in showing a decreased content of β-thromboglobulin (β-TG), platelet factor 4 (PF4), and the platelet growth factor (PGF) that stimulates the proliferation of cultured fibroblasts and arterial smooth muscle cells. Her platelets also contained a decreased number of α-granules in addition to decreased dense granules, suggesting that β-TG, PF4, and PGF are localized in specific α-granules which are morphologically related to dense granules. Another patient was unique in that ATP, epinephrine, and arachidonic acid evoked completely normal aggregation responses, associated with normal production of platelet malondialdehyde. Since his platelets were markedly deficient in ADP, these findings provide further evidence that ADP release is not an absolute requirement for "second phase" aggregation and that PGF2 or thromboxane A2 may directly aggregate platelets independent of ADP release. Variable defects in malondialdehyde production in other patients suggest further heterogeneity of the release defect in storage pool disease.


Prolonged incubation of Storage Pool Deficient (SPD) platelets with 14C-SHT is followed by abnormally rapid catabolism of the amine. When a 1:1 mixture of normal and SPD platelets was incubated with 14C-SHT each abnormal metabolism was not detectable due to the compensatory effect of normal platelets. SPD or normal platelets were incubated with 2 μM 14C-SHT for 5 minutes, washed and resuspended in buffer. Addition of 20 μM aspirin was followed by a rapid efflux from SPD platelets of 14C-SHT, which was not degraded. Normal platelets were not affected. In mixtures of normal and SPD platelets treated with aspirin the efflux of 14C-SHT was proportional to the SPD platelet fraction and still evident when only 50% of SPD platelets were present. In three non-typical cases of congenital SPD no metabolism of exogenous 14C-SHT was observed. In two of these, platelets incubated with 14C-SHT, washed and treated with aspirin, showed a rapid efflux of SHT, comparable to that seen in a 30% normal:70% abnormal mixture, suggesting that the defect only involves a part of the platelet population. In a third patient no efflux of 14C-SHT was seen after aspirin. Aspirin addition to platelets preincubated with 14C-SHT appears to be a good way of distinguishing among different types of SPD and of investigating the presence of a similar defect in acquired SPD in which only a part of the platelet population is likely to be involved.