FREE COMMUNICATIONS XVI
Platelets: Control and Interactions.

THE CONTROL OF PLATELET FUNCTION BY CYCLIC AMP AND THROMBOXANE SYNTHESIS. K.U. BANG,
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Platelet (P) levels of cyclic AMP (cAMP) and thromboxane (TX) synthesis have been identified
as major regulators of P aggregation and release. We have utilized as probes drugs which
either decrease TX synthesis by cyclooxygenase inhibition (aspirin and indomethacin) or which
increase P cAMP (adenosine, N6G; theophylline; isobutylmethylxanthine; and SH-809, a dipyrida-
mole analog) to evaluate relative contributions of cAMP and TX and their possible interactions
in mediating P function. Cyclooxygenase inhibitors at concentrations 0-10 fold lower than those
inhibiting P aggregation and release caused almost complete inhibition of TxB2 synthesis from
exogenous [14C]-arachidonic acid (a) and malonyldialdehyde (MDA) production in P stimulated by
thrombin (T) or N-acetylsalicylic acid (NSA). Drugs elevating P cAMP at concentrations equal to or
greater than those causing complete inhibition of P aggregation and release did not inhibit
TxB2 synthesis from exogenous [14C]-aa nor did they inhibit MDA production in P stimulated by
NDM or by concentrations of T sufficient to produce maximal TX synthesis. However, these drugs
variously inhibited MDA production when P were stimulated at lower T concentrations causing only
minor TX synthesis. Thus, elevated P cAMP did not inhibit TX synthesis from aa but appeared to
weakly inhibit as phospholipase. We conclude that TX synthesis cannot be the sole, final
mediator of P aggregation and release but that these events result from as yet unidentified
mechanisms modulated largely independently by TX synthesis and intra-P cAMP levels.

CALCIUM BINDING SITES IN HUMAN BLOOD PLATELETS. S. MAUTINGG.
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Extracellular calcium ions are required for platelets to aggregate in response to various
aggregating agents. Although magnesium ions can sometimes stimulate aggregation they only
so when a small amount of calcium is present. The calcium bound to native human
platelets suspended in buffered saline containing 0-200mM MgCl2 depends upon the
extracellular calcium concentration. Rebound analysis of the binding data suggests that
a few (0.8 x 10^9) relatively high affinity (K = 9x10^5) calcium binding sites are present
on each platelet. When 2.5mM MgCl2 is included in the saline suspensions the calcium
bound to the platelets is only released at the higher calcium concentrations. Magnesium
ions do not displace the tightly bound calcium. It is suggested that these specific
calcium binding sites are involved in platelet aggregation.