Craig M. Jackson, Frederick A. Dombrose, T. Roy Ittyerah, Sanford N. Gitel, Charles T. Esmon and John W. Suttie** (Washington Univ. Sch. of Med., St. Louis, MO. 63110 and * Univ. of Wisconsin, Madison, WIS. 53706): **Prothrombin Binding to Phospholipid Vesicle Surfaces and Phospholipid Acceleration of Prothrombin Activation. (196)**

Prothrombin binds to phospholipid vesicle surfaces via the Fragment 1 region of the prothrombin molecule. The physiological importance of the direct prothrombin binding to phospholipid has been demonstrated recently in comparative studies of the activation of bovine normal and abnormal (dicoumarol "induced") prothrombins (Esmon, C. T., Suttie, J. W. and Jackson, C. M., In Press). The binding of prothrombin and isolated Fragment 1 to vesicles composed of a variety of different phospholipids has been quantitatively investigated. From these studies it has been shown that prothrombin binding involves 20 ± 2 calcium ions and by comparison with the binding of calcium to prothrombin and Fragment 1 in free solution, this binding is consistent with association via calcium bridges between protein and lipid. Comparison of the ability of phospholipid to accelerate prothrombin activation with the affinity of prothrombin for particular phospholipid surfaces underlines the quantitative importance of the lipid-protein-calcium interaction in the activation process.

The *in vitro* acceleration of prothrombin activation by phospholipid surfaces which can be readily quantitated and related to protein binding to the surface provides a new set of criteria for quantitatively assessing the thrombogenicity of surfaces in general. Although providing a limited definition of and scale for thrombogenicity, the specificity of such assay provides a means by which the multiplicity of factors contributing to surface thrombogenicity may be better understood.

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H. C. Hemker, A. D. Muller and B. M. Bas (Medical Faculty Maastricht, Beeldsnijdersdreef 101, Maastricht): **The Reaction between Prothombin and Staphylocoagulase. (197)**

The reaction between prothrombin and staphylocoagulase is studied.

a. Optimal amounts of the active reaction product (coagulase-thrombin) are found when equimolar amounts of prothrombin and staphylocoagulase are added together.
b. The molecular weight of coagulase-thrombin equals the sum of the molecular weights of staphylocoagulase and prothrombin, both when estimated by gelfiltration and by SDS-polyacrylamide gel electrophoresis.
c. The amino acid composition of coagulase-thrombin is not in contrast with the sum of the amino acid compositions of staphylocoagulase and prothrombin.
d. In a preparation of coagulase-thrombin the N-terminal amino acids are those of prothrombin (alanine) and staphylocoagulase (aspartic acid).
e. An antibody against coagulase-thrombin precipitates both prothrombin and staphylocoagulase but not thrombin.
f. It is concluded that the thrombin acitivity in coagulase-thrombin is a result from a stoichiometric reaction between one molecule of prothrombin and one molecule of staphylocoagulase and that limited proteolysis does not play a role in this mechanism.

John W. Suttie, Charles T. Esmon, Gregory A. Grant and James A. Sadowski (University of Wisconsin, Madison, Wisconsin 53706): **In Vitro Prothrombin Synthesis – The Vitamin K-Dependent Carboxylation of a Prothrombin Precursor. (198)**

Prothrombin is synthesized from a liver microsomal precursor which has now been characterized. The precursor contains functionally active thrombin and can be degraded by thrombin, Xa, or snake venoms to yield products which appear to be identical to those obtained from prothrombin. The molecular weight and amino acid composition of the precursor are similar or identical to prothrombin, but it lacks the calcium-binding sites needed for (Ca^{++}, phospholipid) accelerated activation. In the presence of added vitamin