

## SPECIAL REPORT

# The Nomenclature of Blood Clotting Factors

IRVING S. WRIGHT, M.D., *New York*

Chairman, International Committee for the Nomenclature  
of Blood Clotting Factors\*

IN 1954, the International Committee for the Nomenclature of Blood Clotting Factors was established with one of its primary objectives the development of a common scientific terminology in this field. At that time, the situation was chaotic, with most of the factors being referred to in the literature by multiple, often totally unrelated names—14 different terms were used for one of them. The Committee is composed of 23 members from 15 countries, all of whom have played significant roles in the discovery or application of knowledge regarding these factors. After four years of deliberations the first report was issued which recommended that Roman numerals should be used for the designation of those factors which, in the opinion of the Committee, were sufficiently defined as distinct entities by physiopathological, physical, biochemical and chemical properties. It was also agreed that an author could, if he so desired, use a synonymous term in parenthesis following the Roman numeral.

In its deliberations and decisions regarding the appropriateness of designating a factor by a Roman numeral as a distinct entity, the Committee held the following criteria to be determinant: (1) A factor in question should be considered to be distinct from other known coagulation factors on the basis of several physico-chemical properties, such as stability on storage, adsorbability by various agents, heat inactivation, stability to variations in pH, separability by conventional plasma fractionation methods, together with electrophoretic, chromatographic, and centrifugal techniques; (2) the existence of pathologic states associated with abnormalities in the clotting mechanism, referable to abnormal activities of the entity in question; (3) availability of adequate assay methods.

As previously reported, the Factors I through IX were officially approved at the Rome meeting in 1957. Factor X was approved in Montreux in 1959. The widespread adoption and utilization of this terminology in the world scientific literature demonstrated the need and desirability of this approach. Two additional years were devoted to the accumulation and analysis of data regarding the plasma thromboplastin antecedent (PTA) and

the Hageman Factors. After careful consideration of available data, the Committee voted (Wiesbaden, September 1961) that the PTA and Hageman Factors, as they exist in native plasma, should be considered distinct clotting entities and as such should be assigned Roman numerals. For PTA, the designation was Factor XI, and for Hageman Factor, Factor XII.

To date, therefore, the recommendations of the Committee are that the following terms be used for the designated blood clotting factors.

- Factor I (Fibrinogen)
- Factor II (Prothrombin)
- Factor III (Thromboplastin)
- Factor IV (Calcium)
- Factor V (Ac-Globulin, proaccelerin, labile factor)
- Factor VII (Proconvertin, Spca)
- Factor VIII (Antihemophilic Factor)
- Factor IX (Plasma thromboplastin component—PTC)
- Factor X (Stuart-Prower Factor)
- Factor XI (Plasma thromboplastin antecedent—PTA)
- Factor XII (Hageman Factor)

The Committee is continuing its evaluation of evidence regarding additional factors which may be added to this list if the criteria above listed are met. At the same time, the Committee is fully aware of the dangers of solidification of concept and the desirability for change if new evidence warrants it. For the benefit of investigators, teachers, clinicians, and students alike, it is hoped that this universal terminology will be even more widely accepted and utilized.

Details regarding the references and data may be found in the Transactions of the Committee meetings published as supplements in *Thrombosis et Hemorrhagica Diathesis*, 1958, 1959, 1960 (in press), and 1961 (in press).

### *Members of the International Committee for the Nomenclature of Blood Clotting Factors*

- T. ABE, Tokyo, Japan
- B. ALEXANDER, Boston, Mass., U.S.A.
- T. ASTRUP, Washington, D.C., U.S.A.
- K. BRINKHOUS, Chapel Hill, N.C., U.S.A.
- P. DE NICOLA, Pavia, Italy
- E. DEUTSCHE, Vienna, Austria
- P. FANTL, Melbourne, Australia

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R. HUNTER, Dundee, Scotland  
 L. B. JQUES, Saskatoon, Sask., Canada  
 E. JORPES, Stockholm, Sweden  
 F. KOLLER, Zurich, Switzerland  
 K. LENGGENHAGER, Berne, Switzerland  
 R. G. MACFARLANE, Oxford, England  
 W. MERZ, Lausanne, Switzerland  
 P. OWREN, Oslo, Norway  
 A. PAVLOVSKY, Buenos Aires, Argentina, S.A.

A. QUICK, Milwaukee, Wisc., U.S.A.  
 O. RATNOFF, Cleveland, Ohio, U.S.A.  
 L. ROKA, Frankfurt, Germany  
 W. SEEGER, Detroit, Mich., U.S.A.  
 J. P. SOULIER, Paris, France  
 M. VERSTRAETE, Louvain, Belgium  
 I. S. WRIGHT, New York, U.S.A.  
 IRVING S. WRIGHT, Chairman,  
 New York

## CASE REPORTS

# Cardiac Arrest Induced by Drowning: Attempted Resuscitation by External and Internal Cardiac Massage

K. R. MIDDLETON, M.B., Ch.B., *White Rock, B.C.*

LATE one afternoon in the summer of 1961, an urgent summons was received to go to the beach because of a drowning incident. On arrival there, a 4-year-old boy was found, who was being given very efficient mouth-to-mouth breathing by a local fire department chief. A quick examination revealed no vital signs present, and the boy's colour was greyish-blue.

Two ambulance men, who had also been called, were asked to elevate the legs, and external cardiac massage was begun at 80/min. Within about one to two minutes the patient's colour improved, and the eyes, which had been widely dilated, began to contract. A bystander was dispatched to summon a power-boat, as this particular part of the beach was inaccessible to the ambulance, while another was asked to phone the hospital and tell them to prepare for the arrival of an emergency case of drowning who was to have a thoracotomy on admission.

Transfer of the patient from the sand on to the stretcher, and thence into the power-boat, was accomplished without stopping ventilating or external cardiac massage for more than five seconds. On arrival at a point where the ambulance could get to within 50 yards of the water, transfer from the boat to the ambulance was effected while both of the life-saving procedures were continued; and also on the five- to 10-minute journey to the hospital.

On reaching the emergency department, external cardiac massage was taken over by an assistant while the patient was rapidly and easily intubated, connected to the anesthetic machine and given 100% oxygen.

By this time, in answer to an urgent call, another local physician arrived and undertook "bagging the patient".

A rapid incision was made in the 4th left interspace and extended to the mid-axillary line. The hand was

inserted into the chest, and the heart was pumped at about 70/minute.

A thoracic surgeon from a nearby city was summoned while these procedures were being accomplished. Shortly after his arrival he opened the pericardium and noted that the heart was in a state of ventricular fibrillation. As no defibrillator was in the hospital, the aid of the local R.C.M.P. was obtained to get one from the nearest hospital equipped with one. This took about 30 minutes.

During this period the child's colour was satisfactory, the pupils were moderately well contracted, and a peripheral pulse was palpable.

About 0.5 ml. of 1:1000 adrenaline was injected into the left ventricle in an attempt to improve myocardial tone some 10 minutes before the arrival of the defibrillator, and about this time it was decided to use hypothermia. This was accomplished by means of ice cubes in polyethylene bags packed between the legs and over the lower abdomen.

With the arrival of the defibrillator, little time was lost in applying the electrodes to the heart. The interval timer was set at 0.5 second and the current at 1.0 amp. Two countershocks were given, separated by a couple of seconds. The heart gave a convulsive heave and resumed its fibrillation, so that cardiac massage was restarted.

About five minutes later this procedure was repeated, and this time the heart assumed normal rhythm, but was beating about 40-50/minute, and after five to 10 minutes its beat began to fail, so that cardiac massage was again resorted to.

Cardiac massage was performed for a total of 7½ hours. This period includes both external and internal cardiac massage. During most of this time the patient's colour was good, and the pupils, which were widely dilated when first seen, had become smaller. Our hopes were further sustained by the fact that, on a number of occasions, normal rhythm was maintained for perhaps 10 minutes before the beat again failed.