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Tentative and Updated Classification of Factor X Variants

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Recent studies from several laboratories seem to justify the proposal of a tentative updated classification of congenital factor X defects [2,4, 11,15].

Factor X deficiency was first described in 1956–1957 [1, 13, 17]. Since that time, several variants have been described. The factor X Friuli abnormality appears to be the most important and the most extensively studied [5–8].

Recently, a peculiar factor X defect with a normal partial thromboplastin time (PTT) was described both sporadically [2, 15] and on a congenital basis [11].

Factor X level, by extrinsic system, was 4.2% in the patient presented by Nora et al. [15], 2–3% in the patient seen by Bertina [2] and 26–34% in the family studied by us [11]. This indicates that the abnormality responsible for the peculiar activation pattern with a defect only in the extrinsic system may present itself in different forms, severe or moderate. Unfortunately, no immunological assay is reported for the patient by Nora et al. [15], and this makes a sure classification impossible [4, 8].

The patient presented by Bertina et al. [2] showed an antigen level of 50% of normal. Factor X Padua patients show a level of 100% of normal. It is important that abnormal factor X with peculiar activation pattern be recognized. The description of this peculiar type of factor X deficiency (abnormality limited to the extrinsic system) has considerably complicated the differential diagnosis of factor VII and X deficiencies and abnormalities. In the past it was thought that an abnormal RVV clotting time could discriminate between factor X and VII deficiency. This was demonstrated not to be true by us in 1969 [5] and 1970 [6]. Factor X Friuli in fact may be normally activated by RVV [5]. It has also to be remembered that a factor X abnormality with prolonged PTT and normal PT has been described [16]. The great heterogeneity of factor X defect is further emphasized by the recent discovery of an additional congenital factor X variant (factor Padua2) [12]. In this variant, there is a discrepancy between the levels of factor X obtained by clotting assays and those seen by amidolytic assays. It Table I. Behavior of factor X assays in congenital factor X abnormalities so far described

Condition

Tissue

RVV cephalin

Cephalin

Chromogenic

Immunological

thromboplastins (extrinsic)
(RVV)
(intrinsic)

assay
Classical factor X deficiency

(Mr. Stuart) [1,13]

low

low

low

low

low

Miss Prower defect [3]

low

low

low

?

normal

Factor X Friuli defect

(Mrs. Minin)[6,7,9,10]

low

normal

low

low

normal

Factor X Melbourne [16]

normal

normal

low

9

normal

Factor X Padua [11] (Leiden?)

low

normal

normal

low

normal
 Factor X Padua [12]
 low
 low
 low
 lower than clotting assays
 normal
 Factor X Red [2]
 low
 low
 low
 9
 variably reduced, but higher than clotting counterpart
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may be useful to summarize in the following table (table 1) the factor X variants so far described. Other variants may exist, as suggested by the description of another patient presented in a preliminary manner [14] and by other studies [4].

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