**Abstract**

Factor VIII is connected to the hereditary bleeding disorder hemophilia. People with hemophilia may have absent or dysfunctional Factor VIII, a clotting protein. Factor VIII travels with Von Willebrand factor (VWF) through the bloodstream and is activated when a blood vessel is broken. Factor VIII is a key component in the blood coagulation process. It is activated by thrombin, but only activated because the B domain is clipped. A lack of healthy factor VIII results in symptoms such as swelling in the joints and hemorrhaging. Treatment includes blood transfusions and soon gene therapy.

**Hemophilia A**

- Chromosomal X-linked hereditary bleeding disorder caused by defects in blood coagulation protein factor VIII.
- Hemophilia affects 1 in 5,000 to 10,000 males.
- Symptoms include:
  - Internal bleeding
  - Excessive bleeding from wounds
  - Swelling in joints
  - Easy bruising
- Severity of the disease:
  - Life-threatening to mild, depending on the particular mutation inherited.

**Role in the Coagulation Pathway**

- A healthy body must have the right amount of Factor VIII in the bloodstream.
  - Too little (<35%) causes Hemophilia
  - Too much can cause strokes and heart attacks.
- Factor VIII functions as an activator of Factor X.
  - Factor X converts Prothrombin into Thrombin.
- The half-life of Factor VIII is 8-12 hours.

**Mutations**

<table>
<thead>
<tr>
<th>Mutation Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missense</td>
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<tr>
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<tr>
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</tbody>
</table>

**Domain Structure of Factor VIII**

- Factor VIII has six domains: A1, A2, A3, B, C1 and C2
- The C2 domain binds with the platelet membrane during coagulation.
- The B domain function is unknown, but it may work to regulate the amount of factor VIII produced.
- A1 domain binds with factor IX.

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**Conclusion**

We have this information about factor VIII, but there is still a lot we don’t know about it, such as where in the body it is made, what the specific functions are for each domain and why it travels with VWF. By modeling and continuous research we can build on what we already know.

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