Erythrocyte polyagglutination is a condition in which red blood cells agglutinate when tested against sera from most normal, ABO compatible donors, while not being agglutinated by the patient’s own serum. There are two primary categories of polyagglutination: acquired and inherited. The acquired forms can be further classified as microbial or non-microbial. Microbial polyagglutination is relatively transient and is caused by the action of microbial enzymes on red cell surface oligosaccharides (T, Tk). Non-microbial polyagglutination is more persistent and is associated with a hematologic disorder (Tn). There are several forms of inherited polyagglutination, one being a strong expression of Sd” on red blood cells (Cad).

The different forms of polyagglutination (except possibly Cad) share a fact that hidden receptors (“crypt” antigens) on the red blood cell surface are exposed. Most normal adult sera contain antibodies directed against these hidden receptors, causing the cells to agglutinate. This may lead to the possibility of false blood grouping reactions with reagents prepared from human source material.

Principle of the Procedure:
Certain lectins have demonstrated the ability to agglutinate specific classes of polyagglutinable red blood cells. When polyagglutinable red cells are tested with the kit lectins, a presumptive identification of the form of polyagglutination can be determined based on the pattern of reactivity.

Reagent Description:
The HBS-Lectin Kit is made up of four lectin preparations from seeds: *Arachis hypogaea*, *Salvia sclarea*, *Dolichos biflorus* and *Glycine soja*. Each lectin is diluted for optimal specificity against red blood cells demonstrating the different forms of polyagglutinability.

*Dolichos biflorus* reacts with red cells that are Group A, or A,B.C.

The reagent contains 0.1% (w/v) sodium azide.

The format for the expiration date is expressed as YYYY-MM-DD (year-month-day). Lot number and expiration date information is provided on the vial.

Lectins are clarified by filtration, but may become turbid over time due to lipid precipitation. The lectin may also become darker in color. These are not indications of diminished potency or specificity.

Precautions
1. This reagent contains 0.1% (w/v) sodium azide which is below the national and international regulatory thresholds and when used under a normal condition is not chemically hazardous. If this reagent is discarded in the sink, flush with large volumes of water to prevent the buildup of azide.
2. The Packaging of This Product Contains Dry Natural Rubber.
3. This reagent is for in vitro diagnostic use.
4. This reagent is designed to be used by operators trained in serological techniques.

Storage
The reagent should be stored at 2-8°C. Do not freeze or expose to elevated temperatures.

Specimen Collection:
No special preparation of the patient is required prior to specimen collection. Blood specimen should be collected using an acceptable phlebotomy technique. Red cells obtained from a fully clotted specimen or anticoagulated plasma can be used. Testing should be performed as soon as possible following collection to minimize the chance that falsely positive or falsely negative reactions will be encountered due to contamination or improper storage of the specimen. Samples that cannot be tested immediately should be stored at 2-8°C as soon as possible.

Procedure:

Materials Provided
Hemo bioscience Lectin Kit

Materials Required But Not Provided
Test Tubes
Centrifuge (1000 rcf)
Phosphate Buffered Saline (PBS)
Pipettes
Timer

Recommended Technique:
1. Label four test tubes for each red blood cell suspension to be tested.
2. Place two drops of each lectin into the appropriately labeled test tubes.
3. Add one drop of an approximate 3-5% suspension of red blood cells to be tested, washed at least once and resuspended in PBS.
4. Mix thoroughly by shaking the tube and incubate for 10 minutes at room temperature (23°C ± 3°C).
5. Centrifuge at 1000 rcf (g) for 15 seconds or a time and speed appropriate for the centrifuge used.
6. Resuspend by shaking gently.
7. Read macroscopically for agglutination and record test results.
Microscopic reading of test results is not recommended.

NOTE: Final test results must be interpreted immediately upon centrifugation and resuspension.

Interpretation of Results:

Positive Test
Agglutination of the red blood cells.

Negative Test
No agglutination of the red blood cells.

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Confirmatory tests should be performed.

Results of testing with these lectins are intended to allow for a biflorus *G. hypogea.* Refer to Table 1: Reactivity patterns of red blood cells representing the different forms of polyagglutinability when tested with selected lectins.

*Group O, B or A2 only. Red cells that are Group A2 will react with Dolichos biflorus.*

## Table 1: Reactivity patterns of red blood cells representing the different forms of polyagglutinability when tested with selected lectins.

<table>
<thead>
<tr>
<th>Lectin</th>
<th>Normal Cells</th>
<th>Polyagglutinable Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arachis hypogea</td>
<td>0</td>
<td>Cad+ Tn+ T+ Tk+</td>
</tr>
<tr>
<td>Salvia sclarea</td>
<td>0</td>
<td>0 0 + +</td>
</tr>
<tr>
<td>Dolichos biflorus*</td>
<td>0</td>
<td>+ 0 + +</td>
</tr>
<tr>
<td>Glycine soja</td>
<td>0</td>
<td>+ /0 + +</td>
</tr>
</tbody>
</table>

Table 1: Reactivity patterns of red blood cells representing the different forms of polyagglutinability when tested with selected lectins.

### Additional testing that may be performed to confirm (Table 2):

1. Confirm the absence of agglutinins specific to the suspected form of polyagglutination from the patient’s serum.
2. Absorption of a normal adult serum to confirm that the patient’s red blood cells specifically remove agglutinins for the suspected form of polyagglutination.
3. Test polyagglutinable cells to determine whether or not the membrane sialic acid level is diminished. The *Glycine soja* lectin is used for this purpose; T-transformed red blood cells are agglutinated and Tk-transformed red blood cells are not agglutinated, since T-transformation is associated with a reduction of sialic acid level. However, the reactivity of Cad red blood cells with *Glycine soja* can not be explained, since Cad+ cells are not associated with a reduction of sialic acid. This can be confirmed using Polybrene [12]. Normal red blood cells are aggregated and sialic acid deficient red blood cells are not when incubated for 5 minutes at room temperature with a 1% solution of Polybrene.
4. Observe the effect of treating the red blood cells with a proteolytic enzyme (i.e. ficin or papain). The Tk receptor is enhanced by enzyme treatment while the T receptor is damaged. Another form of polyagglutination (Th) has been described which, like T and Tk, reacts with *Arachis hypogea,* but in Th cells, this reactivity is diminished significantly by enzyme treatment. Th cells react weakly or are nonreactive with *Glycine soja.*
5. An anti-H reagent can be used to measure H antigen reactivity; Tk polyagglutination is associated with a reduction in H antigen reactivity. Another form of polyagglutination (VA) may also be associated with H antigen depression. VA red blood cells are nonreactive when tested with *Arachis hypogea,* *Salvia sclarea* and *Glycine soja.*

### Table 2: Expected results of confirmatory testing

<table>
<thead>
<tr>
<th>Lectin</th>
<th>Cad+</th>
<th>Tn+</th>
<th>T+</th>
<th>Tk+</th>
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<tbody>
<tr>
<td>H Antigen</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>↓</td>
</tr>
<tr>
<td>Polybrene solution</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Proteolytic enzymes</td>
<td>Normal</td>
<td>Normal</td>
<td>↓</td>
<td>1</td>
</tr>
<tr>
<td>Most normal sera</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 2: Expected results of confirmatory testing

### Quality Control

Positive control cells are typically not readily available. If desired, T and Tk cells can be prepared [8]. Positive control cells for the *Glycine Soja* lectin can be prepared by treating normal adult red blood cells with ficin. Normal red blood cells (or commercial reagent red blood cells) may be used as negative controls.

### Limitations:

1. **Dolichos biflorus will react with cells that are Group A1 and A2B.**
2. The strength of reactivity with the lectins will depend on the degree to which red blood cells have been transformed.
3. Red blood cells may simultaneously exhibit more than one form of polyagglutinability, which could result in a pattern of reactivity with the lectins which does not allow for presumptive identification.
4. Additional forms of polyagglutinability may exist whereby the red blood cells are not agglutinated by these lectins yet are agglutinated when tested with fresh normal adult sera.
5. Since some forms of polyagglutinability are transient, uniform reactivity and patterns may not be observed when testing samples collected from the same patient on different occasions.

### Bibliography:


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**Glossary of Symbols:**

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</tr>
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<tr>
<td><img src="image7" alt="Caution, consult documents" /></td>
<td>Caution, consult documents.</td>
</tr>
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