

<p><a href="#">TED Talk - How Do Blood Transfusions Work?</a></p> <p>Question: How do blood transfusions work?</p>	<p>Brandon Sharp</p> <p>August 18, 2020</p> <p>p.1</p>
<p><b>Antigen – Foreign body that causes an immune response</b></p> <ul style="list-style-type: none"> <li>• William Halstead performed one of the first known successful blood transfusions on his sister in 1881.</li> <li>• 1667 – Jean Baptist Denis performed a cross-species transfusion of sheep's blood on a human suffering from psychosis.</li> <li>• The second injection caused a severe immune response resulting in fever, back pain, burning in the arm, and thick, black urine.</li> <li>• Blood types must match for a transfusion to be successful</li> <li>• Antibodies will recognize foreign proteins from mismatched blood types (antigens) and target them for destruction.</li> <li>• Antibodies/antigens bind and are expelled in the urine.</li> <li>• Severe clots can cause death</li> <li>• 1901 – Discovery of blood types.</li> <li>• 1907 – Blood samples were mixed prior to transfusion to check for clotting.</li> <li>• 1914 – Sodium Citrate removes calcium from blood and allows for storage.</li> <li>• 1916 – Heparin invented (modern anticoagulant).</li> </ul>	<ul style="list-style-type: none"> <li>• William Halsted 1881</li> <li>• Sister bleeding severely after childbirth, William injected his own blood</li> <li>• Successful</li> <li>• 1667 – Jean Baptist Denis injected sheep's blood into a human</li> <li>• Treatment for psychosis?</li> <li>• 1<sup>st</sup> good</li> <li>• 2<sup>nd</sup> bad</li> <li>• Fever, back pain, burning in arm, thick, black urine = immune response</li> <li>• Antibodies recognize antigens (proteins)</li> <li>• Antibodies bind to antigens = clot</li> <li>• Expelled in urine</li> <li>• Can cause fatal clotting</li> <li>• 1901 – Discovery of blood types</li> <li>• Different types clot same don't</li> <li>• 1907 – Blood mixed before transfusion, checks for clotting</li> <li>• Direct person-to-person only – no air</li> <li>• Air contact = rapid clotting</li> <li>• 1914 – Sodium citrate = anti coagulant, allows storage, no clots</li> <li>• 1916 – Heparin, modern anti-coagulant</li> <li>• Better, deactivated clotting enzymes</li> <li>• WW1 – Heparin and storage device allowed storage for medics</li> <li>• Inspired modern blood banks</li> </ul>
<ul style="list-style-type: none"> <li>• Transfusions will only be successful if blood types match to prevent a dangerous immune system response.</li> <li>• Antibodies recognize antigens and attempt to destroy them by binding with them and expelling them through the urine. Severe clotting can cause death</li> <li>• The invention of Heparin allowed for long term storage of blood and the creation of modern blood banks.</li> </ul>	

