

An exploration of germ-line engineering as a mechanism

[Engineering](#)



**ASSIGN
BUSTER**

All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials. J. S. Tenement A. G. Mikes Preface and Acknowledgments This solution manual is an accompaniment to Bimetallism: The Intersection of Biology and Materials Science by J. S. Tenement and A. G. Mikes (Pearson Prentice Hall, Upper Saddle River, 2008) intended for educators only. It contains the end-of-chapter problems written in this textbook and their solutions.

It is important to indicate that the answers to the problems were formulated taking into consideration the material covered up to that point in the textbook. We would like to express our gratitude to the following two individuals for their valuable assistance in the preparation of the solution manual: Mark Sewerage, Ph. D. (Rice University), who wrote the end-of-chapter problems and prepared the first draft of their solutions, and Lead Clouds, M. S. (Rice University), who contributed to the solutions of the problems and edited the manual to its final version.

Moreover, we would like to acknowledge the Rice Leistering students in the BIO 370: Bimetallism class in the Fall 2007, and especially Shannon Moore, and Maude Rowland, a teaching assistant in that class, for their comments which contributed to the completion Of the solution manual. J. S. Tenement A. G. Mikes February 2008 This work is protected by united States copyright laws and is provided solely World Wide Web) will destroy the integrity of the work and is not permitted. Chapter 1 1. One common biomedical application is the construction of an arterial graft, a device that replaces a section of an artery. An artery is a flexible blood vessel that can withstand varying <https://assignbuster.com/an-exploration-of-germ-line-engineering-as-a-mechanism/>

pressures and regulates the flow of blood. Arteries also provide a smooth interior surface to inhibit blood clotting within the vessel. A. You need to design a vascular graft. List some advantages and disadvantages with each of the three major types of bimetallism. Which would you choose for this application?

Answer: Advantage Ceramics Strong Strong Easy to shape Inexpensive and available Polymers Can be flexible, smooth Metals Disadvantage Rigid Brittle Inflexible A polymer would be more suitable for the vascular graft application, since neither metals nor ceramics offer the necessary elasticity.

B. What specific material characteristics need to be considered for the arterial graft application? Answer: Flexibility is very important, and the material should also possess a certain tensile strength.

The surface properties of the material like smoothness and hydrophobic must be also considered in terms of its ability to support adhesion of endothelial cells or not cause damage to platelets. Moreover, the material should be easy to shape. C. Would you use a natural or synthetic material for this application? What are the advantages and disadvantages of each?

Answer: A natural polymer would be more likely to integrate into the surrounding tissue. However, natural polymers may not possess the necessary mechanical properties for this application.