

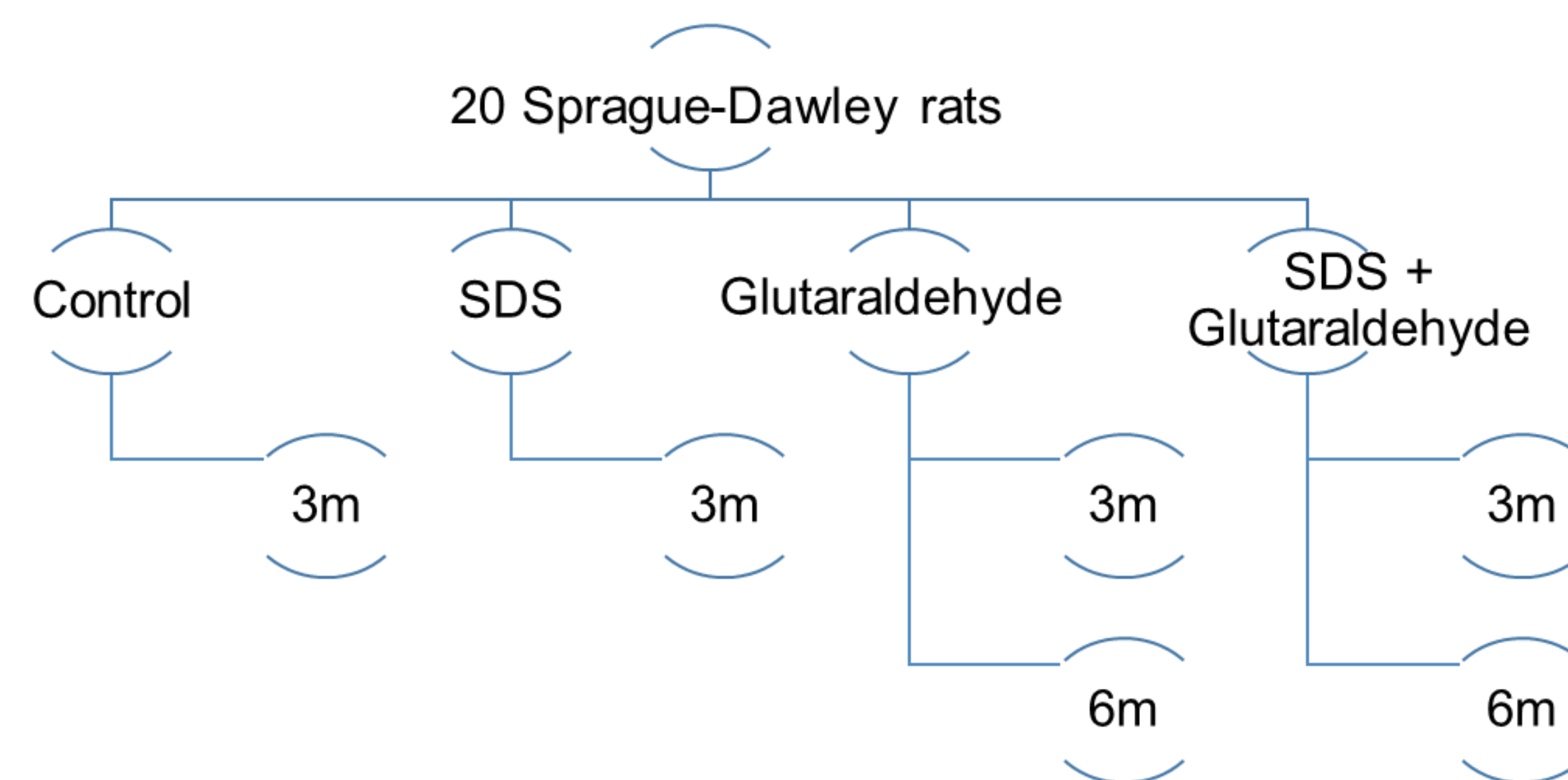
The Human Umbilical Artery as a Source of Vascular Grafts for CABG

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BACKGROUND

- For more than 50 years, scientists have worked on developing vascular grafts for use for coronary artery bypass grafts (CABG).
- The only durable and available conduits for CABG are autologous saphenous veins, internal mammary arteries and radial arteries.
- Issues in these small-diameter grafts often lead to thrombosis.
- These issues, and the obvious importance of finding a stable, long-lasting vascular conduit small enough to be useful for CABG, led us to study the possibility of using human umbilical artery (HUA) segments for these applications.

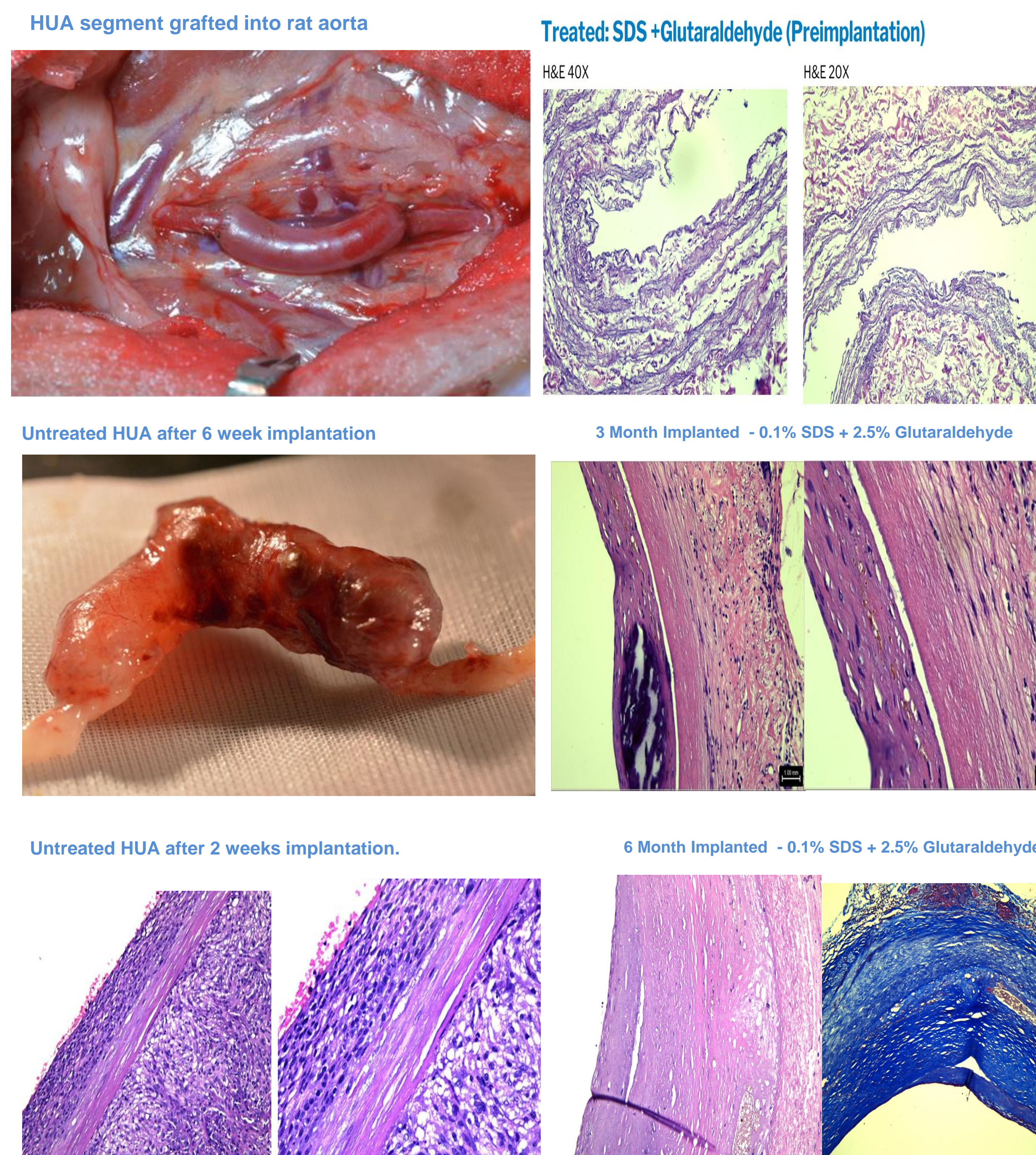
DESIGN



- HUA grafts on 20 Sprague-Dawley rats
- Using no pretreatment, or one of several pretreatment cocktails including various fixatives, decellularizing agents, nucleases, proteases and alcohols, at varying concentrations
- Periods of time from 1 week to 6 months and involving sacrifice, SCG retrieval, preparation for histological staining and microscopic examination

INTERVENTION AND IMPACT

- Study the question of how to treat non-autologous vessels for implantation such that they are less “visible” to the immune system
- We have a model in which human umbilical artery segments are grafted into rats: infra-renal inter-positional aorta grafts with no treatment or after subjecting the veins to various treatments intended to extend patency.
- Reverse xenograft model accelerates the rate of failure due to the extreme difference in species biomarkers.



RESULTS

- Data from our lab shows a strong immune reaction to the implantation of HUA, as expected.
- Control rats (HUAs with no pretreatment), show serious degradation as early as 6 weeks after grafting.
- All the pretreated vessels appeared superior to controls, with some demonstrating minimal intimal hyperplasia out to the longest time points tested.

CONCLUSION

- We have successfully tested the hypothesis that human HUA grafts can be subjected to pre-treatment such that when they are implanted into rats, they will retain greater patency and have improved histological and physiological performance at 3 and 6 months compared to controls.
- 9 month HUA grafts are currently being studied
- This research has significant implications for graft patency and retention in CABG and other clinical applications.
- In the next phase of the experiment we will repeat the program with immunocompromised rats

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