EULERIAN-BASED WALL SHEAR STRESS TOPOLOGICAL SKELETON AS A TEMPLATE OF NEAR-WALL MASS TRANSPORT IN ARTERIES

hemodynamics (TAWSS10, OSI90, RRT90) were identified, and their co-localization was quantified [3].

Results

DIV_W and LDL luminal distributions are provided in Fig. 1. WSS contraction/expansion regions are coloured in blue/red (negative/positive DIV_W, Fig. 1A). A marked co-occurrence of WSS contraction regions and LDL concentration polarization on the vessels wall clearly emerges. These observations are confirmed by quantitative analysis (Fig. 1C), reporting that WSS contraction regions co-localize with high LDL concentration regions at least the 40% more than canonical WSS-based descriptors.

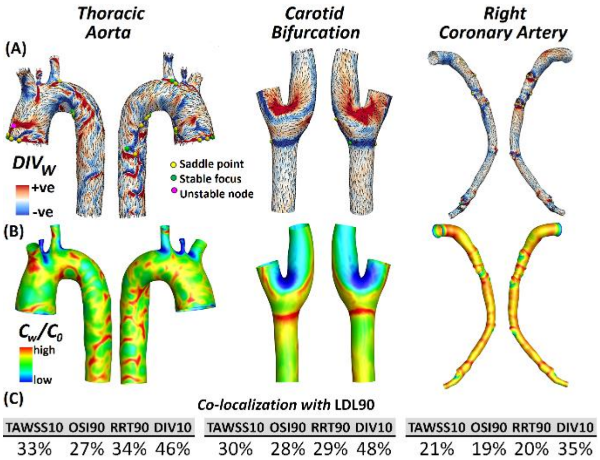

Figure 1: A) Cycle-average WSS TS. B) LDL wall concentration. C) SAs co-localization.

Discussion

Our findings clearly indicate that the Eulerian-based method for analysing the WSS TS [5] provides an effective template of WSS manifolds, which in turn co-localize with LDL polarization areas at the luminal surface. This means that the DIV10-based approach: (1) identifies high LDL polarization areas at the luminal surface better than canonical WSS-based descriptors; (2) reduces computational costs and methodological complexity with respect to classical mass transport simulations.

References

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