

Executive Summary

1

This final report on the TRF senior research scholar project entitled "Molecular Study of Natural Rubber Latex for Industrial Applications" includes several new findings related to latex allergen, a practical biotech application of high-value latex biochemical and basic knowledge on rubber biosynthesis. Accordingly, a new hydrophobic allergen was identified. An efficient procedure for large scale preparation of *Hevea* protease inhibitor (HPI), having anti-HBV and anti-gingipain activities with potential biotech applications, from fresh latex was established. The formerly proposed thread-like tubular reticulum, connecting rubber particles to a single-(lutoid) and double-(Frey-Wyssling, FW) membrane bound organelles/ particles, as a site of rubber biosynthesis (RB) in latex vessel by Southorn (1961) was confirmed from our RB polymerizing enzyme study. FW particles were accordingly suggested to be involved in the initiation, lutoids in the early elongation and rubber particles in the late elongation of the consecutive steps in RB. Moreover, the FW was confirmed to be plastid by successful isolation of cDNA clones encoding plastidic enzymes, 1-deoxy-D-xylulose-5-phosphate reductoisomerase and solanesyl diphosphate synthase, from the *Hevea* latex.