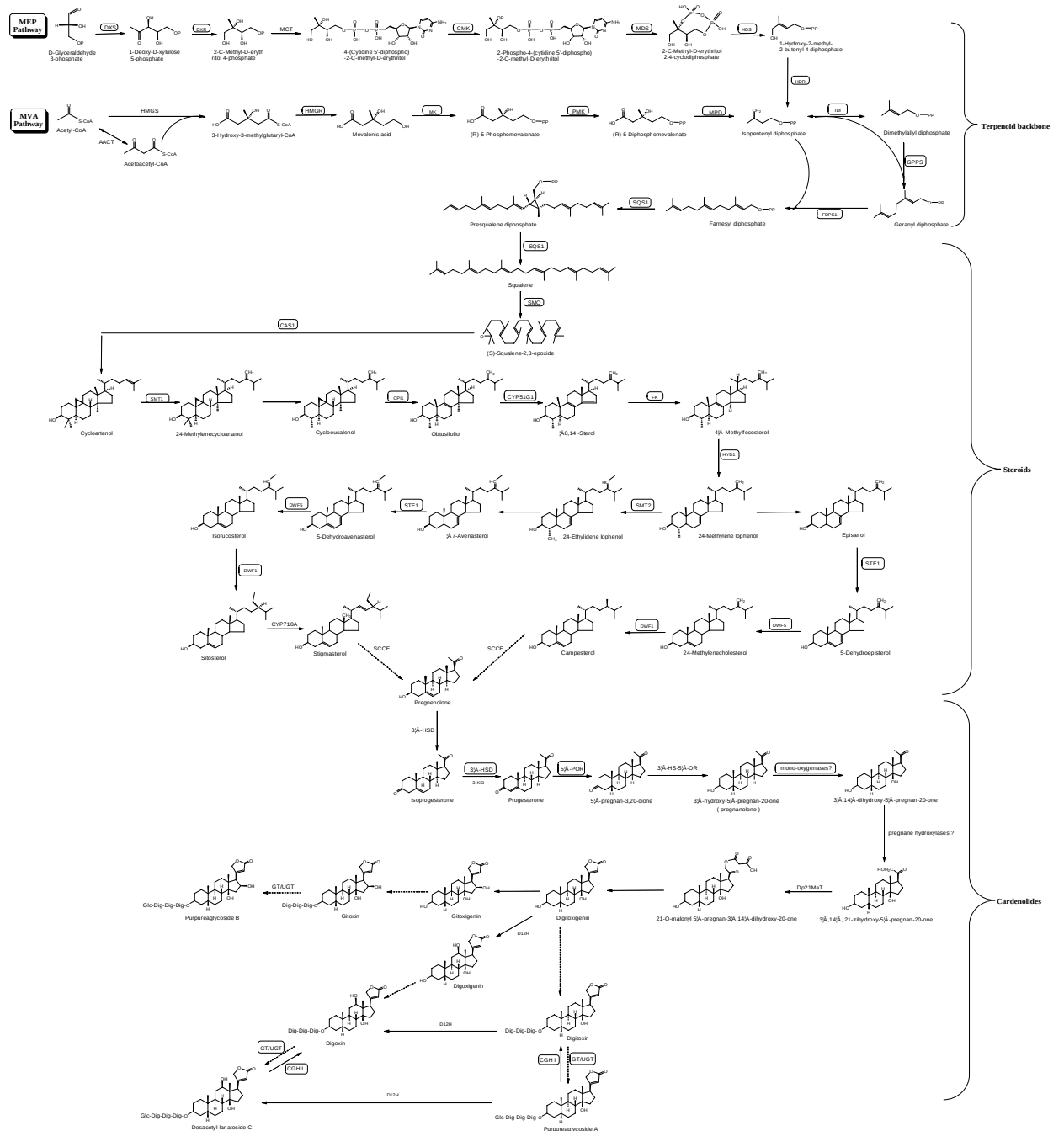




Additional file 8. The putative biosynthetic pathway of cardiac glycosides in *Digitalis Purpurea*.

The pathway roughly comprises terpenoid backbone biosynthesis, steroid biosynthesis and cardenolide biosynthesis three stages. The enzymes with corresponding unigenes are framed. Abbreviation: DXS, 1-deoxy-D-xylulose-5-phosphate synthase; DXR, 1-deoxy-D-xylulose-5-phosphate reductoisomerase; MCT, 2-C-methyl-D-erythritol 4-phosphate cytidyltransferase; CMK, 4-diphosphocytidyl-2-C-methyl-D-erythritol kinase; MDS, 2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase; HDS, 4-hydroxy-3-methylbut-2-en-1-yl diphosphate synthase; HDR, 4-hydroxy-3-methylbut-2-en-1-yl diphosphate reductase; AACT, acetyl-CoA C-acetyltransferase; HMGS, hydroxymethylglutaryl-CoA synthase; HMGR, hydroxymethylglutaryl-CoA reductase; MK, mevalonate kinase; PMK, phosphomevalonate kinase; MPD, diphosphomevalonate decarboxylase;

IDI, isopentenyl-diphosphate delta-isomerase; GGPPS1, geranylgeranyl pyrophosphate synthase 1; FDPS1, farnesyl diphosphate synthase 1; SQS1, squalene synthase 1; SMO, squalene monooxygenase; CAS1, cycloartenol synthase 1; SMT1, sterol 24-C-methyltransferase; CPI1, cyclopropyl isomerase; CYP51G1, cytochrome P450, family 51, subfamily A (sterol 14-demethylase); FK, delta14-sterol reductase; HYD1, cholesterol delta-isomerase; SMT2, sterol methyltransferase 2; STE1, C-5 sterol desaturase; DWF5, sterol delta7 reductase; DWF1, delta24-sterol reductase; SCCE, cholesterol monooxygenase (side-chain-cleaving); 3 β HSD, 3-beta-hydroxysteroid dehydrogenase; 3-KSI, Δ^5 -3-ketosteroid isomerase; 5 β POR, progesterone 5 β -reductase; 3 β HS- P5 β OR, 3 β -hydroxysteroid 5 β -oxidoreductase; Dp21MaT, 21-hydroxypregnane 21-O-malonyltransferase; D12H, digitoxin 12 β -hydroxylase; CGH I, cardenolide 16-O-glucohydrolase; GT, glycosyltransferase/ glucuronosyltransferase; UGT, UDP- glycosyltransferase/ glucuronosyltransferase.