

Natural Selection · CK (Hainan Tall)

ABC1K7 Kinase
Plastid-localized · ACTIVE

Chloroplast Retrograde Signaling
GUN1 · GUN4 → ABI4 → Nucleus

Flavonoid Pathway · CANALIZED
PAL → C4H → 4CL → CHS → CHI → F3H → FLS/DFR/ANS
CV = 0.172 (Highly Constrained)

Carbon Allocation → DEFENSE

- Flavonoids ↑↑ (log₂FC = +1.42 vs W5)
- Tannins ↑↑ (oxidative protection)
- Lignans ↑↑ (structural reinforcement)

CK Phenotype

- Green fruit · Thick shell 7.9 mm
- 🍷 TSS 5.5–6.0 Brix° (low sweetness)
- 🛡️ High defense · Low amino acids

Carbon
Reallocation

Artificial Selection · W5 (Wenye 5)

ABC1K7 Y → F Mutation
Kinase ATTENUATED · Near-fixed (92%)

Chloroplast Retrograde Signaling
GUN1 · GUN4 → ABI4 → ↓↓↓ Nucleus

Flavonoid Pathway · DECANALIZED
PAL → C4H → 4CL → CHS → Low expression
CV = 0.485 (Regulatory Release)

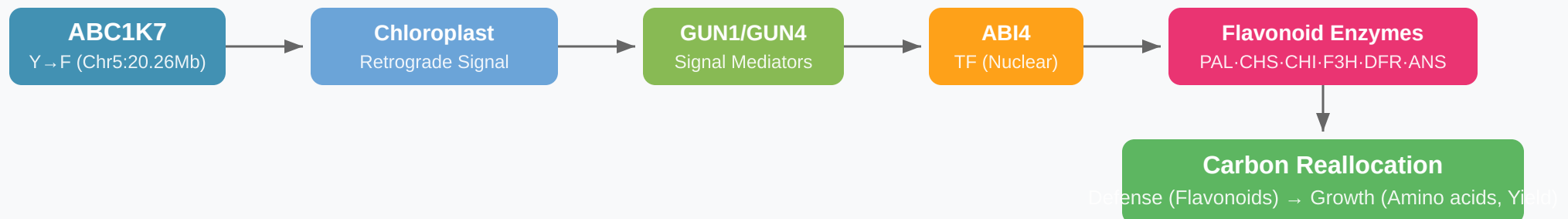
Carbon Reallocation → GROWTH

- Amino acids ↑↑ (35× at 2 months)
- Nucleotides ↑↑ (dIMP 34.6×)
- Proline ↑↑ (79× at 2-month stage)

W5 Phenotype

- Red-brown fruit · Thin shell 2.2 mm
- 🍷 TSS 7.5–8.2 Brix° (sweet water)
- 🌱 High yield · Dwarf architecture

Molecular Pathway: ABC1K7 → Carbon Reallocation



† Downstream components (GUN1, GUN4, ABI4) inferred from Arabidopsis (Koussevitzky et al., 2007; Chi et al., 2015); functional conservation in coconut awaits validation.