## ISOQUINOLINE ALKALOID BIOSYNTHESIS Phenylalanine, tyrosine and tryptophan biosynthesis L-Tyrosine **►O**° Lycorine 3,4-Dihydroxybenzaldehyde K14455... K01592 K01593 K00815... K00832... Crinine K00422 \_Tyramine K00505 2.1.1.- C° Galanthamine 4-Hydroxyphenylpyruvate Norbelladine 4'-Methylnorbelladine N-Demethylnarwedine N-Demethylgalanthamine L-Dopæ∳⁵ 4.1.1.80 K00505 1.14.13.-4-Hydroxydihydrocinnamaldehyde K01592 K01593 4-Hydroxyphenylacetadehydio 5° Dopamine, Autumnaline Isoandrocymbine O-Methylandrocymbine N-Formyldemecolcine Demecolcine Deacetylcolchicine Colchicine **▶⊙**° 2.1.1.- ⊢ Floramultine Tyrosine metabolism → Kreysigine **▶⊙** 2.1.1.- ├ K13382 K00274 K13371... K00276 **O** Secologanin Ankorine (S)-Norcoclaurine © 3,4-DHPAA K13382 K13383 4.3.3.4 4.3.3.3 (S)-Norlaudanosoline (S)-Coclaurine Protoemetine 2'-Norberbamunine<sup>c</sup>♥ Deacetylipecoside 🗘 Deacety- Clisoipecoside **→** • Emetine (R)-N-Methylcoclaurine spontaneous spontaneous Guattegaumerine 💇 K13387 K13384 **©**Cephaeline ♥ (R)-Norre-K13383 K13387 Berbamunine 💇 Demethyl-O Demethyl- 🌣 Deoxy-**O**Tubulosine alangiside isoalangiside tubulósine (S)-N-Methylcolaurine K13385 O Papaverine (S)-6-O-Methyl-norlaudanosoline (S)-3'-Hydroxy- ॐ N-methylcoclaurine K13384 21.1.121 (S)-Nororientaline Alangiside Alangimarckine Isoalangiside K13386 K13386 ်**ဗုံ**(S)-Norreticuline (S)-Reticuline Tetrahydropalmatine K13384 1.3.3.8 K00307 K13389 K13390 1.5.-.-2.1.1.89 (S)-Tetrahydrocolumbamine Columbamine Palmatine ်တီ¹(S)-Cory-tuberine **►**© Corydaline 1.3.3.8 21.1.147 • 1,2-Dehydro-reticulinium °**©**<sup>©2</sup>Laudanine (S)-Scoulerine K13390 K21070 1.21.3.2 K21580 1.5.1.27 (S)-Canadine Berberine 1.5.1.31 ► ○ (R)-Canadine °♥⁴(S)-Cheilan-thifoline 1.3.3.8 C09381 🚅🗘 (R)-Reticuline Magnoflorine K13395 K13384 K13391 ්**ථ**්Salutaridine ်္**ံ**(S)-Stylopine (R)-Norreticuline K13396 K13392 °**\$**Salutaridinol K13393 K21692 K21692 ුණු නිalutaridinol °**\$**Protopine °**5**⁴Allocryptopine spontaneous K21693 ်**ံ**ဗီ-Hydroxyprotopine Neopinone 🗨 <sup>⊆</sup>🍑³Thebaine spontaneous K14975 spontaneous 12-Hydroxy-dihydrochelirubine Dihydromacarpine Dihydro-sanfuinarine dihydrosanguinarine chelirubine °**Ф**'Oripavine 1.14.13*5*7 **►°○**° 1.14.13*5*6 **► ○** ┥21.1.119ト Codeinone © 💇