UBIQUINONE AND OTHER TERPENOID-QUINONE BIOSYNTHESIS 2-Methyl-6-solanyl-1,4-benzoquinol P9301_16961 K12501 **⊭**©⁵Plastoquinol-9 **Q**Solanesyl-PP 4-Hydroxy-4-Hydroxyphenylphenyllactate pyrúvate Terpenoid backbone K18606 biosynthesis Homogentisate δ-Tocopherol β-Tocopherol K09834 🍎 Phytyl-PP K00815... P9301_1696 K09833 K05928 2,3-Dimethyl-5-phytylquinol 2-Methyl-6-phytylquinol α-Tocopherol y-Tocopherol Phenylpropanoid biosynthesis (Vitamin E) 6-Geranylgeranyl-2-methylbenzene-6-Geranylgeranyl-2,3-dimethylbenzeney-Tocotrienol ,4-dioÍ 4diol L-Tyrosine K09833 **►O** α-Tocotrienol K00487 🕶 🗘 4-Coumarate (Vitamin E) trans-Geranylgeranyl-PP 🧖 Cinnamate K09834 K05928 10 β-Tocotrienol δ-Tocotrienol Terpenoid backbone biosynthesis K01904 Phenylalanine, tyrosine and tryptophan biosynthesis UbiC Chorismate MenF Isochorismate K03181.. K01075 menF 4-Coumaroyl-4-Hydroxy-benzoyl-CoA CoA MenD 2-Succinyl-5-enolpyruvyl-6-6-hydroxy-3-cyclohexene-1-carboxylate K11782 MqnA 4-Hydroxybenzoate 241.194 MenH 3.2.1.-4-Hydroxybenzoate-Polyprenyl-PP (1R,6R)-2-Succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate GPP 3-[(1-Carboxy-O-glucoside Terpenoid backbone (S-Ovinyl)oxy]benzoate biosynthesis K13565 K06125 ubiA MenC K18285 MqnE 3-Polyprenyl-4-hydroxybenzoate Geranyl-<u>2</u>-SuccinyIbenzoate hydroxybenzoate 6-Amino-6-deoxy-] UbiD UbiX futalosine **P**Spirodilactone MenE Geranyl-3-Polyprenyl-♥ 4,5-dihydroxybenzoate♥ 2-Polyprenyl-phenol hydroquinone K18286.. ▲2-Succinylbenzoyl-CoA 1.1413116 K18800 Coq3 3"-Hydroxy-geranyl-hydroquinone menB MenB shikonofuran **O**Futalosine K18284 2-Polyprenyl-6-hydroxyphenol o 4,4-Dihydroxy-2-naphthoyl-CoA 3-Polyprenyl-4-hydroxy o 5-methoxybenzoate K11783 MqnB P9301_01931 Ö ⁴Dihydro-echinofuran 🗘 Deoxyshikonin UbiG 1,4Dihydroxy-2-naphthoate 2-Polyprenyl-6-methoxyphenol Dehypoxanthine-futalosine Terpenoid backbone biosynthesis **O**²Shikonin K06126 ubiH K11784 MqnC Octaprenyl-PP ,—∽©€1 — — -Phytyl-PP ·— נ≫❤ 2-Polyprenyl-6-methoxy-1,4-bénzoquinone Cyclic dehypo-xanthinefutalosine MenA MenA K06127 ubiE 2-Phytyl-1,4-naphthoquinone ₈2-Demethylmenaquinone MqnD 2-Polyprenyl-3-methyl-6-methoxy-1,4-benzoquinone UbiE MenG MenG K06134 ♥ Phylloquinone K03184 -**★**Menaquinone 1,4-Dihydroxy-6-naphthoate 2-Polyprenyl-3-methyl-5-hydroxy-6-methoxy-1,4-benzoquinone K00355... K00355... Vitamin K cycle K00591 K00568 K05357 K05357 Menaquinol 🌣 Phylloquinol 🍳 K10106 K10106 Ubiquinone-n Complement and coagulation cascades Phylloquinone epoxide Menaquinone Oxidative phosphorylation epoxide 00130 5/13/15 (c) Kanehisa Laboratories