UBIQUINONE AND OTHER TERPENOID-QUINONE BIOSYNTHESIS 2-Methyl-6-solanyl-1,4-benzoquinol **⊭**©⁵Plastoquinol-9 Solanesyl-PP 4-Hydroxy-4-Hydroxyphenylphenyllactate pyrúvate K18606 Terpenoid backbone biosynthesis Homogentisate δ-Tocopherol β-Tocopherol °**♥**Phytyl-PP 2,3-Dimethyl-5-phytylquinol α-Tocopherol (Vitamin E) 2-Methyl-6-phytylquinol y-Tocopherol Phenylpropanoid biosynthesis 6-Geranylgeranyl-2-methylbenzene-6-Geranylgeranyl-2,3-dimethylbenzeney-Tocotrienol ,4-dioÍ .4diol **►**©⁵³α-Tocotrienol (Vitamin E) L-Tyrosine K00487 ►©4-Coumarate trans-Geranylgeranyl-PR Cinnamate **F**1**(4)**54 δ-Tocotrienol β-Tocotrienol Terpenoid backbone biosynthesis Phenylalanine, tyrosine and tryptophan biosynthesis UbiC MenF Chorismate Isochorismate K03181.. K01075 K01851.. 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 GPP (1R,6R)-2-Succinyl-6-hydroxy-2,4-cyclohexadienec₩2 3-[(1-Carboxy-vinyl)oxy]benzoate O-glucoside Terpenoid backbone [>O biosynthesis 1-carboxylate K13565 MenCK18285 MqnE 3-Polyprenyl-4-hydroxybenzoate Geranyl-hydroxybenzoate <u>2</u>-SuccinyIbenzoate ან-Amino-6-deoxy-UbiD UbiX futalosine **P**Spirodilactone MenE Geranyl-hydroquinone 3-Polyprenyl-▼ 4,5-dihydroxybenzoate ♀ 2-Polyprenyl-phenol K18286 ▲2-SuccinyIbenzoyl-CoA 1.1413116 K18800 Coq3 Dihydro-shikonofuran 3"-Hydroxy-geranyl-hydroquinone MenB °**⇔**Futalosine K18284 2-Polyprenyl-6-hydroxyphenol o 4,4-Dihydroxy-2-naphthoyl-CoA 3-Polyprenyl-4-hydroxy o 5-methoxybenzoate K11783 MqnB Ö ⁴Dihydro-echinofuran UbiG ODeoxyshikonin 1,4Dihydroxy-2-naphthoate 2-Polyprenyl-6-methoxyphenol **⊭**⊘Dehypoxanthine-futalosine Terpenoid backbone biosynthesis **O**²Shikonin K06126 MqnC Octaprenyl-PP ,—∽©€1 — — -Phytyl-PP ·— נ≫❤ 2-Polyprenyl-6-methoxy-1,4bénzoquinone cocyclic dehypo-xanthinefutalosine MenA MenA K06127 K03183 2-Phytyl-1,4-naphthoquinone _{ss}2-Demethylmenaquinone MqnD 2-Polyprenyl-3-methyl-6-methoxy-1,4-benzoquinone UbiE MenG MenG ▼ Phylloquinone K06134 K03184 -**★**Menaquinone 1,4-Dihydroxy-6-naphthoate 2-Polyprenyl-3-methyl-5-hydroxy-6-methoxy-1,4-benzoquinone Vitamin K cycle ်**တို** Menaquinol K05357 K05357 Phylloquinof 🍄 3 Ubiquinone-n Complement and coagulation cascades യ Phylloquinone epoxide Menaquinone Oxidative phosphorylation epoxide 00130 5/13/15 (c) Kanehisa Laboratories