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Besides, the peptides increased the viability (68.2% to 124.8%) of CCD-33Co cells in comparison when they were treated with H₂O₂ only (21.3%). Furthermore, it was observed that peptides had scavenging properties with radical inhibition over NO (16.1% to 73.8%), SO (9.5% to 64.6%) and HO (4.9% to 56.0%) radicals. Finally, the peptides promoted a delay in linoleic acid oxidation ranging from 0.0066 to 0.426 AU/h (absorbance units are proportional to oxidation level), compared to the control (0.516 AU/h). The number of sulfur-containing amino acids significantly correlated with all the antioxidant activities tested; NO ($r=0.95$), SO ($r=0.95$) and HO ($r=0.69$), the reduction on linoleic acid oxidation ($r=-0.86$), and the in vitro determinations of ROS decreased ($r=0.66$) and cytoprotective effect ($r=0.70$). In general, MPACGSS was the most potent peptide followed by MTEEY in all the evaluations, correlating with the presence of sulfur-containing amino acids methionine and cysteine, known to provide antioxidant properties to peptides.

[P28] Biochemical and genetic characterization of tyrosine aminotransferases in *Arabidopsis thaliana*

Presenter(s): Hiroshi A Maeda, University of Wisconsin-Madison

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In plants, tyrosine (Tyr) serves as a key precursor of various plant natural products (e.g., tocochromanols, plastoquinone, ubiquinone, rosmarinic acid, morphine alkaloids), which are crucial for plant environmental responses and of pharmaceutical or nutritional importance to human. Tyrosine aminotransferases (TAT) catalyze the reversible transamination between Tyr and 4-hydroxyphenylpyruvate (HPP), the key entry reaction to many of the Tyr-derived compounds. Here we report phylogenetic, biochemical, genetic, and subcellular localization analyses of TAT enzymes from *Arabidopsis thaliana*. TAT1 and TAT2 formed

a monophyletic clade that is sister to a cysteine lyase clade. Detailed biochemical characterization showed that the recombinant enzymes of both TAT1 and TAT2 converted Tyr to HPP, as previously reported, but also used various keto acceptors and other amino acids such as phenylalanine (Phe) and methionine (Met). The *tat1* and *tat2* single and double mutants of *A. thaliana* exhibited only partial reduction in total TAT activity, increased Tyr levels, and partially reduced levels of tocopherol and plastoquinone. GFP localization and subcellular fractionation studies further showed that TAT1 and TAT2 as well as subsequent HPP dioxygenase (HPPD) are located outside of the plastids. These results indicate that TAT1 and TAT2 partially contribute to the conversion of Tyr to HPP outside the plastids, leading to tocopherol and plastoquinone biosynthesis. However, TAT1 and TAT2 likely have additional functions and also yet to be identified aminotransferases having TAT activity exist in both cytosol and plastids in *A. thaliana*. The study highlights biochemical and genetic complexity of Tyr catabolism leading to the formation of natural products in plants.

[P29] Solgen 40, the high Genistin/Genistein soy concentrate prevents bone mineral loss during menopause in a dose concentrate manner preventing the oxidized bone microenvironment.

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Estrogen deficiency accelerates the effects of aging on bone by decreasing defense against oxidative stress (OS). Genistin/genistein

and daidzin/daidzein, the most common phytoestrogens from soy isoflavones seems to protect the adult skeleton against bone loss by slowing the rate of bone remodeling and by maintaining a focal balance between bone formation and resorption. Recent studies report that reactive oxygen species (ROS) may play a role in postmenopausal bone loss by creating a more oxidized bone microenvironment and increase the intracellular concentration of the antioxidant glutathione in bone prevents bone loss during estrogen deficiency in mice. For understanding how soy isoflavones can prevent the bone damage by ROS and help in the maintenance of glutathione levels we have studied the capacity of genistin/genistein, daizin/daidzein for blocking a common ROS as DPPH radical, by a novel HPLC-DPPH-DAD in vitro test. Our results has revealed that the high genistin/genistein soy concentrate SOLGEN 40 blocks ROS species in a dose dependent manner. In the other hand soy concentrates containing high daidzin/daidzein just partially blocks ROS and the increase of dadizin/daidzein concentration do not increase the block of ROS. Therefore, the administration of high dosages of SOLGEN 40 and other high genistin/genistein soy concentrates seems to be a safe an efficient strategy during menopause for preventing bone mineral loss by diminishing the intracellular concentration of reactive oxygen species

[P30] DNA Intercalating Alkaloids Isolated From *Chelidonium Majus* (Papaveraceae)

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DNA intercalating agents increase the stability of DNA which can be demonstrated by measuring the melting temperature (T_m). T_m can be determined in a spectrophotometer in which the cell temperature is increased

gradually. The resulting absorption data comes as a sigmoidal curve from which melting temperature can be determined when half of the DNA has denatured. The current study aims to assess DNA intercalating activities of four pure bioactive isoquinoline alkaloids: sanguinarine, berberine, allocryptopine and chelerythrine which were isolated from *Chelidonium majus* (Papaveraceae) by repeated silica gel column chromatography, recrystallization and preparative thin layer chromatography (TLC). The isolated compounds were identified by comparing their physical properties and mass spectra with those of the published data. The results showed that sanguinarine is the most active intercalating agent with T_m value of 83.55 ± 0.49 followed by berberine, chelerythrine and allocryptopine with T_m values 62.58 ± 0.47, 51.38 ± 0.37 and 50.94 ± 0.65, respectively, relative to 49.78 ± 1.05 of bacteriophage DNA alone and 86.09 ± 0.5 for ethidium bromide as a positive control.

[P31] Improving stability of bean anthocyanins by β-cyclodextrin in a sport beverage

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The objective was to investigate the color stability of common bean anthocyanins from two black bean cultivars (Otomi and Idaho) co-pigmented with β-cyclodextrin in a sport beverage, as potential replacements for synthetic colorants. The model beverage system was exposed to white fluorescent light and stored at 32 °C for 10 days. Antioxidant capacity, total anthocyanins, and individual anthocyanin characterization (LC-ESI-MS) were performed. Cultivar Idaho bean exhibited the highest antioxidant capacity (325.1 μM Trolox/g dry coat) and presented the highest