

Integrative Extension of Drug Interaction Ontology (DIO) for Herb-Drug and Food-Drug Interactions

Sumi Yoshikawa
Riken Genomic Sciences Center
2006 sumi@gsc.riken.jp

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What Is Drug Interaction

Definition: *"May be defined as the phenomenon that occurs when the effects or pharmacokinetics of a drug are altered by prior administration or co-administration of a second drug."*

Drug Interaction Facts 2004



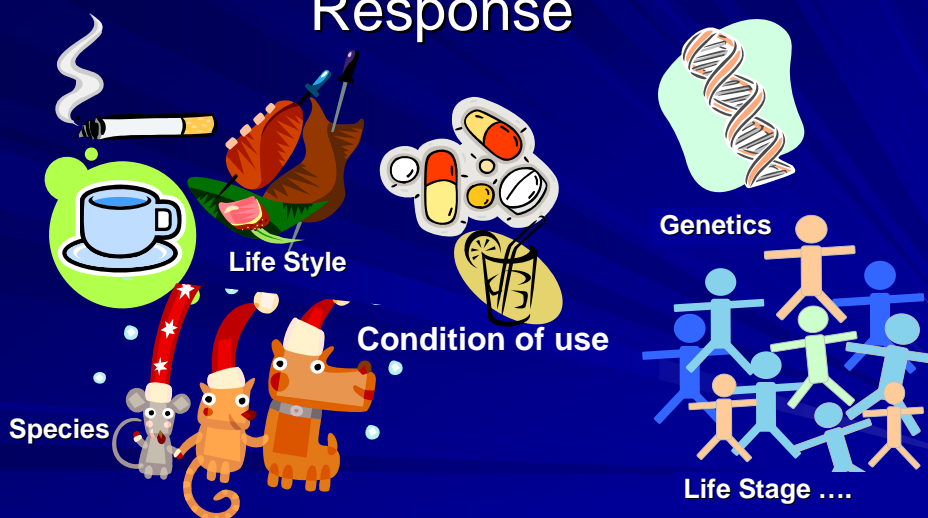
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Outline

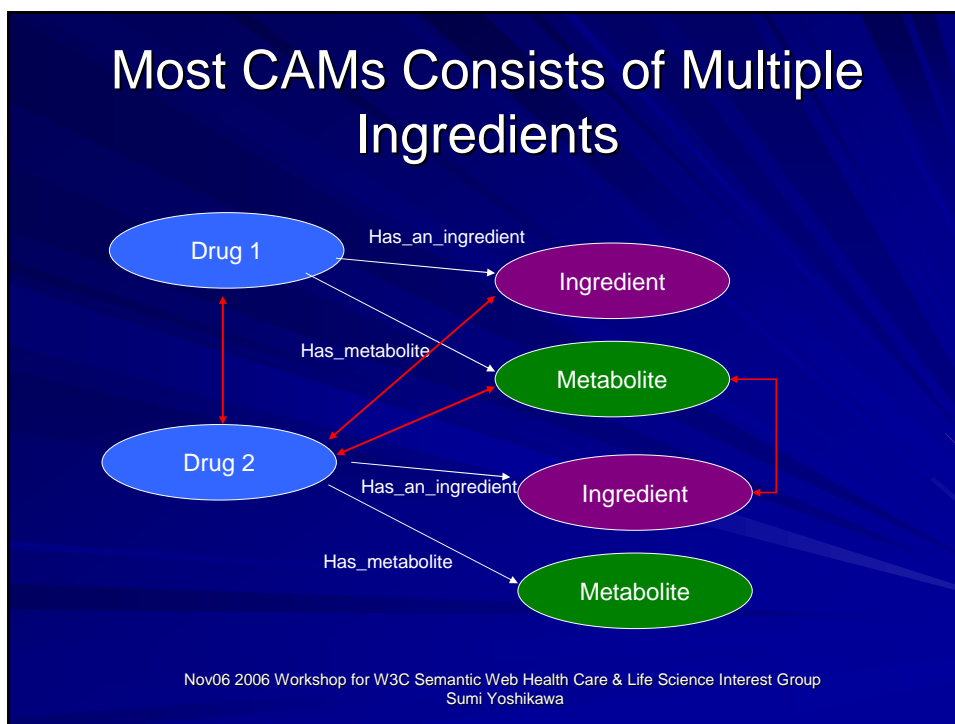
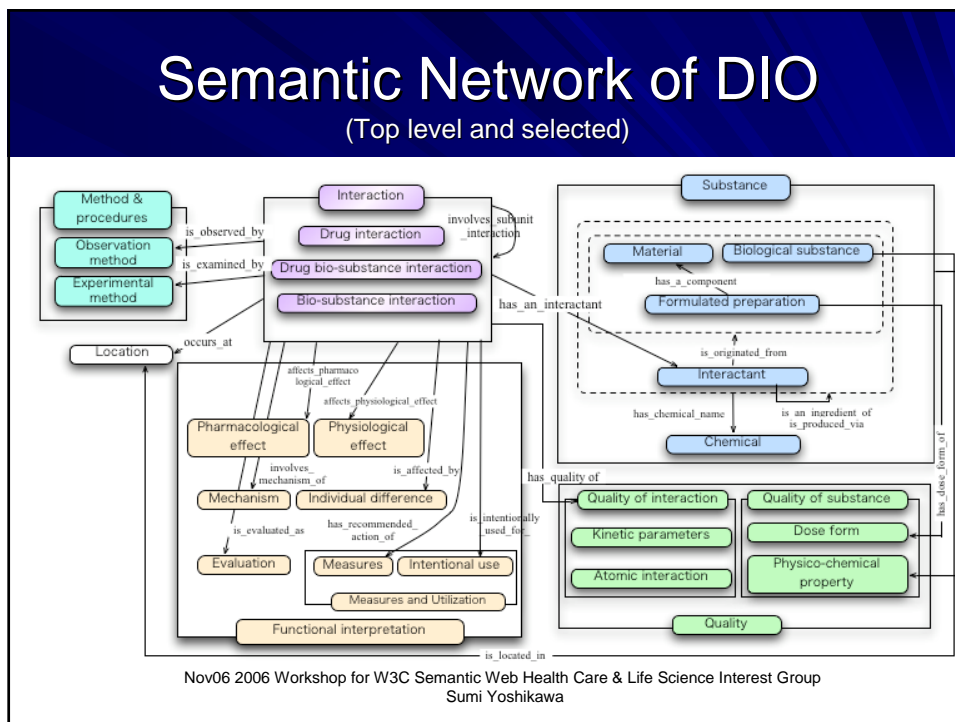
- Complexity of Drug Interaction
- Drug Interaction Ontology for food, CAM interactions
 - Treatment of Ingredients and metabolites
 - Treatment of pharmacologic & clinical interpretations

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Complexity of Biological Response



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Most CAMs Consists of Multiple Ingredients



- (Substance) *VK is_anIngredient_of PowerNutrient™*
VA is_anIngredient_of PowerNutrient™
- (Interaction) *VK-Warfarin has_an_interactant VK*,
VK-Warfarin has_an_interactant Warfarin,
VA-Taxol has_an_interactant VA,
VA-Taxol has_an_interactant Taxol,
 etc.
- Defined class which consists of substances that are included in PowerNutrient™:
PowerNutrient™_Ingredient :
 $\exists is_anIngredient_of\ some\ PowerNutrient^{\text{TM}} (\rightarrow VK, VA)$
- Defined class which consists of interactions that in PowerNutrient™ is associated:
PowerNutrient™_Interaction :
 $\exists is_has_an_interactant_of\ some\ PowerNutrient^{\text{TM}}_Ingredient (\rightarrow VK-Warfarin, VA-Taxol, etc.)$

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The screenshot shows the Protege OWL editor interface. The 'SUBCLASS EXPLORER' on the left displays an 'Asserted Hierarchy' with 'PowerNutrient™-interaction' highlighted. The middle pane shows an 'Inferred Hierarchy' with 'PowerNutrient™-interaction' expanded to show subclasses: 'VA-Etretinate', 'VA-Taxol', 'VA-Tretinoin', and 'Warfarin-VK'. The right pane shows the 'CLASS EDITOR' for 'PowerNutrient™-interaction', with a red box highlighting the property 'has_interactant some PowerNutrient™_Ingredient'.

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Why Ontologies for Drug Interaction

- Integration of different type of information sources: academic literatures, report to regulatory body, basic biochemical vs. clinical etc.
- Better communications and understanding
 - Supportive and complementary to face-to-face communication between medical providers and patients
 - Easy access to relevant information

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