**THIS DOCUMENT IS NOW OBSOLETE**

**PLEASE SEE THE REPLACEMENT:**

<https://docs.google.com/document/d/1vOitEIjAnEeUS6nRPhBqD2IxDTAMSLIBa1BuOQ59EWE/edit#>

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Proposed draft specification for standardized Reasoning Tool API responses, in order to facilitate comparison and co-development of the Reasoning Tools:

This document was originally drafted at the January hackathon. That version is preserved as second and also quoted in yellow.

This document is now being revised in April, mainly due to a revised KG specification, and a desire to keep the API standard aligned with the KG standard. The April revision is now presented first below with revised sections in green.

Emerging KG Standard: <https://docs.google.com/document/d/1TrvqJPe_HwmRJ5HCwZ7fsi9_mwGcwLOZ53Fnjo8Sh4E/edit#>

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## April 2018 Revision

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- Example toy response. Many elements are optional

{

"@context": "http://translator.ncats.io",

"@type": "medical\_translator\_query\_response",

"@id": "http://rtx.ncats.io/api/v1/response/1234",

"tool\_version": "RTX 0.4",

"schema\_version": "0.5",

"datetime": "2018-04-26 12:04:45",

"original\_question\_text": "what proteins are affected by sickle cell anemia",

"restated\_question\_text": "Which proteins are affected by sickle cell anemia?",

"query\_template": [ ( \* potentially more complex, see QuerySpecification doc)

{ "type": "disease",

"name": "sickle cell anemia",

},

{ "type": "Protein",

} ],

"result\_code": "OK",

"message": "1 result found",

"result\_list": [

{ "@id": "http://rtx.ncats.io/api/v1/response/1234/result/2345",

"text": "A free text description of this result",

"confidence": 0.932,

"result\_graph": {

"node\_list": [

{ "@id": "<http://omim.org/entry/603903>", (yellow is the January previous)

"@type": "MedicalCondition",

"name": "sickle cell anemia",

"accession": "OMIM:603903",

"description": "A disease characterized by chronic hemolytic anemia...",

},

{ "id": "OMIM:603903", (green is the April revised)

"category": "disease", (this is exactly the KG property “category”)

"name": "sickle cell anemia",

"uri": "http://omim.org/entry/603903",

"description": "A disease characterized by chronic hemolytic anemia...",

"symbol": "",

},

{ "@id": "https://www.uniprot.org/uniprot/P00738",

"@type": "Protein",

"name": "Haptoglobin",

"symbol": "HP",

"accession": "P00738",

"description": "Haptoglobin captures, and combines with free plasma hemoglobin...",

{ "id": "UniProt:P00738",

"category": "protein",

"name": "Haptoglobin",

"uri": "https://www.uniprot.org/uniprot/P00738",

"description": "Haptoglobin captures, and combines with free plasma hemoglobin...",

"symbol": "HP",

"node\_property\_list": [

{ "@type": "n\_citations",

"name": "Number of citations",

"value": 329,

"uri": "http://www.uniprot.org/uniprot/P00738/publications",

} ],

} ],

"edge\_list": [

{ "@type": "affects",

"source\_id": "http://omim.org/entry/603903",

"target\_id": "https://www.uniprot.org/uniprot/P00738",

"confidence": 1.0,

{ "predicate": "affects", (KG predicate)

"subject": "OMIM:603903",

"object": "UniProt:P00738",

"is\_defined\_by": "RTX", (KG is\_defined\_by)

"provided\_by": "OMIM", (KG provided\_by)

"confidence": 1.0, (NOTE: not in KG spec!)

"edge\_property\_list": [

{ "@type": "PubMed\_article",

"name": "Orthopaedic Manifestations of Sickle Cell Disease.",

"value": null,

"uri": "https://www.ncbi.nlm.nih.gov/pubmed/29309293",

} ],

"origin\_list": [

{ "@id": "OMIM:603903",

"@type": "Monarch\_BioLink\_API\_Relationship",

"name": "",

} ],

}

]

}

]

}

}

}

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## January 2018 Version

- Example toy response. Many elements are optional

{

"@context": "http://translator.ncats.io",

"@type": "medical\_translator\_query\_result",

"@id": "http://rtx.ncats.io/api/v1/response/1234",

"tool\_version": "RTX 0.4",

"schema\_version": "0.5",

"datetime": "2018-01-09 12:34:45",

"original\_question\_text": "what proteins are affected by sickle cell anemia",

"restated\_question\_text": "Which proteins are affected by sickle cell anemia?",

"query\_template": [ ( \* potentially more complex, see QuerySpecification doc)

{ "type": "disease",

"name": "sickle cell anemia",

},

{ "type": "Protein",

} ],

"result\_code": "OK",

"message": "1 result found",

"result\_list": [

{ "@id": "http://rtx.ncats.io/api/v1/response/1234/result/2345",

"text": "A free text description of this result",

"confidence": 0.932,

"result\_graph": {

"node\_list": [

{ "@id": "http://omim.org/entry/603903",

"@type": "MedicalCondition",

"name": "sickle cell anemia",

"accession": "OMIM:603903",

"description": "A disease characterized by chronic hemolytic anemia...",

},

{ "@id": "https://www.uniprot.org/uniprot/P00738",

"@type": "Protein",

"name": "Haptoglobin",

"symbol": "HP",

"accession": "P00738",

"description": "Haptoglobin captures, and combines with free plasma hemoglobin...",

"node\_attributes": [

{ "@type": "",

"name": "",

"value": "",

"url": "",

} ]

} ],

"edge\_list": [

{ "@type": "affects",

"source\_id": "http://omim.org/entry/603903",

"target\_id": "https://www.uniprot.org/uniprot/P00738",

"confidence": 1.0,

"origin\_list": [

{ "@id": "https://api.monarchinitiative.org/api/bioentity/disease/OMIM:603903/genes/",

"@type": "Monarch\_BioLink\_API\_Relationship",

"name": "",

"attribute\_list": [

{ "@type": "PubMed\_article",

"name": "Orthopaedic Manifestations of Sickle Cell Disease.",

"value": null,

"url": "https://www.ncbi.nlm.nih.gov/pubmed/29309293",

}

]

}

]

}

]

}

}

}

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