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1 Introduction

In the review we were reminded to provide better insight in the process of ontology development. In order to make our efforts more transparent we provide this document which merely lists additions to the ontology since the review. Furthermore, we plan to submit a paper on conceptual design of the ontology within the next months.

2 Development of the ontology

(AC = Added Class, MC = Moved Class, DC = Deleted Class, RN = Renamed Class, AP = Added Property)

MC InformationObject to GenericallyDependentContinuant

got rid of several disjoints applying to InformationObject

MC Identifier under InformationObject

fixed disjoints relating to Identifier

changed constraint "TelephoneNumber hasNumericalValue exactly 1" to "TelephoneNumber hasStringValue exactly 1"

restricted the domain of hasStringValue to InformationObject

Identifier hasStringValue exactly 1 (this makes some of the "hasStringValue exactly 1" constraints on the Identifier branch redundant)

Drug roleOf only ChemicalSubstance

Therapy roleOf only (span:Process or span:FiatProcessPart)

Relative roleOf only Organism

ProfessionalRole roleOf only HumanBeing

turned hasIdentifier (and all relations under it) into object property

Microarray hasIdentifier exactly 1

Biopsy hasOutcome some HistologicalSample

HumanBeing hasRelative min 0

MalignNeoplasm relapseOf only MalignNeoplasm
SubstanceSample undergoesMedicalProcess min 0
TissueMicroarray ro:hasPart some HistologicalSample
OrganismalProcess ro:hasParticipant some Organism
AP undergoneBy as reciprocal to undergoes
Menopause undergoneBy some FemaleHumanBeing
Menstruation undergoneBy some FemaleHumanBeing
MenstrualCycle undergoneBy some FemaleHumanBeing
Abortion undergoneBy some FemaleHumanBeing
Pregnancy undergoneBy some FemaleHumanBeing
Parturition undergoneBy some FemaleHumanBeing
TumorDevelopment undergoneBy some Neoplasm
Labor undergoneBy some FemaleHumanBeing
TreatmenCycle undergoneBy some Organism
Institution hasIdentifier some InstitutionIdentifier
ClinicalTrial hasIdentifier some ClinicalTrialIdentifier
TrucutBiopsy hasIdentifier some Identifier
HumanBeing hasSize some BodySurfaceArea
deleted constraint "FemaleHumanBeing undergoes some Menopause"
MaleHumanBeing not (undergoes some Menopause)
MaleHumanBeing not (undergoes some Menstruation)
MaleHumanBeing not (undergoes some Pregnancy)
MaleHumanBeing not (undergoes some Labor)
MaleHumanBeing not (undergoes some Parturition)
HistologicalExamination undergoneBy some PathologicalFormation
TumorGradeAssessment undergoneBy some Neoplasm
UrineExam ro:hasParticipant some UrineSample
PregnancyTest undergoneBy some Organism
SputumExam undergoneBy some Organism
TumorGradeAssessment undergoneBy some Organism
UrineExam undergoneBy some Organism
Biopsy undergoneBy some Organism
ECG undergoneBy some Organism
HematologicalBiochemicalTest undergoneBy some Organism
ClinicalExamination undergoneBy some Organism
HistologicalExamination undergoneBy some Organism
AC Density

AC PlateletCount, TotalBilirubin, ANCount, ALPLevel, ALTCount, ASTCount, WBCCount, SerumCreatinineConcentration, TotalRBC, HemoglobinConcentration

AlkalinePhosphataseTest reveals some ALPLevel

ANC reveals some ANCount

CountingPlatelets reveals some PlateletCount

CountingRedBloodCells reveals some TotalRBC

HbTest reveals some HemoglobinConcentration

SerumCreatinineTest reveals some SerumCreatinineConcentration

TotalBilirubinTest reveals some TotalBilirubin

TransaminaseBiochemistry reveals some ALTCount

TransaminaseBiochemistry reveals some ASTCount

WBC reveals some WBCCount

ANC reveals only ANCount

AlkalinePhosphataseTest reveals only ALPLevel

CountingPlatelets reveals only PlateletCount

SerumCreatinineTest reveals only SerumCreatinineConcentration

TotalBilirubinTest reveals only TotalBilirubin

TransaminaseBiochemistry reveals only (ALTCount or ASTCount)

WBC reveals only WBCCount

HBTest reveals only HemoglobinConcentration

CountingRedBloodCells reveals only TotalRBC

ThoracicComputertomography undergoneBy some Organism

AbdominalComputertomography undergoneBy some Organism

changed "HistologicalExamination undergoneBy some PathologicalFormation" to "HistologicalExamination undergoneBy some MaterialOrganismallIndependentContinuant"

SubstanceSample sampledBy some HumanBeing

changed range of sampledFrom from (Site or OrganismallIndependentContinuant) to (Site or MaterialOrganismallIndependentContinuant or Organism)

BloodPlasmaSample sampledFrom some Organism

BloodSample sampledFrom some Organism

HistologicalSample sampledFrom some Organism

UrineSample sampledFrom some Organism

Symptom symptomOf only Organism

Turned Gender individuals into classes, as per trope ideology

PerformanceRating performanceRatingOf only Organism

AC InclusionCriterion

made InclusionCriterion and ExclusionCriterion disjoint

Echocardiography reveals some LVEF

AC NuclearImaging

AC MUGAScan as child of NuclearImaging

MUGAScan reveals some LVEF

AC PregnancyStatus

PregnancyTest reveals some PregnancyStatus

PregnancyTest reveals only PregnancyStatus

PregnancyStatus hasBooleanValue exactly 1

PregnancyTest not (undergoneBy some MaleHumanBeing)

Disease diseaseOf only Organism

AC ESV

ECG reveals some ESV

AC CardiacCycle

AC ICC

made ICC disjoint from IHC

AC ERStatus

AC ERNegative

AC ERPositive

IHC reveals some ERStatus

IHC reveals some PRStatus

IHC ro:hasParticipant some ER

TumorGradeAssessment reveals some DifferentiationClass

AC NucleicAcid

AC DNA

AC RNA

DNAReplication undergoneBy only DNA

DNAReplication undergoneBy some DNA

DNAReplication hasOutcome some DNA

DNAReplication hasOutcome only DNA

MC ER UNDER SteroidHormoneReceptor

AC AR (androgen receptor)

renamed ProgesteroneReceptor as PR

AC SexHormone as child of SteroidHormoneReceptor

MC AR, ER and PR UNDER SexHormone

IHC ro:hasParticipant some PR

added several comments in various places (see, e.g., on ICC)

renamed ProgesteroneReceptorHistologicalAssessment to PRHistologicalAssessment

renamed Catecholamin to Catecholamine

turned Hormone into role

Catecholamin hasRole some Hormone

GranulocyteColonyStimulatingFactor hasRole some Hormone

LH-RH hasRole some Hormone

SexHormone hasRole some Hormone

AC Metabolism

MetabolismByproduct outcomeOf some Metabolism

Organism undergoes some Metabolism

Metabolism undergoneBy only Organism

Metabolism undergoneBy some Organism

Necrosis undergoneBy only CanonicalPortionOfTissue

Necrosis undergoneBy some CanonicalPortionOfTissue

TumorDevelopment undergoneBy only Neoplasm

ChemotherapyCycle ro:partOf some Chemotherapy

MedicationCycle ro:partOf some Pharmacotherapy

TreatmentCycle ro:partOf some TherapeuticProcess

AP hasNumberOfCycles

Chemotherapy hasNumberOfCycles some NumberOfCycles

added CanonicalBodyProper to domain of hasGender

CanonicalBodyOfVertebrate hasGender some Gender

CanonicalBodyOfVertebrate hasGender only Gender

CanonicalBodyProper hasGender some Gender

CanonicalBodyProper hasGender only Gender

FemaleHumanBeing hasGender some Female

FemaleHumanBeing hasGender only Female

MaleHumanBeing hasGender some Male

MaleHumanBeing hasGender only Male

MedicalProcess ro:hasParticipant some Organism

TherapeuticProcess undergoneBy some Organism

TherapeuticProcess hasPatient some Organism

MedicalProcess ro:hasAgent some HumanBeing

DeclarativeProposition describes only StateOfAffairs

added comment @ Resection

MC ExcisionalBiopsy under TumorResection

moved all -tomys under Resection

RC BreastSurgery into BreastResection

MC ReconstructiveBreastSurgery to root of SurgicalOperation

removed disjoints on the Resection branch that made the MO inconsistent

!!!switched to Protégé 4 (need QCRs)!!!

HumanBeing fulfils min 0 EligibilityCriterion
Neoplasm undergoes min 0 TumorResection
HumanBeing undergoes min 0 Transplant
HumanBeing undergoes min 0 Chemotherapy
HumanBeing undergoes min 0 Immunotherapy
HumanBeing undergoes min 0 DoseIncrease
HumanBeing undergoes min 0 DoseReduction
HumanBeing undergoes min 0 GeneTherapy
HumanBeing undergoes min 0 ClinicalExamination
HumanBeing participatesIn min 0 ClinicalTrial
HumanBeing undertakes min 0 PatientConsent
HumanBeing undergoes min 0 Registration
HumanBeing undergoes min 0 ProtocolChange
HumanBeing undergoes min 0 ECG
HumanBeing undergoes min 0 MagneticResonanceImaging
HumanBeing undergoes min 0 ChemotherapyCycle
HumanBeing undergoes min 0 ProstateIrradiation
HumanBeing undergoes min 0 LungIrradiation
HumanBeing undergoes min 0 BoneIrradiation
HumanBeing undergoes min 0 MammalIrradiation
HumanBeing undergoes min 0 CerebricIrradiation
HumanBeing undergoes min 0 AbdominalBathIrradiation
HumanBeing undergoes min 0 PrimaryTumorIrradiation
HumanBeing undergoes min 0 TumorAndParaaortalLymphNodeIrradiation
HumanBeing undergoes min 0 BoostIrradiation
HumanBeing undergoes min 0 Brachytherapy
HumanBeing undergoes min 0 ReconstructiveBreastSurgery
HumanBeing undergoes min 0 MUGAScan
HumanBeing undergoes min 0 NuclearImaging
HumanBeing undergoes min 0 Computertomography
HumanBeing undergoes min 0 AbdominalComputertomography
HumanBeing undergoes min 0 ThorarcicComputertomography
Organism undergoes min 0 ConeBiopsy

Organism undergoes min 0 CoreNeedleBiopsy
Organism undergoes min 0 EndoscopicBiopsy
Organism undergoes min 0 FineNeedleBiopsy
Organism undergoes min 0 PunchBiopsy
Organism undergoes min 0 SurfaceBiopsy
Organism undergoes min 0 TrucutBiopsy
Organism undergoes min 0 SuctionAssistedCoreBiopsy
OrganismallIndependentContinuant undergoes min 0 Infection
Organism undergoes min 0 InducedAbortion
Organism undergoes min 0 Miscarriage
Organism undergoes min 0 Abortion
Organism undergoes min 0 Diarrhea
Organism undergoes min 0 Cough
Organism undergoes min 0 Infection
Organism undergoes min 0 Labor
Organism undergoes min 0 Lactation
Organism undergoes min 0 Menopause
Organism undergoes min 0 Menstruation
Organism undergoes min 0 Pregnancy
Organism undergoes min 0 Vomiting
MC Diagnosis to Document
Diagnosis outcomeOf some DiagnosticProcess
AC ScientificObservation in Process root
MC MeasuringProcess as child of ScientificObservation
MC Life to OrganismalProcess
DC ExtraOrganismalProcess
MC OrganismalProcess to Process root
DC BiologicalProcess
AC PrimaryTumor
AC Metastasis
Carcinoma isA Metastasis or PrimaryTumor
MixedTumor isA Metastasis or PrimaryTumor
NeuroEndocrineTumor isA Metastasis or PrimaryTumor
Sarcoma isA Metastasis or PrimaryTumor
HaematooncologicalTumor isA PrimaryTumor (multiple inheritance!)
HaematooncologicalTumor disjoint from Metastasis
TherapeuticProcess hasRole some Therapy

SupportivePharmacotherapy hasRole only SupportingTherapy
MC Infusion to TherapeuticProcess root
Chemotherapy hasRole some (PrimaryTherapy or SupportingTherapy)
HormonalTreatment hasRole some (PrimaryTherapy or SupportingTherapy)
Immunotherapy hasRole some (PrimaryTherapy or SupportingTherapy)
Chemotherapy hasRole min 0 AdjuvantChemotherapy
Chemotherapy hasRole min 0 NeoadjuvantChemotherapy
Chemotherapy hasRole some (AdjuvantChemotherapy or NeoadjuvantChemotherapy or PrimaryTherapy)
HormonalTreatment not (hasRole some AdjuvantChemotherapy)
HormonalTreatment not (hasRole some NeoadjuvantChemotherapy)
Immunotherapy not (hasRole some AdjuvantChemotherapy)
Immunotherapy not (hasRole some NeoadjuvantChemotherapy)
TumorResection undergoneBy some Neoplasm
AC Lung, Bone, Breast, Prostate, Brain under AnatomicalStructure for consideration for further placement
ProstateIrradiation undergoneBy some Prostate
MammalIrradiation undergoneBy some Breast
LungIrradiation undergoneBy some Lung
BoneIrradiation undergoneBy some Bone
CerebricIrradiation undergoneBy some Brain
HumanBeing hasPart some Bone
HumanBeing hasPart some Breast
HumanBeing hasPart some Brain
HumanBeing hasPart some Lung
MaleHumanBeing hasPart some Prostate
Prostate partOf only MaleHumanBeing
Organism undergoes min 0 SurgicalProcedure
Organism undergoes min 0 Radiotherapy
Organism undergoes min 0 Pharmacotherapy
Organism undergoes min 0 DoseModulation
Organism undergoes min 0 SurgicalSuture
Organism undergoes min 0 SurgicalOperation
HumanBeing undergoes min 0 AxillaryNodeDissection
HumanBeing undergoes min 0 ReconstructiveBreastsurgery
HumanBeing undergoes min 0 BreastResection
HumanBeing undergoes min 0 Adenomastectomy
HumanBeing undergoes min 0 Mastopexy

HumanBeing undergoes min 0 Lumpectomy
 HumanBeing undergoes min 0 Mastectomy
 HumanBeing undergoes min 0 PartialMastectomy
 HumanBeing undergoes min 0 Quadrantectomy
 HumanBeing undergoes min 0 SegmentalMastectomy
 HumanBeing undergoes min 0 PateyMastectomy
 HumanBeing undergoes min 0 TotalMastectomy
 HumanBeing undergoes min 0 MaddenMastectomy
 HumanBeing undergoes min 0 SkinSparingTotalMastectomy
 HumanBeing undergoes min 0 SubcutaneousMastectomy
 FemaleHumanBeing undergoes min 0 Hysterectomy
 FemaleHumanBeing undergoes min 0 PartialHysterectomy
 FemaleHumanBeing undergoes min 0 TotalHysterectomy
 AC Thyroid
 Lobectomy undergoneBy some (Brain or Lung or Organism or Thyroid)
 Lobectomy undergoneBy only (Brain or Lung or Organism or Thyroid)
 Organism undergoes min 0 Lobectomy
 Brain undergoes min 0 Lobectomy
 Thyroid undergoes min 0 Lobectomy
 Lung undergoes min 0 Lobectomy
 AC Cell
 AC NucleatedCell
 AC DiploidNucleatedCell
 AC SomaticCell
 AC HemalCell
 AC DifferentiatedHemalCell
 AC GranularLeucocyte
 AC Neutrophil
 AC NonNucleatedCell
 AC NonNucleatedSolocyte
 AC Platelet
 AC Serum
 MC PleuralEffusion UNDER BodySubstance
 MC Pus UNDER BodySubstance
 MC BiologicalMacromolecule UNDER BodySubstance
 MC MetabolismByproduct UNDER BodySubstance
 DC CanonicalBodySubstance

DC	PathologicalBodySubstance		
AC	SubdivisionOfCardinalBodyPart		
AC	SubdivisionOfBodyProper		
AC	SubdivisionOfTrunk		
AC	SubdivisionOfTrunkProper		
AC	Throat		
AC	SubdivisionOfThorax		
AC	RegionOfAnteriorChest		
AC	RegionOfPectoralPartOfChest		
MC	Breast	UNDER	RegionOfPectoralPartOfChest
AC	Organ		
AC	SolidOrgan		
AC	ParenchymatousOrgan		
AC	LobularOrgan		
AC	Liver		
AC	CardinalOrganPart		
AC	OrganComponent		
AC	LymphNode		
MC	Lung	UNDER	LobularOrgan
AC	CavitatedOrgan		
AC	OrganWithCavitatedParts		
AC	Abdomen		
MC	Bone	UNDER	OrganWithCavitatedParts
AC	OrganComponentOfNeuraxis		
MC	Brain	UNDER	OrganComponentOfNeuraxis
AC	CorticomedullaryOrgan		
AC	Kidney		
AC	WallOfOrgan		
AC	SerousMembrane		
AC	ViscusSerousMembrane		
AC	Peritoneum		
AC	OrganRegion		
AC	OrganSegment		
AC	RegionOfVascularTreeOrgan		
AC	SegmentOfVenousTreeOrgan		
AC	Vein		
AC	SystemicVein		

AC	SubdivisionOfInferiorVenaCavalTree		
AC	RenalVein		
AC	OrganWithOrganCavity		
AC	Ureter		
MC	Prostate	UNDER	LobularOrgan
MC	Thyroid	UNDER	LobularOrgan
AC	AnatomicalCluster		
AC	OrganCluster		
AC	Iliopsoas		
AC	Spleen		
AC	Pancreas		
AC	SegmentOfLargeInstestine		
AC	Colon		
AC	RegionOfOrganComponent		
AC	RegionOfSerousMembrane		
AC	RegionOfPeritoneum		
AC	RegionOfVisceralPeritoneum		
AC	PeritonealMesentery		
AC	MesenteryOfLargeInstestine (=Mesocolon)		
AC	Heart		
AC	Blood		
AC	Leucocyte		
MC	GranularLeucocyte	UNDER	Leucocyte
AC	NonParenchymatousOrgan		
AC	Skin		
AC	Hemoglobin		
AC	AnatomicalCompartment		
AC	CompartmentOfTrunk		
AC	BodyCompartmentSubdivision		
AC	SubdivisionOfThoracicCompartment		
AC	Mediastinum		