Nano Risk governance and data management

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http://www.bionanoteam.com/

Ljubljana, 6.2.2020, Nanotechnology and nanoApplication
Ustanovitvena okroga miza Slovenske nanotehnološke platforme
Torek, 13. 6. 2017 ob 15.30 na UL Fakulteti za kemijo in kemijsko tehnologijo

KSS
Knowledge demand side

KDS
Knowledge supply side
University of Ljubljana, Biotechnical Faculty, Research group for nanobiology and nanotoxicology

- EU FP7 NanoValid (2011-2015)
- H2020, MSCA-ITN-2015 Pandora
  - (2016-2019)
- H2020, NANORIGO (2019-2023)
- DaNa 2.0, funded by German Federal Ministry of Education and Research (ongoing)

❖ NanoSafetyCluster

National centres of excellence (CO):
- CO NAMASTE
- CO Nanocenter
Nanotechnologies
Safety

Safety Projects
- NanoSafety Cluster
- NanoValid
- NanolImpactNet
- SIINN - Safe Implementation
- NHECD
- Safenano
- Marina FP7
- NANO CODE
- NANOSH
- nanoSTAIR
- Steptoe & Johnson
- Legal/Regulatory Issues (nanotechlawbc.com)
- DaNa
- NANOTRANSPORT
- EURO-NanoTox
- BioNanoNet
- NANO REg
- NanoSafePack
- Nanomicex
- eNanoMapper

Working Groups
Promoting NanoSafety Research
Figure 1: The number of published papers on nanotoxicology from 1980 to 2013.

https://www.researchgate.net/publication/266746424_Nanosafety_Research-re_We_on_the_Right_Track/figures?lo=1
Data
Examples of data bases

<table>
<thead>
<tr>
<th>Examples of data bases</th>
</tr>
</thead>
</table>

```
<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Table RML</td>
<td>November 2019 HQ1 PDF (77 pp, 7.62 MB)</td>
</tr>
</tbody>
</table>
```
Examples of data bases

https://toxico.nibiohn.go.jp/english/datalist.html#vivo

<table>
<thead>
<tr>
<th>Compound</th>
<th>Vehicle</th>
<th>Administration route</th>
<th>Organ</th>
<th>Single dose (mg/kg)</th>
<th>Repeat dose (mg/kg)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-acetaminophen</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>300 600 1000</td>
<td>300 600 1000</td>
<td></td>
</tr>
<tr>
<td>2-isoniazid</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver</td>
<td>200 600 2000</td>
<td>50 100 200</td>
<td></td>
</tr>
<tr>
<td>3-carbon tetrachloride</td>
<td>corn oil</td>
<td>Gavage</td>
<td>Liver</td>
<td>30 100 300</td>
<td>30 100 300</td>
<td></td>
</tr>
<tr>
<td>4-phenobarbital</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver</td>
<td>100 150 300</td>
<td>10 30 100</td>
<td></td>
</tr>
<tr>
<td>5-valproic acid</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>45 150 450</td>
<td>45 150 450</td>
<td></td>
</tr>
<tr>
<td>6-clofibrate</td>
<td>corn oil</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>30 100 300</td>
<td>30 100 300</td>
<td></td>
</tr>
<tr>
<td>7-tetracycline</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>20 60 200</td>
<td>20 60 200</td>
<td></td>
</tr>
<tr>
<td>8-naphthyl isothiocyanate</td>
<td>corn oil</td>
<td>Gavage</td>
<td>Liver</td>
<td>15 50 150</td>
<td>5 15</td>
<td></td>
</tr>
<tr>
<td>9-allyl alcohol</td>
<td>corn oil</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>3 10 30</td>
<td>3 10 30</td>
<td></td>
</tr>
<tr>
<td>10-phenylbutazone</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>20 60 200</td>
<td>20 60 200</td>
<td></td>
</tr>
<tr>
<td>11-omeprazole</td>
<td>0.5% MC</td>
<td>Gavage</td>
<td>Liver / Kidney</td>
<td>100 300 1000</td>
<td>100 300 1000</td>
<td></td>
</tr>
</tbody>
</table>
Examples of a data base

Class: Toxicology

Term IRI: http://purl.obolibrary.org/obo/NCIT_C17206

Definition: Toxicology is the branch of pharmacology that deals with the nature and effects and treatments of poisons. [def-source: NCI]

Annotations

- ALT_DEFINITION: Toxicology is the study of the adverse effects of chemical, physical or biological agents on people, animals, and the environment. The study of poisons, including the source, effect, and treatment of poisoning. It is a branch of pharmacology (the study of drugs).
- Contributing_Source: CDISC
- Legacy_Concept_Name: Toxicology
- Preferred_Name: Toxicology
- Semantic_Type: Biomedical Occupation or Discipline
- UMLS_CUI: C0040541
- code: C17206
- has exact synonym: toxicology; Toxicology; TOX
- in subset: CDISC SEND Terminology; CDISC SEND Study Category Terminology; Clinical Data Interchange Standards Consortium Terminology
Examples of data bases

INDICATORS ▾ DATABASES ▾ NBIC + METHODOLOGY ▾ ...

43 NANOMATERIALS IN 1,844,645 ARTICLES, 220,026 PATENTS AND 3,272 PRODUCTS

GRAPHYNE Article: 672 Patent: 21
FAIR data principle

To be Findable:

• F1. (meta)data are assigned a globally unique and eternally persistent identifier.
  F2. data are described with rich metadata.
  F3. (meta)data are registered or indexed in a searchable resource.
  F4. metadata specify the data identifier.

To be Accessible:

• A1 (meta)data are retrievable by their identifier using a standardized communications protocol.
  A1.1 the protocol is open, free, and universally implementable.
  A1.2 the protocol allows for an authentication and authorization procedure, where necessary.
  A2 metadata are accessible, even when the data are no longer available.

To be Interoperable:

• I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
  I2. (meta)data use vocabularies that follow FAIR principles.
  I3. (meta)data include qualified references to other (meta)data.

To be Re-usable:

• R1. meta(data) have a plurality of accurate and relevant attributes.
  R1.1. (meta)data are released with a clear and accessible data usage license.
  R1.2. (meta)data are associated with their provenance.
  R1.3. (meta)data meet domain-relevant community standards.
Challenges

Problems to be solved:

a) data, information and knowledge is siloed (isolated, separated)
b) data, information and knowledge is human readable but not machine readable, not FAIR!

By Risk Governance Council:
Nano Risk Governance council (NRGC)

One of the main goals of three H2020 RIA risk-governance projects (NANORIGO, RiskGone, Gov4Nano) will establish a science-based safety governance body for nanomaterials, in the form of a transparent, self-sustained European Risk Governance Council (ERGC). The role of the ERGC is to provide expert opinions on the governance of engineered nanomaterials (ENMs).
DG GROWTH is EU commission service

DG GROWTH supervises certain regulatory agencies European Chemicals Agency (ECHA)

the European Chemicals Agency (ECHA) implements the EU’s legislation on chemical products

REACH and CLP are EU regulations
NRGC for nanoinovation
Working together!

Designing Better, Together!
Thank you for your attention!