



Global**Exposome**

Compassionate Science, Sustainable Planet

Luis Falcón, MD, MSc

About me



Luis Falcón

Founder, GNU Solidario
Author of GNU Health
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Education

- Computer Scientist
- Physician
- Genomics & Medical Genetics

Activism

- Social Medicine
- Animal Rights

Advancing Social Medicine



- GNU Solidario is a non-for-profit organization
- Works globally
- Focused on Social Medicine
- Fights for the rights of human and nonhuman animals
- NPO behind GNU Health and Global Exposome Project

GNU Solidario around the world



Projects from GNU Solidario



GNUHealth: The Libre Digital Health Ecosystem

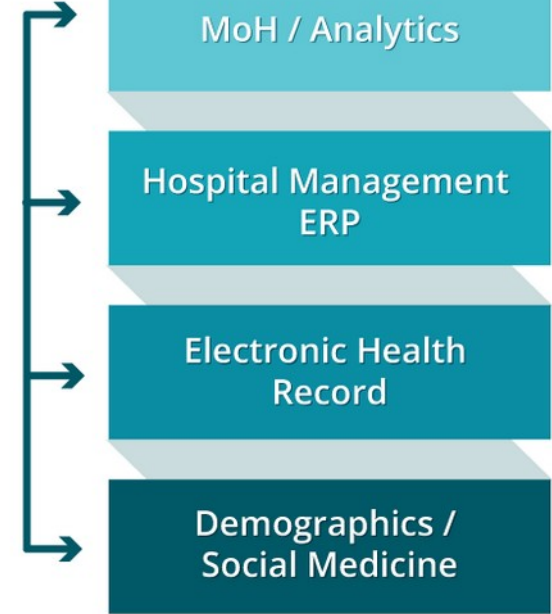
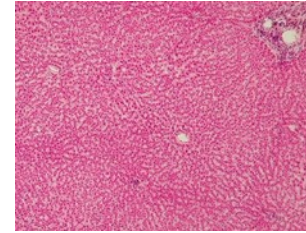
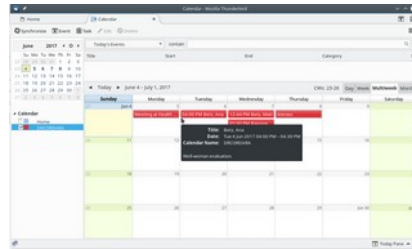
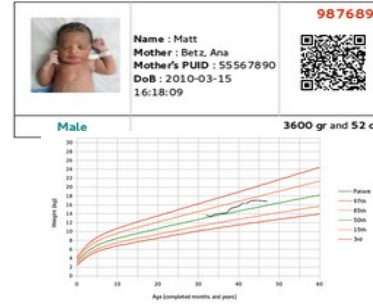
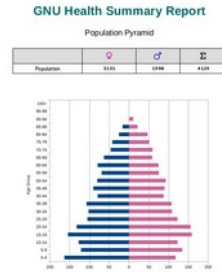
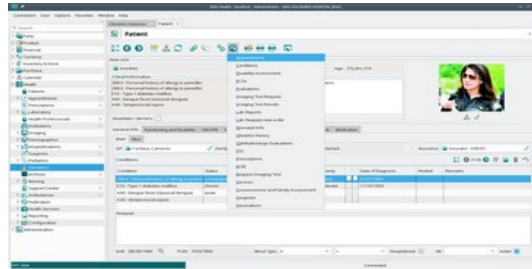




GNUHealth ecosystem



GNUHealth HMIS component



GNUHealth: A Digital Public Good, helping millions around the world



Rompiendo Cadenas



ROMPIENDO CADENAS

Rompiendo Cadenas: Campaigns



FREE BEAGLES
FROM EXPERIMENTS

Free beagles from experiments at University of Barcelona, and replace them by ethical, human-relevant methods



PACT OF TEGUISE
NO MORE ANIMAL ABUSE



A call to accelerate human-focussed medical research

The Global Exposome Project - GEP



Global**Exposome**
Compassionate Science, Sustainable Planet

Exposome/ ('ɛkspəʊ,səʊm) /

“The cumulative measure of environmental influences and associated biological responses throughout the lifespan, including exposures from the environment, diet, behavior, and endogenous processes.”

Miller and Jones (2014)

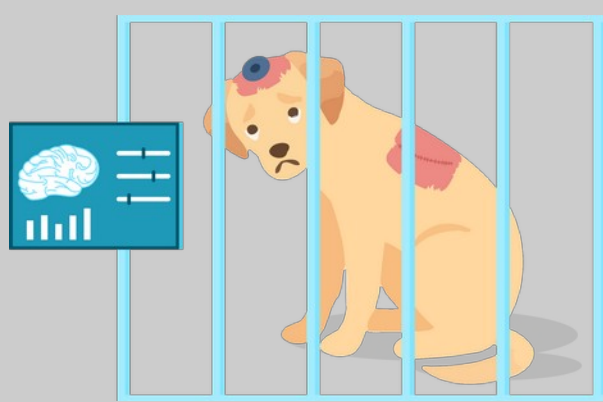
Humanity has become a victim of its own greed and cruelty



Human is both the cause and the victim of a global, chronic inflammatory process.

- Anthropocentrism
- Capitalism
- Speciesism
- Abuse of natural resources
- Social gradient & inequity

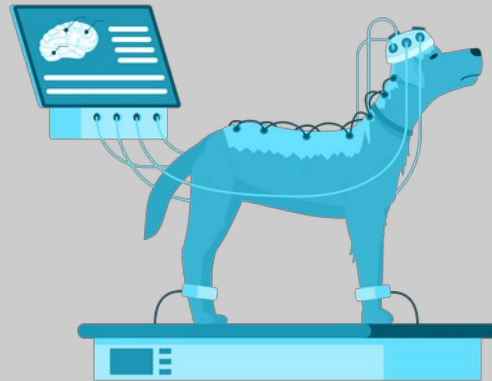
The Failure of Animal experimentation: A cruel business lost in translation



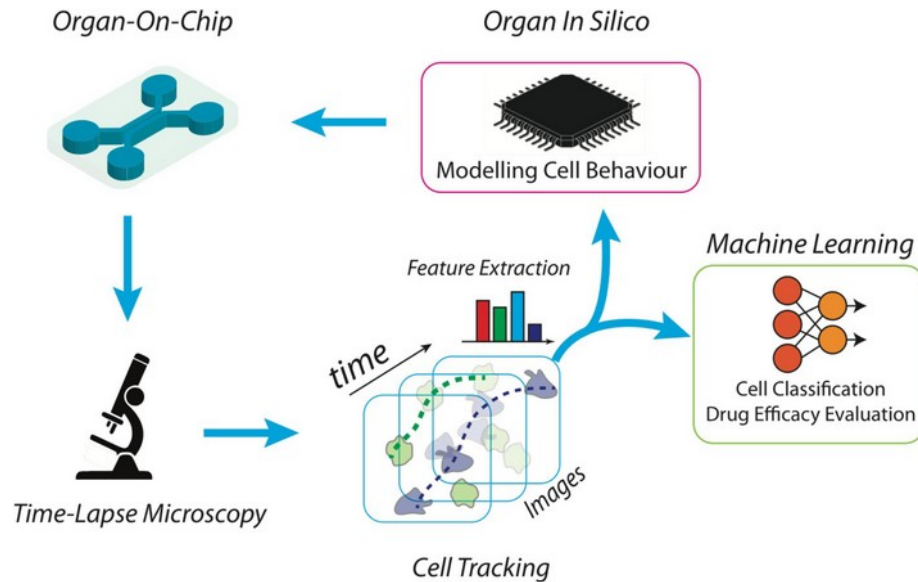
**Argument solid
enough
to stop here**

**They kidnap, stress, torture, hurt and kill
sentient beings.**

- Over 96% trials result in failure
- ≈100% failure in neurodegenerative conditions
- Lost in translation from preclinical animal trials to human.
- 3Rs (Replace, Reduce, Refine) has failed
- Use of public institutions by pharma corporations for obscure experiments.
- Time to fund open science, cruelty-free, modern human relevant research.



Alternatives to Animal Experimentation



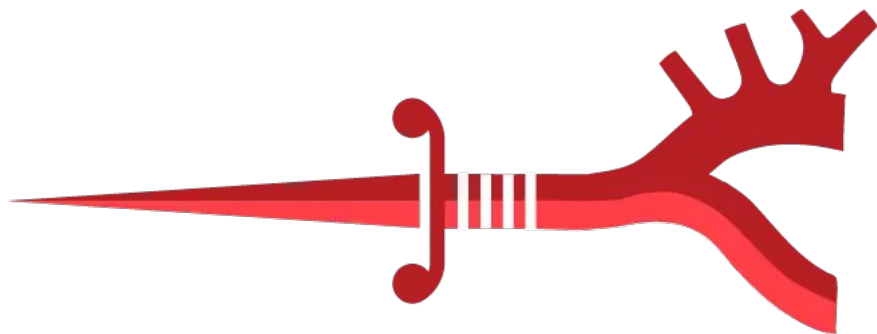
From Petri Dishes to Organ on Chip Platform: The Increasing Importance of Machine Learning and Image Analysis
<https://www.frontiersin.org/articles/10.3389/fphar.2019.00100/full>

NAMs

- New Approach Methodologies
- Human relevant
- Ethical
- Affordable
- Dynamic
- Specific to individual / context

The Stiletto Project:

A Computational Model of the Cerebral Perforating Arteries in Health and Disease



STILETTO

A computational model of the cerebral perforating arteries in health and disease

- Multi-disciplinary project
- Part of the Global Exposome Project
- Cruelty-free research (no animal models)
- Tiny cerebral arteries (μm) critical in cerebral homeostasis
- Study of Small Vessel Disease (SVD) and cognitive impairment / dementia
- Brain microcirculation and the neurovascular unit (NVU)
- Role of exposome
- Open Science for education and research

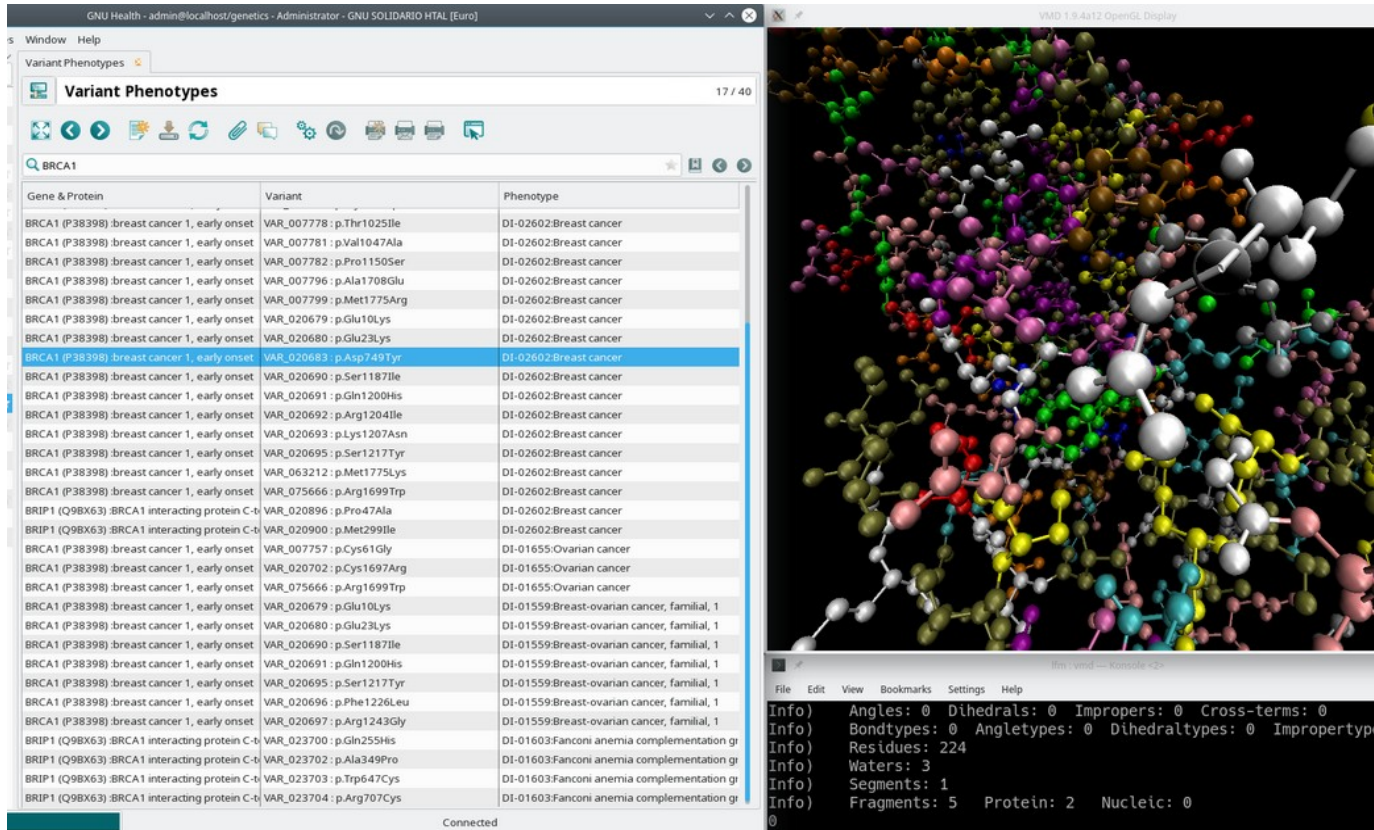


Medical Imaging with Orthanc

The screenshot displays the Orthanc web interface. On the left is a sidebar menu with categories: Artikel, Währungen, Health, Books of Life, Patients, Appointments, Prescriptions, Health Professionals, Institutions, Imaging, Orthanc, Patients, Studies, Dx Imaging - New, Dx Imaging Requests, and Dx Imaging - Results. The 'Studies' section is active, showing patient information: Patient: PHENIX, Date: 27.09.2005, Referring Physician: CHIR-PED^CHIR-PE, UUID: 49974143-ec23cb52-6b2a1c46-14d5daa0-0822ce1a, and Server: Orthanc_Demo. To the right, a description box contains: Description: CT2 TÊTE, FACE, SINUS, Institution: HUG, ID: 1361, URL: (with a globe icon), and Test: (with a search icon). Below this, a table lists series with columns for Patient, Study, Series, and Instance. The series 'T1DIPFEC' is selected, showing a list of 8 instances. A preview of the selected series is shown on the right, displaying a brain MRI scan. The Orthanc logo is visible in the bottom left corner of the interface.

Patient	Study	Series	Instance
PHENIX	CT2 TÊTE, FACE, SINUS	T1DIPFEC	Instance 1
			Instance 2
			Instance 3
			Instance 4
			Instance 5
			Instance 6
			Instance 7
			Instance 8

Participating institutions will send the information to the GH Federation



The screenshot displays the GNU Health application interface. The left pane shows the 'Variant Phenotypes' section with a search bar containing 'BRCA1'. Below the search bar is a table listing various genetic variants and their associated phenotypes.

Gene & Protein	Variant	Phenotype
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007778 : p.Thr1025Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007781 : p.Val1047Ala	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007782 : p.Pro1150Ser	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007796 : p.Ala1708Glu	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007799 : p.Met1775Arg	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020683 : p.Asp749Tyr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020692 : p.Arg1204Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020693 : p.Lys1207Asn	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_063212 : p.Met1775Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-02602:Breast cancer
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_020896 : p.Pro47Ala	DI-02602:Breast cancer
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_020900 : p.Met299Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007757 : p.Cys61Gly	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020702 : p.Cys1697Arg	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020696 : p.Phe1226Leu	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020697 : p.Arg1243Gly	DI-01559:Breast-ovarian cancer, familial, 1
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_023700 : p.Gln255His	DI-01603:Fanconi anemia complementation gr
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_023702 : p.Ala349Pro	DI-01603:Fanconi anemia complementation gr
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_023703 : p.Trp647Cys	DI-01603:Fanconi anemia complementation gr
BRIP1 (Q9BX63) :BRCA1 interacting protein C-t	VAR_023704 : p.Arg707Cys	DI-01603:Fanconi anemia complementation gr

The right pane shows a 3D molecular model of a protein structure, rendered in a space-filling style with various colors representing different atoms. Below the model is a terminal window displaying system information:

```
Info) Angles: 0 Dihedrals: 0 Improper: 0 Cross-terms: 0
Info) Bondtypes: 0 Angletypes: 0 Dihedraltypes: 0 Improptyp
Info) Residues: 224
Info) Waters: 3
Info) Segments: 1
Info) Fragments: 5 Protein: 2 Nucleic: 0
```

Individuals can also participate



GNUHealth Federation: Collaborative, Open Science

Information gathered from participating institutions across the globe.
Statistics, validation,...

Open Science: Researchers and Scientists and from around the world will be able to participate

Improve quality of care
From Medical imaging, laboratory and genomics to **Socioeconomic and lifestyle** information

The **person** can be an active player in the system of health

Using GPL license saves millions of euros and boosts collaboration for the betterment of our health systems.

Become part of the Global Exposome Project!



Send your ideas / project to:

info@globalexposome.org
exposome@gnusolidario.org



GNU Solidario: A social project with a bit of technology behind



First GNU Solidario project. Santiago del Estero, Argentina 2006

Thank you for supporting us!



<https://www.gnusolidario.org/support>