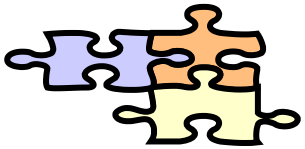
Connecting Biological Sciences and Technology, Mathematics, Social Sciences and Humanities in common projects



To increase societal impact of research in Oncology

Controling Cancer Incidence, morbidity and mortality
A Global Challenge

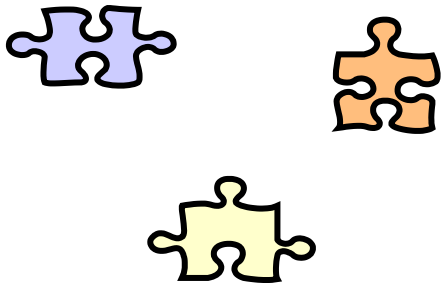
A few key points:

- ❑ **Cancer, first ranked mortality cause with considerable financial and societal impact**
- ❑ **Moving paradigms for treatments**
- ❑ **Increasing coasts for up-to date treatments leading to inequities and Health Inequalities**
- ❑ **Increasing place for biotechnologies and SMES in R&D**
- ❑ **at least 35% of cancers can be avoided**
- ❑ **currently, only 50% of patients can be cured (with considerable variations)**

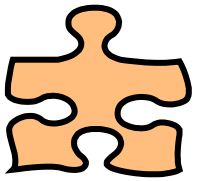
Controling Cancer Incidence, morbidity and mortality
A Global Challenge

Major players:

- ❑ **The patients and unaffected people**
- ❑ **The health system with important variations of performance and major difficulties In developing countries**
- ❑ **The educational system (all level)**
- ❑ **Academic research Institutions and researchers**



Oncology: three current challenges in Biological Sciences and Technology



Developing PPP to boost Translational Research

❑ Aim: Integrate and modelize complex and massive data from Omics and imaging to understand diversity of cancers and intra-tumoral heterogeneity

Why?: **to customize therapies and prevent relapses**

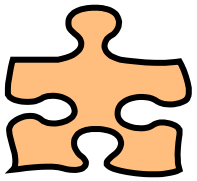
❑ Aim: Understand host response (including immune response)

Why?: **to eradict minimal residual disease**

❑ Aim: Construction of in vitro or in vivo models that more accurately reflect the growth of human cancers in patients

Why?: **to assess anticancer drugs and decrease drug attrition in early phase trials**

Oncology: three current challenges in Biological Sciences and Technology



❑ What is lacking?

✓ a biological theory of life

Why is it important?: To construct a multiscale model from molecules to populations

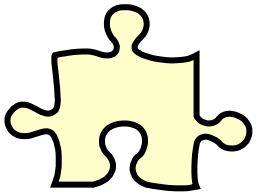
In oncology:

To construct a model of normal and tumoral cells for in-silico testing drug effects

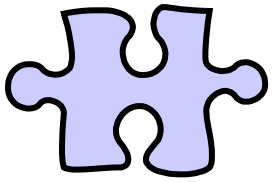
✓a strong link between systems and synthetic biology

❑ What we need?

✓Attract mathematicians and engineers by constructing a common language



Oncology: three current challenges in Social Sciences and Humanities



- Aim: Understand reasons for poor results in prevention (tobacco, alcohol, obesity etc..)

  Why?: **to avoid at least 35% of cancers in industrialized countries**

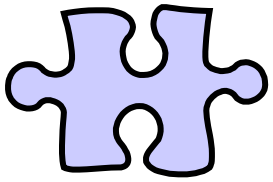
- Aim: Understand reasons for unequal access to innovation

  Why?: **to decrease mortality**

- Aim: Understand the complex network: patient, health system, city

  Why?: **to improve patient quality of live**

Oncology: three current challenges in Social Sciences and Humanities

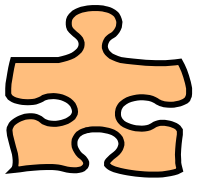


❑ What is lacking? (in France)

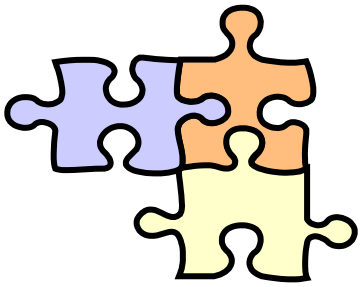
- ✓ Interest of researchers
- ✓ Involvement of patients
- ✓ links between Biology and Social Sciences

❑ What we need?

- ✓Attract researchers in SSH and bridge to Biology
- ✓Develop international and comparative SSH studies



From multidisciplinary to interdisciplinary approaches

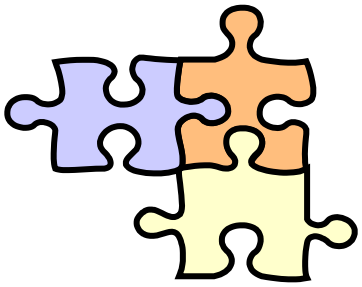


- **Aim: construct a new common language**
- **Some suggestions**

✓Education:
- ✓Develop interdisciplinary courses at Master and PhD degrees
- ✓Encourage PhD courses for engineers (France) and MDs

✓Research:
- ✓Foster creation of multidisciplinary Labs (Universities, Research Agencies)
- ✓Include association representatives and patients in scientific advisory boards

From multidisciplinary to interdisciplinary approaches



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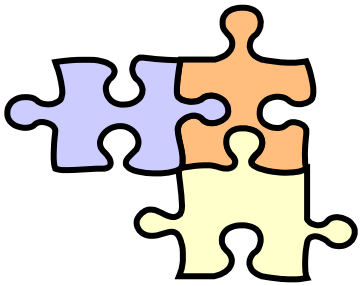
Global Challenges through better governance (OECD 2012)



- ❑ difficulties reaching international agreement on common priorities
- ★ ❑ insufficient modalities of funding
- ★ ❑ obstacles to the transfer of science, technology and innovation into practice
- ★ ❑ insufficient participation of relevant actors in society
- ❑ lack of integration of countries with weak scientific infrastructure
- ❑ problems of intellectual property rights for application of new technologies