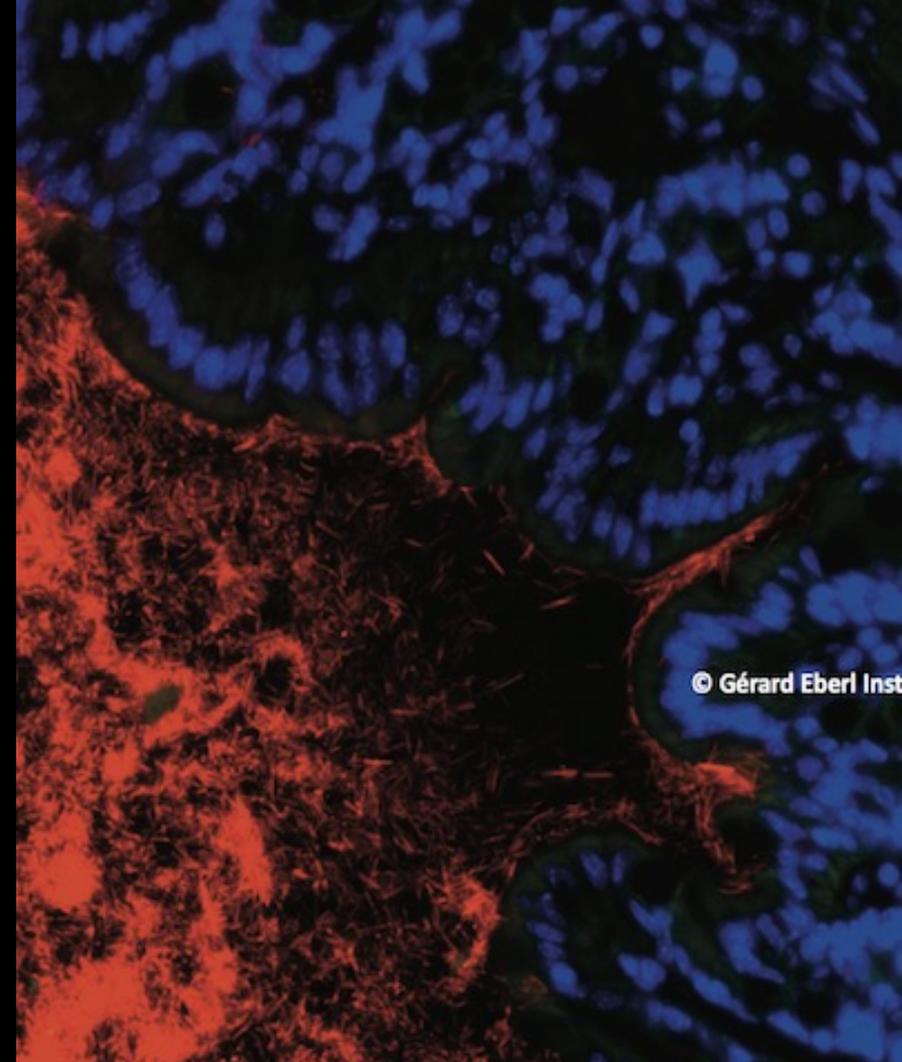


Philosophie du cancer

séance #1: Introduction

Lucie Laplane



Le tournant régionaliste à partir des années 1970/1980

La philosophie de la biologie se constitue en rejetant la philosophie des sciences dominée par la physique

Hull, Ruse, Schaffner, Wimsatt, etc.

Slogan:

« rien d'intéressant en philosophie des sciences ne peut être réalisé en dehors du domaine du travail interne aux disciplines »

[Gayon, 2009]

« Philosophie de ... »

... *La physique*

... *La biologie*

... *La chimie*

... *Neurosciences*

... *L'économie*

... *Des mathématiques*

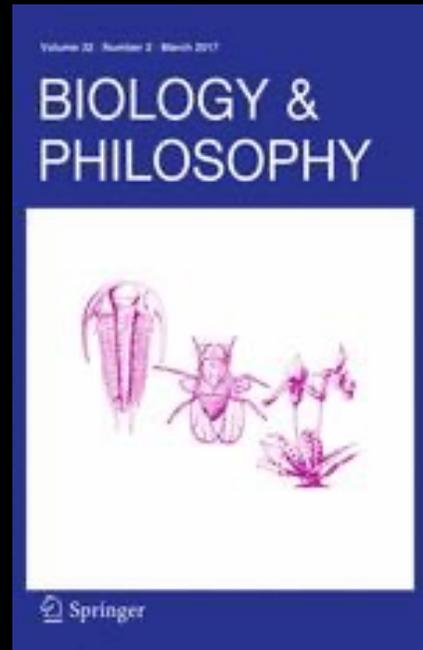
Sociétés savantes et congrès, postes dans les universités, revues, manuels, cursus universitaire

La constitution de la philosophie de la biologie

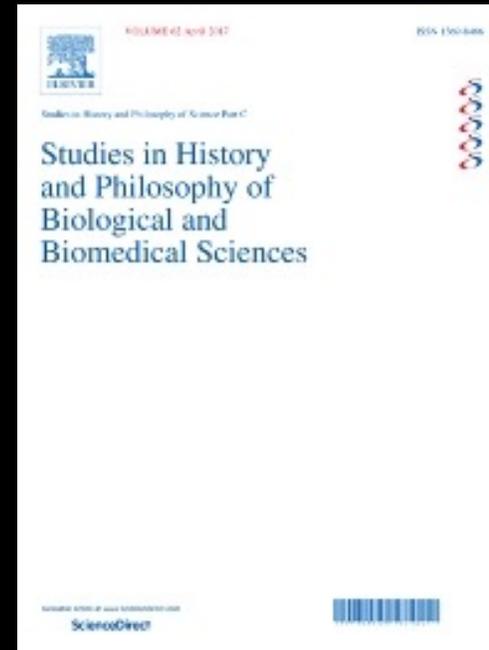
Revues



1979



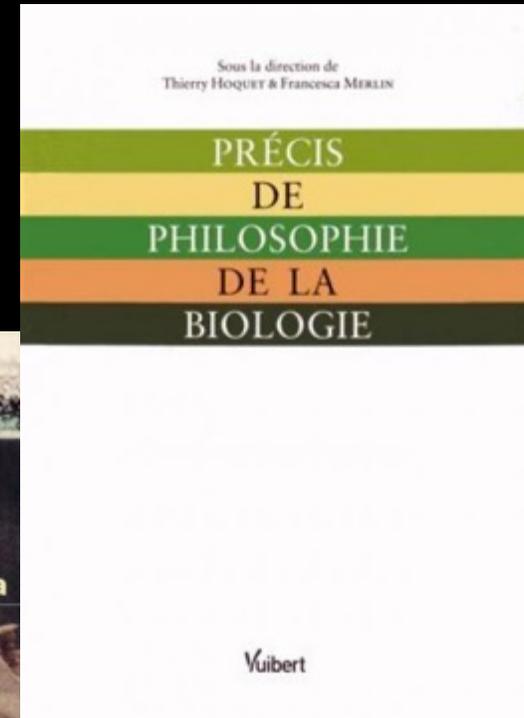
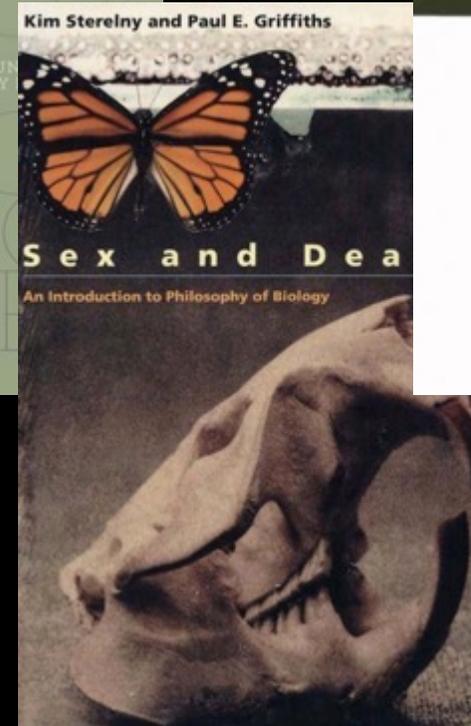
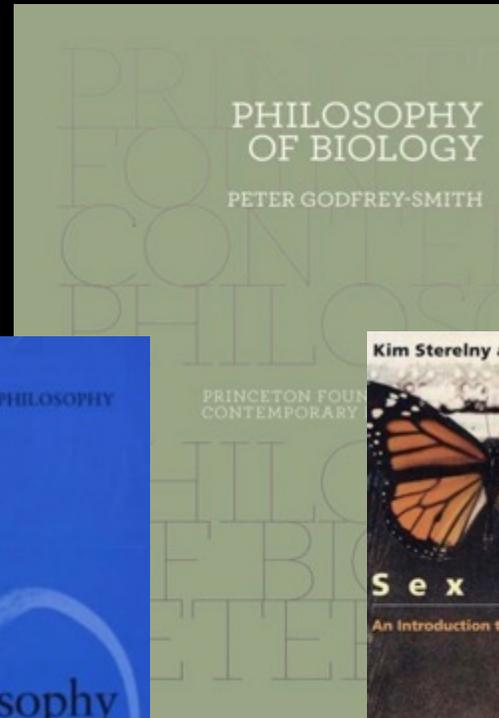
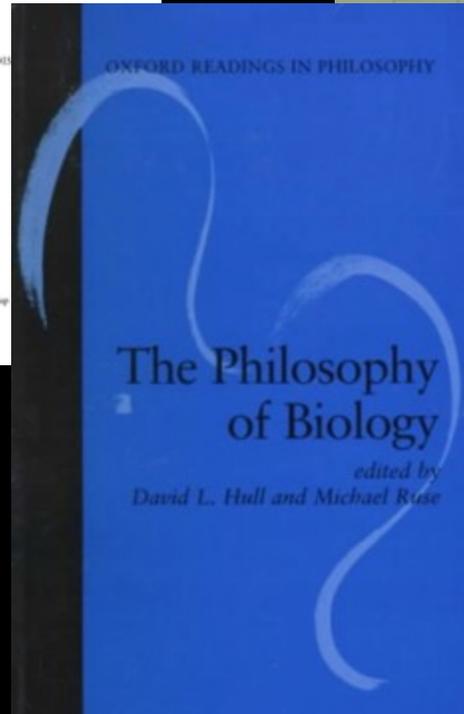
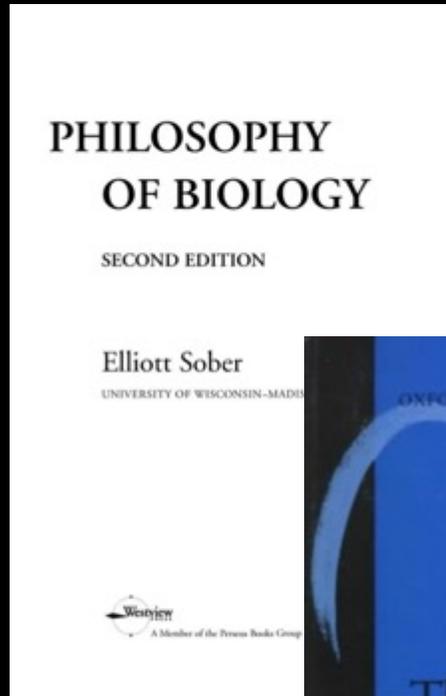
1986



1998

La constitution de la philosophie de la biologie

Manuels et anthologies



La constitution de la philosophie de la biologie
Sociétés savantes



international society for the history, philosophy and
social studies of **biology**

~ 800 personnes
(scientifiques, philosophes, historiens, sociologues)

eLife



Edited by
Helga Groll

Philosophy of Biology

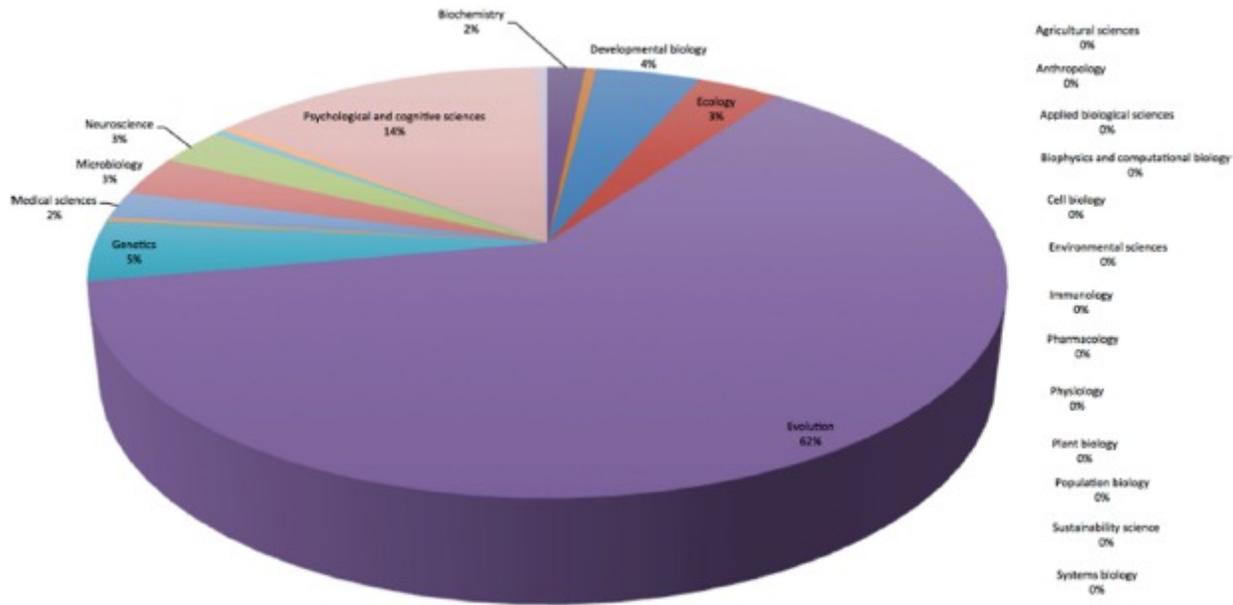
A series of articles offering philosophical perspectives on the life sciences.



Collection · Mar 13, 2019

vividbiology.com

Philosophie de la biologie: quelle biologie?



PNAS 2003-2015

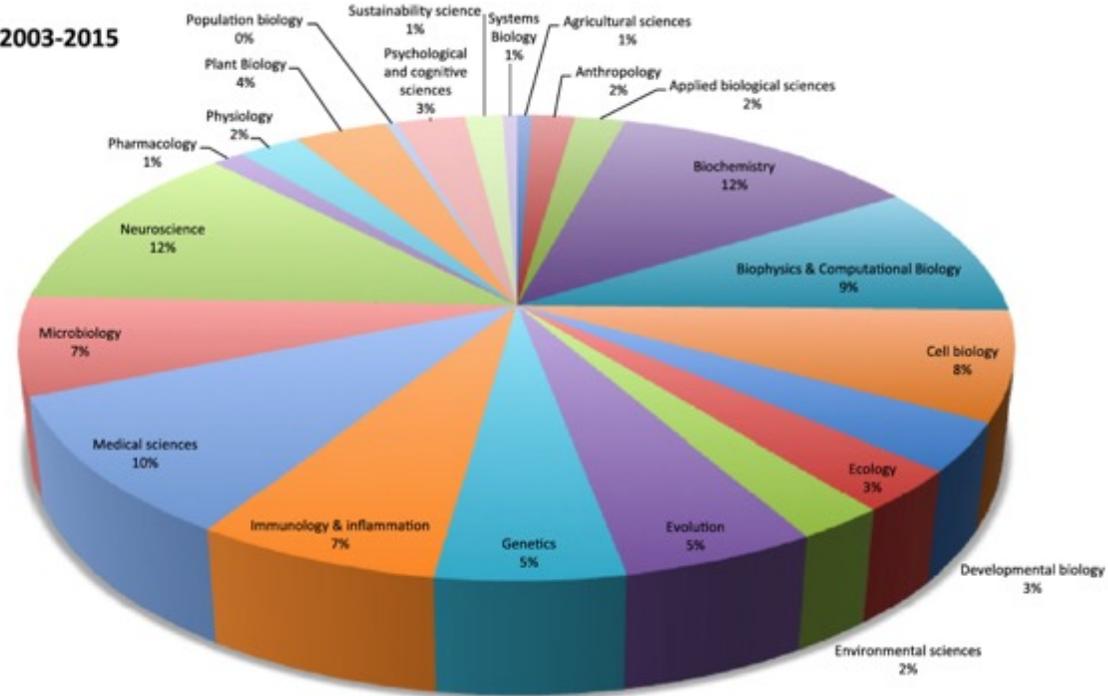
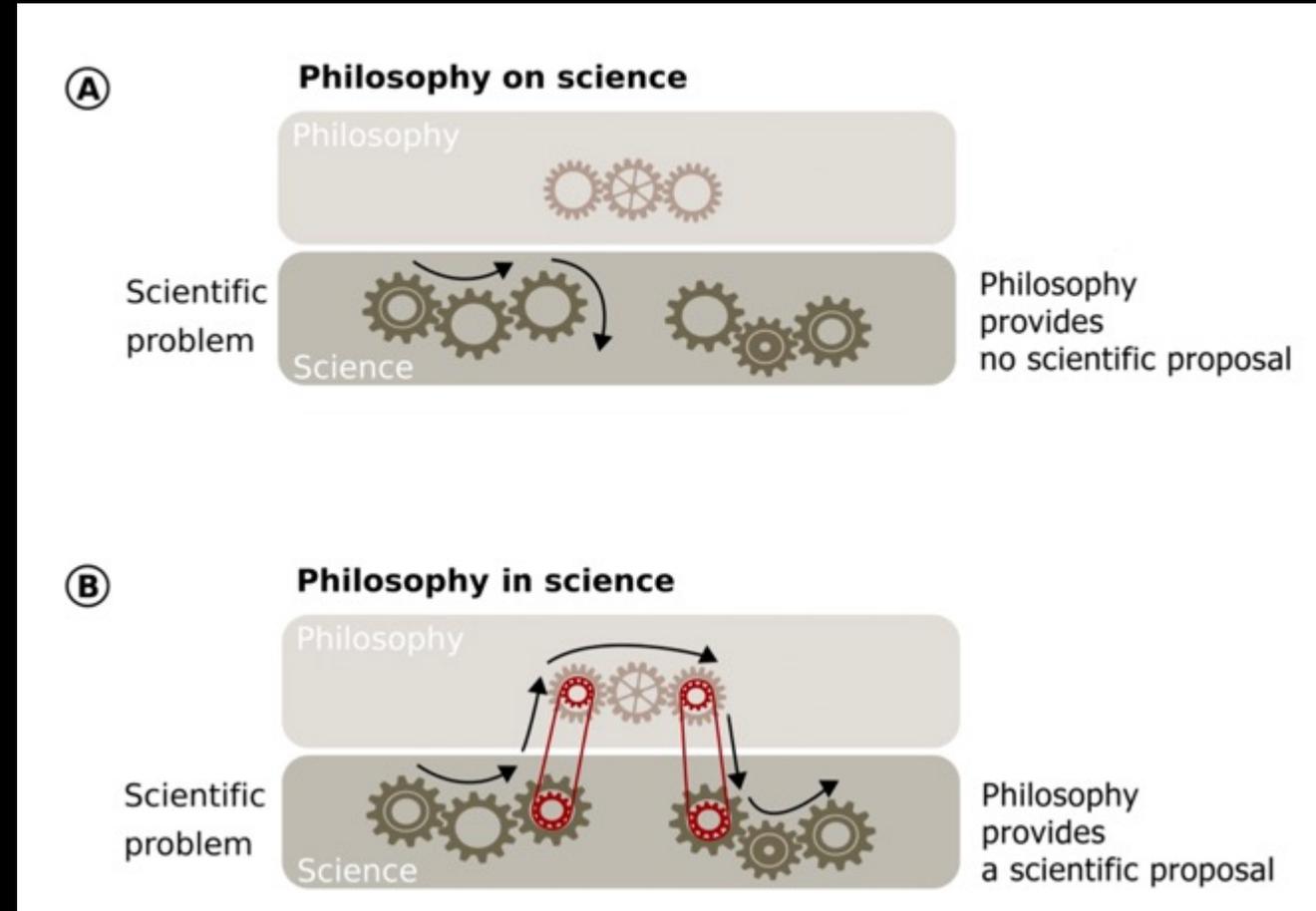


Fig. 2 Biological domains represented in *Biology & Philosophy* from 2003 to 2015

Philosophie de la biologie: quelle philosophie?

- La majorité de la PoB est de la philo *sur* la bio
- Une partie de la PoB est de la philo *dans* la bio

PinS :
une façon de faire de la **philosophie et de la science**



MCDONNELL INITIATIVE @MBL

Transforming discovery through collaborations among historians, philosophers, and life scientists

HOME

ABOUT US

NEWS

WORKING GROUPS

MEMBERS

IMPACT

Historians and philosophers of science and scientists work on the same problems. So, why not work on these problems together and transform the way we understand them? That's what we do.

We are investigating how regeneration works across the scales of complex living systems.

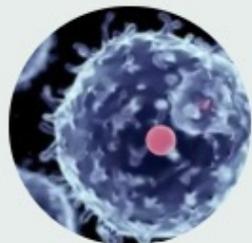




MICROBIAL COMMUNITY REGENERATION

Research in microbial ecology and microbiomics focuses increasingly on ecological questions, such as about resilience, that is, the capacity for a system to return to a stable state following a disturbance.

[\(more...\)](#)



STEM CELL REGENERATION

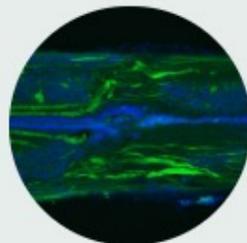
Our project focuses on the general question “*what are stem cells?*” with a particular interest in how stemness might differ depending on tissues and contexts, in particular in regeneration and cancer.



ECOSYSTEMS REGENERATION

Do ecosystems regenerate? Issues of complexity and scale, both spatial and temporal, lie at the heart of analyses of ecosystem regeneration.

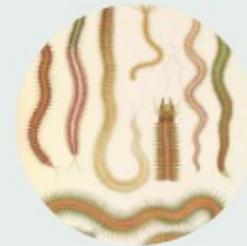
[\(more...\)](#)



NEURON REGENERATION

From the 19th-century to today, nerve cell regeneration has had a place at the MBL and in the history of the “neuro” disciplines.

[\(more...\)](#)



GERMLINE REGENERATION

Germ cells can be lost, rendering an organism unable to reproduce. The predominant line of thought in germline biology tells us that once the germline is lost, it cannot regenerate.

[\(more...\)](#)



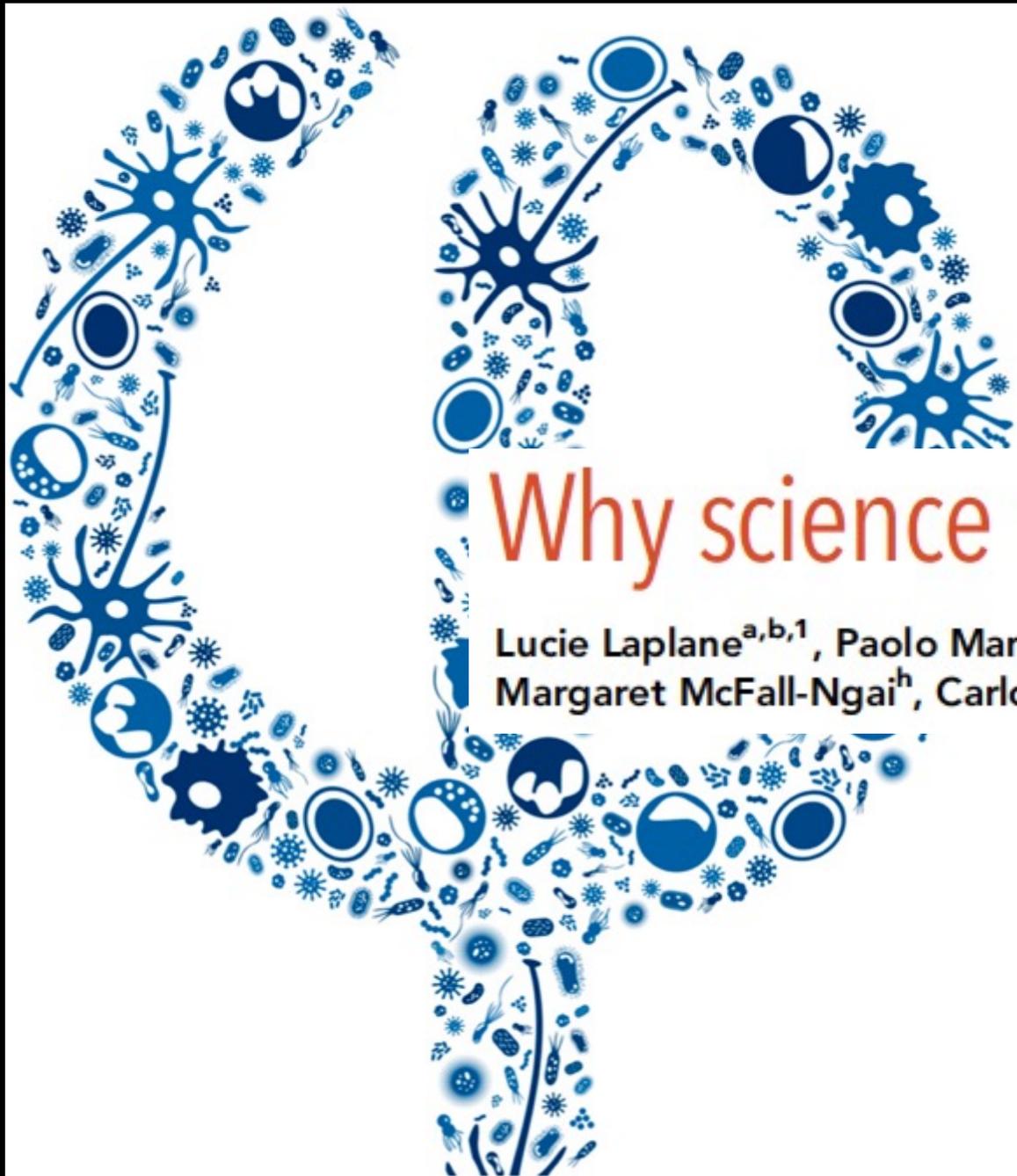
PhilInBioMed

Institute for Philosophy in Biology and Medicine

What is PhilInBioMed?

PhilInBioMed is both an interdisciplinary institute located at the **University of Bordeaux**, France, and a **national** and **international** network of interdisciplinary institutes. PhilInBioMed aims at promoting **philosophy *in* the biological and medical sciences**, a co-production of knowledge by the direct interactions of philosophers, biologists, and medical doctors.

The mission of **PhilInBioMed** is to promote short-term and long-term stays of philosophers in biology and medicine labs, as well as short-term and long-term stays of biologists and MDs in philosophy labs, and, ultimately, collaborative publications by philosophers, biologists, and medical doctors.



Why science needs philosophy

Lucie Laplane^{a,b,1}, Paolo Mantovani^{c,1}, Ralph Adolphs^d, Hasok Chang^e, Alberto Mantovani^{f,g}, Margaret McFall-Ngai^h, Carlo Rovelliⁱ, Elliott Sober^j, and Thomas Pradeu^{a,k,2}

Philosophie *dans* la biologie

- Surprise et scepticisme: Est-ce que ça existe? Les philosophes *peuvent-ils* faire cela?
- Critique: Les philosophes doivent-il le faire ou au contraire s'en abstenir? N'y a-t-il pas un risque de dissolution de la philosophie? N'est-ce pas une forme d'instrumentalisation de la philosophie?
- Trivialisation: Nous, les philosophes, on fait tous cela.

Philosophy in Science: Can philosophers of science permeate through science and produce scientific knowledge?

Thomas Pradeu, Mael Lemoine, Mahdi Khelifaoui, and Yves Gingras



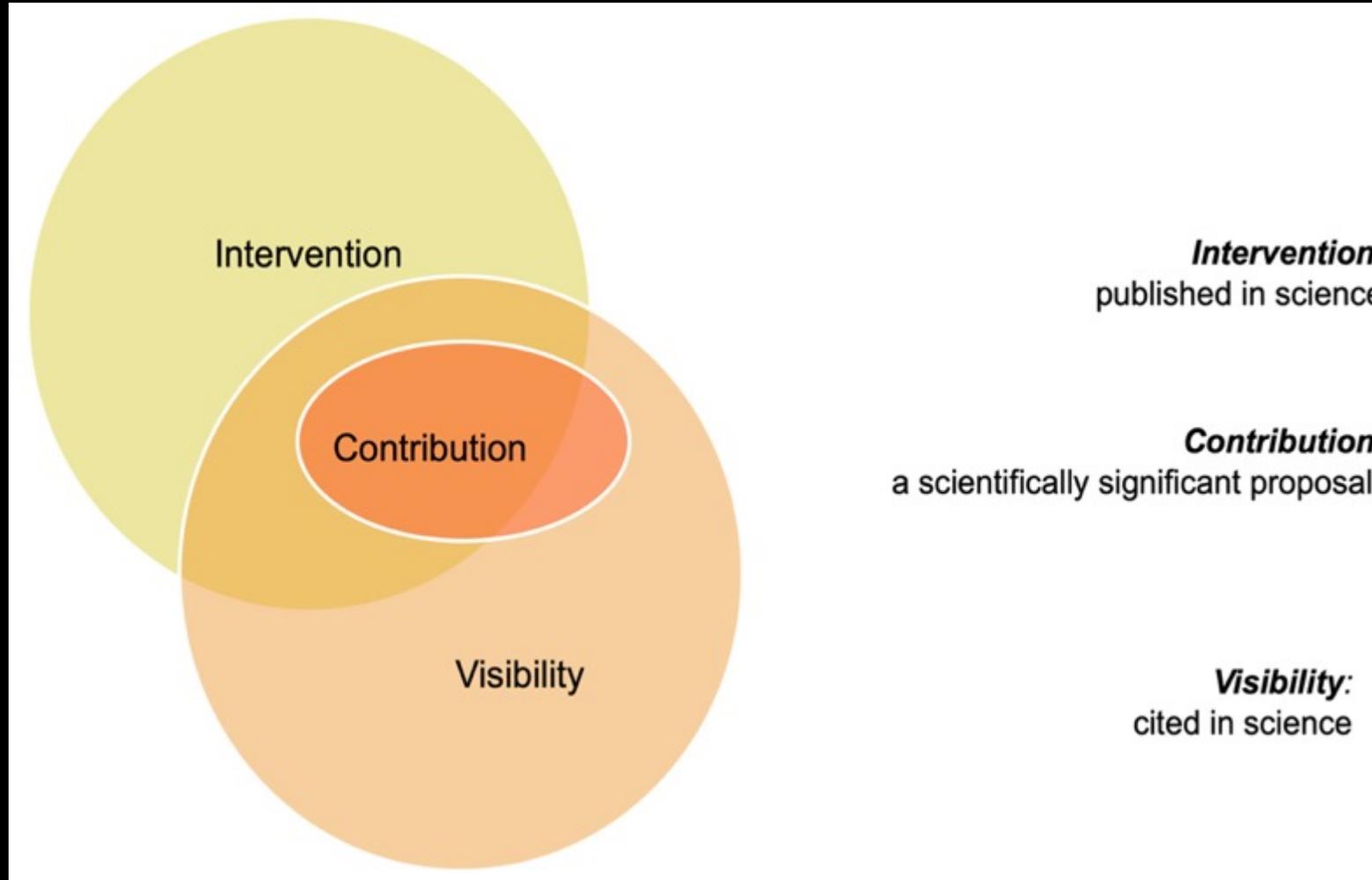
The British Journal for
the Philosophy of Science

Synthese
<https://doi.org/10.1007/s11229-021-03067-x>

**The visibility of philosophy of science in the sciences,
1980–2018**

Mahdi Khelifaoui¹ · Yves Gingras² · Maël Lemoine³ · Thomas Pradeu³

La Philosophie dans les sciences



intervention

Author	Ratio of science vs PoS papers	N Papers in PoS	N Papers in Science
SMITH-B	21.00	2	42
WAKEFIELD-JC	12.50	2	25
MILLER-FG	7.88	8	63
BEDAU-MA	6.33	3	19
HOWICK-J	5.67	3	17
CHURCHLAND-PS	5.00	3	15
RUSE-M	4.50	4	18
SUPPES-P	3.70	10	37
KRAGH-H	3.43	7	24
HANSSON-SO	3.06	16	49
BROWN-HR	3.00	7	21
DEHARO-S	3.00	5	15
BYERLY-HC	3.00	2	6
VANBENTHEM-J	2.86	7	20
CLELAND-CE	2.75	4	11
FINE-A	2.67	3	8
DACOSTA-NCA	2.56	9	23
COLYVAN-M	2.40	5	12
SPIRITES-P	2.40	5	12
PENNOCK-RT	2.25	4	9
DENNETT-DC	2.00	4	8

Highly interventionist philosophers of science, having published at least 5 papers in science (higher part of Table 2)

- Groupe 1: Les 100 philosophes des sciences les plus cités (dans des journaux de philo des sciences)
 - 78% ont publié >1 dans des journaux scientifiques, 58% >2, 29% >5,
 - 21% n'ont jamais publiés dans des revues scientifiques.
- Groupe 2: Les philosophes avec >5 publi dans des revues scientifiques
 - 56% ont plus de la moitié de leurs publi dans des revues de sciences

=> Il y a un sous-ensemble de philosophes pour qui publier en science est un objectif majeur qui mérite une part importante de leur temps de recherche

Visibilité

Name	Title	Date	N Cit SNG	ARC SNG
Fine-A	Hidden-Variables, Joint Probability, and The Bell Inequalities	1982	427	15,81
Shrader-Frechette-Ks	Verification, Validation, and Confirmation of Numerical-Models In The Earth-Sciences	1994	1167	10,91
Sterelny-K	The Extended Evolutionary Synthesis: Its Structure, Assumptions and Predictions	2015	97	10,78
Skyrms-B	Evolutionary Dynamics of Collective Action In N-Person Stag Hunt Dilemmas	2009	108	7,71
Newen-A	Mind Reading: Neural Mechanisms of Theory of Mind and Self-Perspective	2001	394	7,58
Miller-FG	Placebos Without Deception: A Randomized Controlled Trial In Irritable Bowel Syndrome	2010	206	7,10
Churchland-Ps	Problems With Measuring Peripheral Oxytocin: Can The Data On Oxytocin and Human Behavior Be Trusted?	2013	123	6,15
Pennock-RT	The Evolutionary Origin of Complex Features	2003	232	6,11
Colyvan-M	A Taxonomy and Treatment of Uncertainty For Ecology and Conservation Biology	2002	313	5,91
Dietrich-MR	Micrnas and Metazoan Macroevolution: Insights Into Canalization, Complexity, and The Cambrian Explosion	2009	129	4,96
Skyrms-B	A Dynamic Model of Social Network Formation	2000	125	4,63
Fine-A	Joint Distributions, Quantum Correlations, and Commuting Observables	1982	123	4,56
Hull-DI	Individuality and Selection	1980	195	4,53
Godfrey-Smith-P	A Tortoise-Hare Pattern Seen In Adapting Structured and Unstructured Populations Suggests A Rugged Fitness Landscape In Bacteria	2015	26	4,33
Miller-FG	The Nocebo Effect and Its Relevance For Clinical Practice	2011	103	4,29
Sterelny-K	Cause and Effect In Biology Revisited: Is Mayr's Proximate-Ultimate Dichotomy Still Useful?	2011	94	4,27
Smith-B	Relations In Biomedical Ontologies	2005	229	4,24
Pollock-JI	How To Reason Defeasibly	1992	71	4,18
Smith-B	Oae: The Ontology of Adverse Events	2014	29	4,14

ARC = field/year normalized average ratio of citations

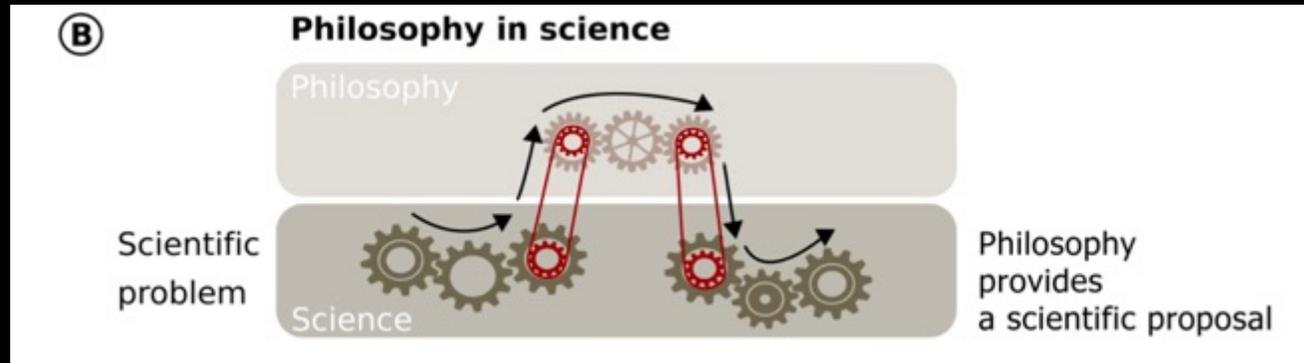
- ARC in science ≥ 1.0 and N citations in science ≥ 20 : 229 articles

Average ARC : 2.19

Types de contributions scientifiques des philosophes

- Nouveaux résultats scientifiques:
 - Nouvelles theories, nouveaux théorèmes.
 - Nouvelles observations/experimentations.
- Nouveaux outils:
 - Nouvelles méthodes.
 - Nouveaux outils conceptuels
- Participation à des débats scientifiques

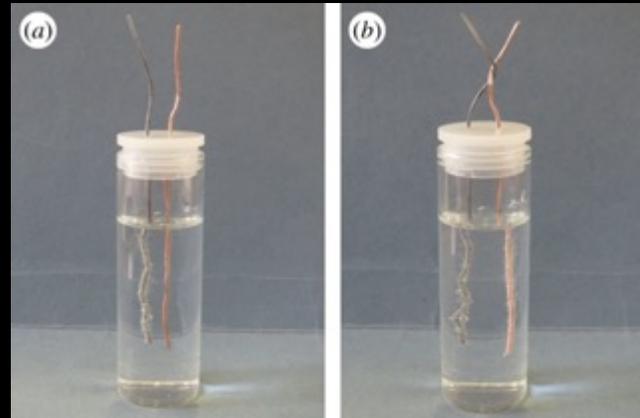
Plus de continuité entre la philosophie et la biologie



Hasok Chang
University of Cambridge



HPS can be the “continuation of science by other means”

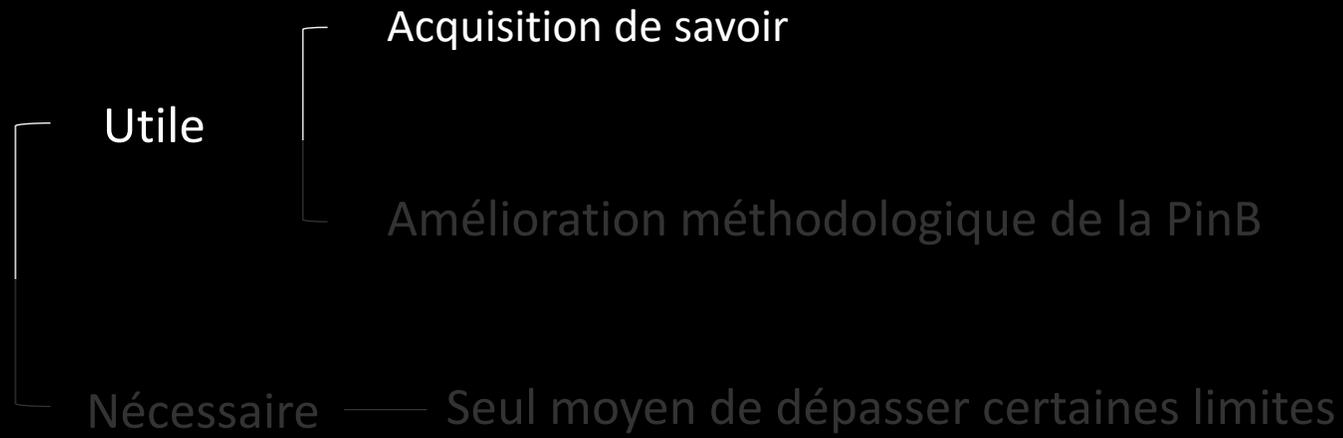


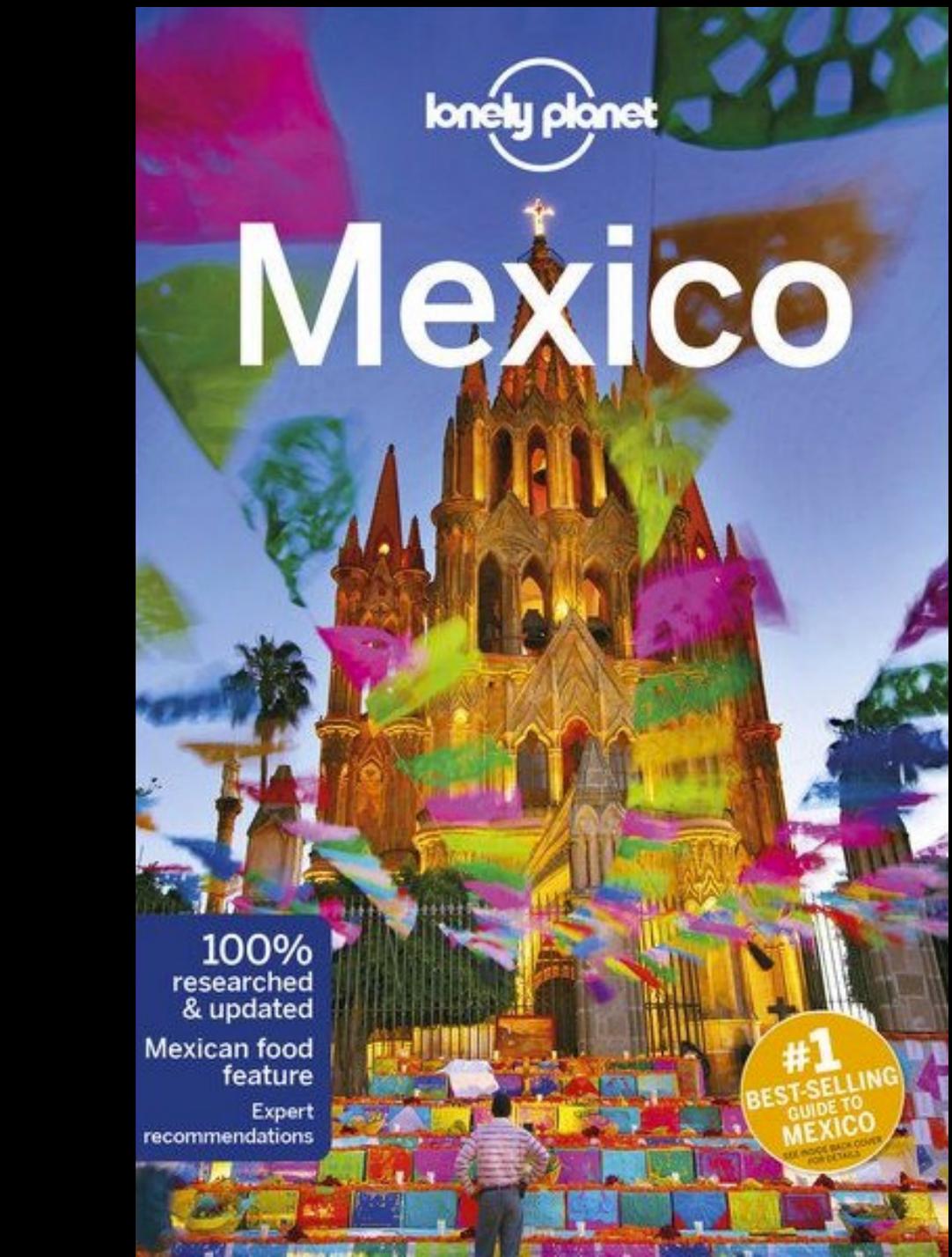
<https://www.forbiddenhistories.com/hasok-anti-chemist/>





Arguments pour



The image shows the cover of the Lonely Planet Mexico travel guide. The background features a large, ornate Gothic cathedral at night, illuminated with warm lights. In the foreground, there are colorful, multi-colored paper lanterns or flags hanging from above. A person is visible in the lower left, looking at a display of colorful items. The Lonely Planet logo is at the top left, and the word 'Mexico' is written in large white letters across the top. There are several callouts: a blue box on the left stating '100% researched & updated Mexican food feature Expert recommendations', and a yellow circular badge on the right stating '#1 BEST-SELLING GUIDE TO MEXICO'.

lonely planet

Mexico

100%
researched
& updated
Mexican food
feature
Expert
recommendations

#1
BEST-SELLING
GUIDE TO
MEXICO
SEE INSIDE BACK COVER
FOR DETAILS

L'experimentation apporte:

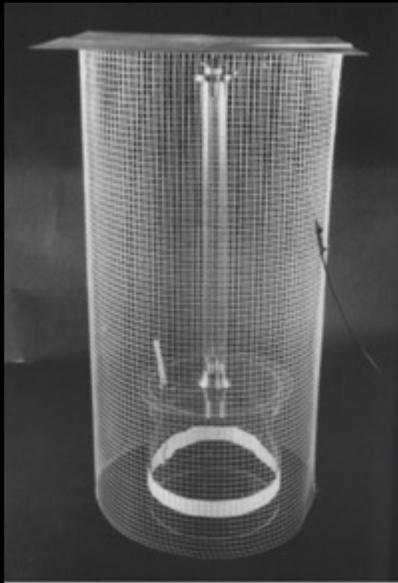
- Une connaissance intime
- Crédibilité/légitimité

Les « expériences historiques »

Objectif: comprendre d'anciennes controverses ou bien des découvertes scientifiques

Controverse sur la loi de l'électrostatique:

$1/r$ vs $1/r^2$



La balance de Coulomb avec et sans la cage de Faraday (Image issue de: « Laboratoire Historique »)

Anomalous dissolution of a gold electrode in salt water.



(Image credit: Hasok Chang)

- **Une meilleure connaissance de l'histoire**

“through historical replications of past experiments, our understanding of history can become deeper, more immediate, and more complete”

H Chang, Sci & Educ 2011

- **Une meilleure connaissance de la science**

“practical history always teaches us a lot about science... We learn that science is difficult, that it involves choices and techniques and practices that remain largely unarticulated and sometimes ‘black-boxed’, as sociologists like to put it. That tells us much about how science works.”

Maienschein, Laubichler, Loettgers, Isis 2008

- **Une meilleure connaissance de la nature**

“improve scientific knowledge itself—that is, to gain more, better, or different knowledge of nature than current science delivers”

H Chang, Sci & Educ 2011

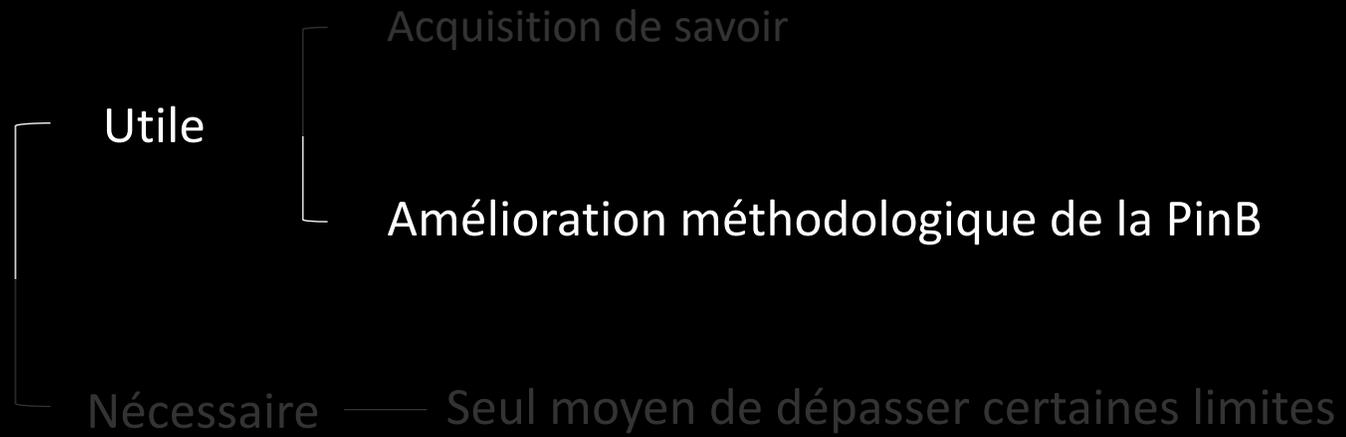
L'expérimentation apporte des connaissances

La PoB repose sur de bonnes connaissances de la bio

Les philosophes de la bio ne font pas d'expériences

Peut-on se passer de ces connaissances?

Arguments pour



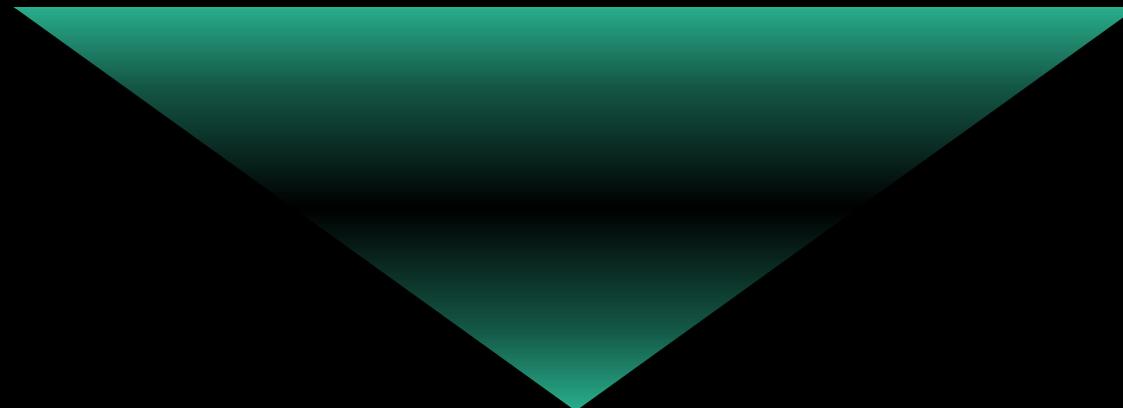
Objectif de la PinS: contribuer à la science

Obstacles: Les scientifiques peinent à voir la plus-value de la philosophie pour les sciences (eg Hawking: “philosophy is dead”)

Il faut donc montrer comment la philo peut-être utile en pratique dans les sciences

- Poser des questions/soutenir des thèses avec des conséquences concrètes
- Faire des interventions qui peuvent être testées, ou utilisées expérimentalement

philosophie



biologie expérimentale

Arguments pour

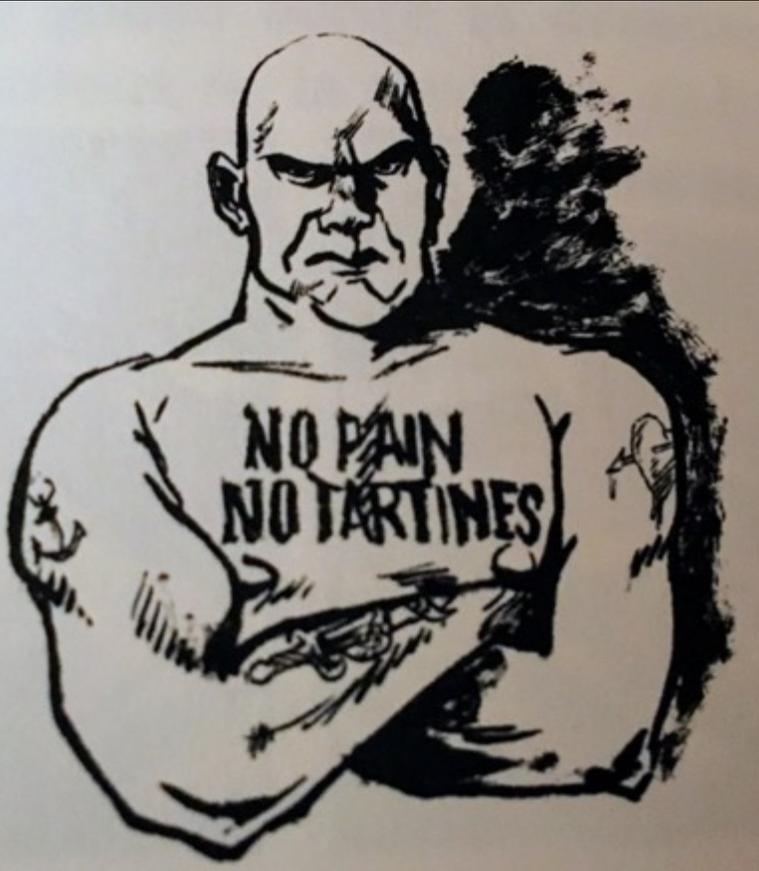
Utile

Acquisition de savoir

Amélioration méthodologique de la PinB

Nécessaire

Seul moyen de dépasser certaines limites



Chang:

HPS as a continuation of science

Science by other means

Experimentation as a continuation of philosophy

Philosophy by other means

Philosophie du Cancer

Sociétés savantes et congrès, postes dans les universités, revues, manuels, cursus universitaire

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Cancer

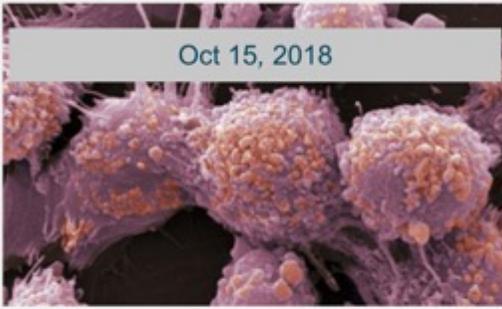
First published Tue May 7, 2019; substantive revision Mon Oct 23, 2023

Cancer is a major health problem worldwide; it is a leading cause of death, and with few exceptions, there have been steady increases in incidence and mortality (WHO, 2020). Perhaps not surprisingly, then, cancer is a central topic of biomedical research, drawing billions of dollars annually. In 2019, the U.S. National Cancer Institute (NCI) allocated \$5.74 billion in federal dollars, a \$79 million increase over 2018 (NCI, 2019—see the Other Internet Resources). A search for the term “cancer” in PubMed returns over three million hits.

Despite this, cancer—and scientific research on cancer—has received relatively little attention from philosophers of science. However, this is starting to change. Recent work by philosophers of science has made substantial contributions to addressing conceptual and methodological issues that arise in cancer science and medicine (Pradeu, et. al., 2023). This entry will focus on four such issues.

First, scientific classifications of cancer have as yet failed to yield a unified taxonomy. There is a diversity of classificatory schemes for cancer, and while some are hierarchical or nested, others appear to be “cross-cutting.” Initially, researchers turned to genomics in hopes that such issues might be resolved by molecular “subtyping”. However, genomic sequencing and its sequelae—transcriptomics, proteomics, epigenomics, etc.—have, if anything, complicated cancer classification. This literature thus raises a variety of questions about both the nature of the disease and disease classification: Are there some classifications that are more useful, or better than others? What makes a classification a good one? What does it mean to track more or less “natural” distinctions in the context of disease? The problem of cancer classification is complicated by the fact that cancer progression is a process with a complex natural history. Thus, cancer serves as a challenging case not only for disease classification, but also for demarcating disease from health.

Oct 15, 2018

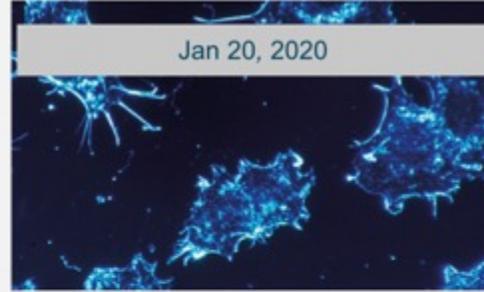


Philosophy of Cancer Biology Workshop, with Hans Clevers (PUSG, University of Bordeaux, France)

The University of Bordeaux, the CNRS, ImmunoConcEpT, and PhillnBioMed host an international workshop on the Philosophy of Cancer Biology in Bordeaux, France, organized by Sara Green, Lucie Laplane, Maël Lemoine, ...

[Continue reading](#) →

Jan 20, 2020

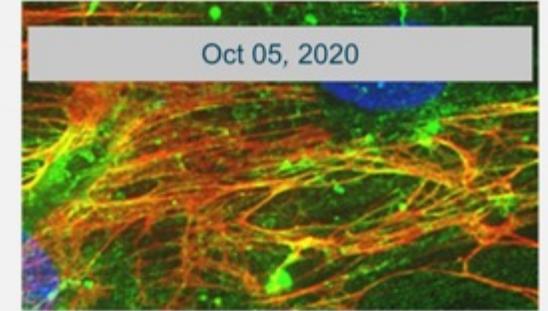


Second Philosophy of Cancer Biology Workshop, with Jerome Galon and Joel Brown (Pey Berland, Bordeaux, France)

January 20th-21st, 2020 University of Bordeaux (France) Campus Pey Berland (35 Place Pey Berland 33000 Bordeaux) The University of Bordeaux, the CNRS, ImmunoConcEpT, and PhillnBioMed host the second international ...

[Continue reading](#) →

Oct 05, 2020



Third Philosophy of Cancer Biology Workshop, with Fanny Jaulin and Andrei Seluanov (via Zoom)

Videos of talks available below Program and list of speakers Program 3rd Philosophy of Cancer Biology Workshop (please click to enlarge) Plenary speakers Fanny Jaulin (Gustave Roussy, INSERM, ...

[Continue reading](#) →

Dec 06, 2021



Fourth Philosophy of Cancer Biology Workshop

The Fourth Philosophy of Cancer Biology Workshop will be held in Bordeaux, France. Campus Victoire Amphi Sigalas (Building C - 2nd Floor) 3ter Place de la Victoire, 33000 Bordeaux, France ...

[Continue reading](#) →

Oct 06, 2022



Fifth Philosophy of Cancer Biology Workshop: Cancer and Evolution

This workshop will explore cancer from an evolutionary perspective, with a strong focus on how cancer appeared and evolved and on the different forms of cancer across taxa. Schedule Speakers ...

[Continue reading](#) →

Mar 04, 2024



Sixth Philosophy of Cancer Biology Workshop

The Sixth Philosophy of Cancer Biology Workshop was held in Bordeaux, France, from March 4th to 6th, 2024. Context Cancer is one of the main causes of death globally according ...

[Continue reading](#) →

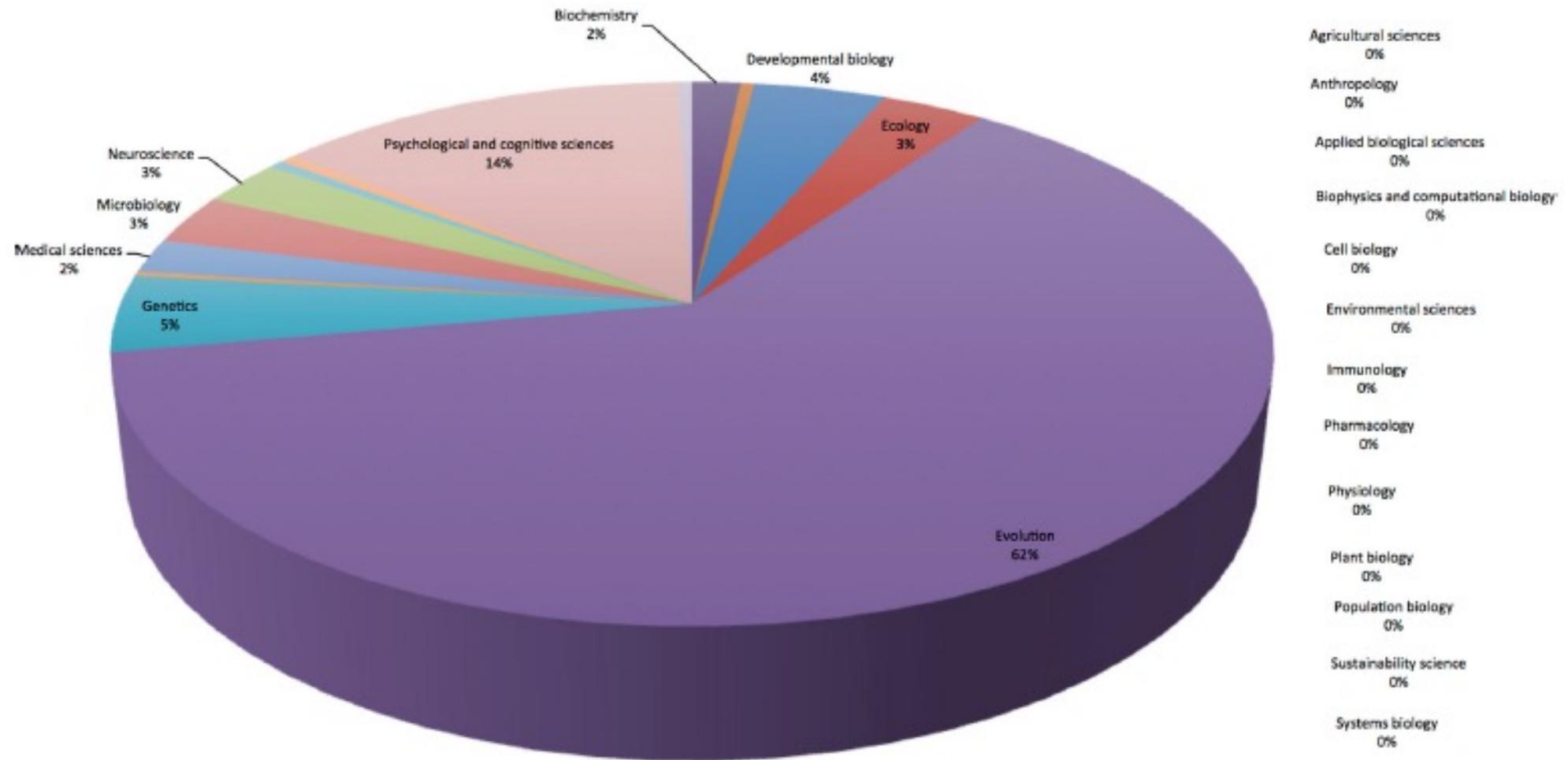


Fig. 2 Biological domains represented in Biology & Philosophy from 2003 to 2015

Petite recherche

- Le cancer, qu'est-ce que c'est?
- Les chiffres du cancer

Ligue contre le cancer, INCa, ARC, FRM

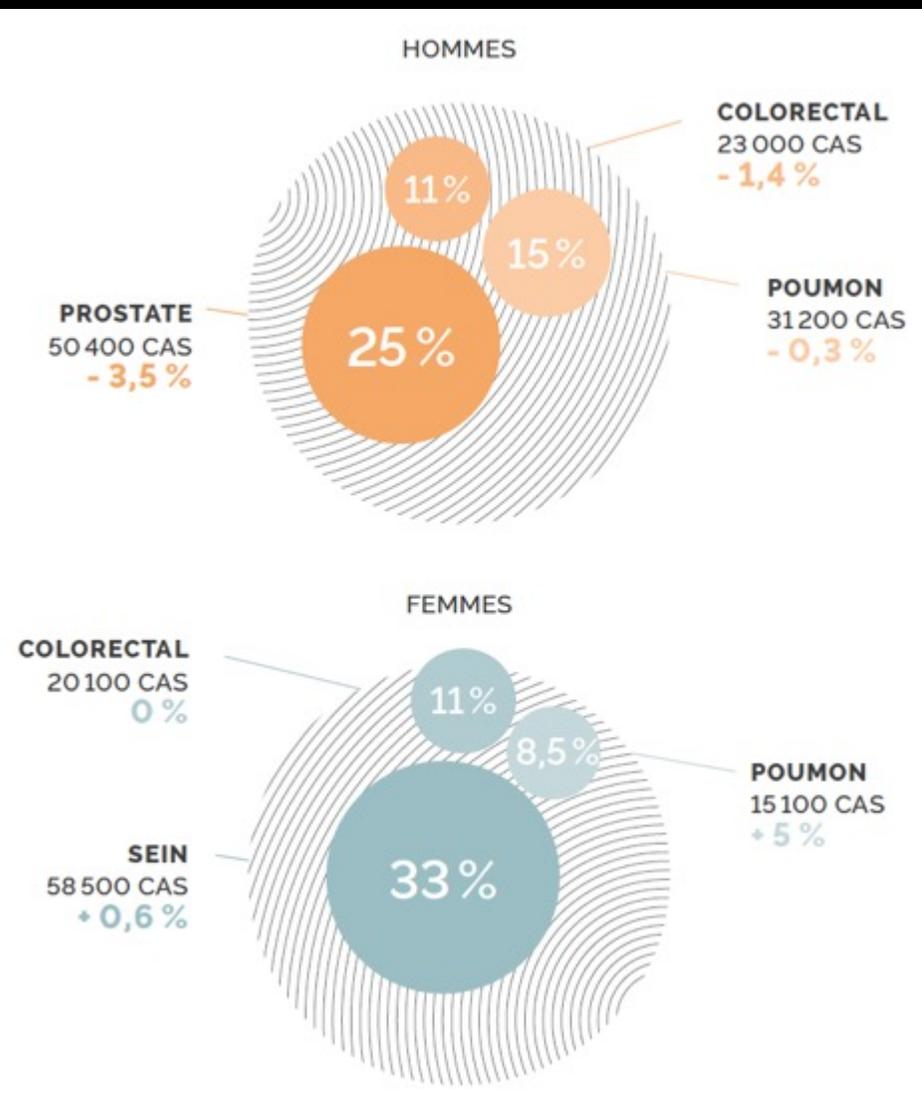
Le cancer en France

1ère cause de mortalité
chez les hommes
2ème chez les femmes

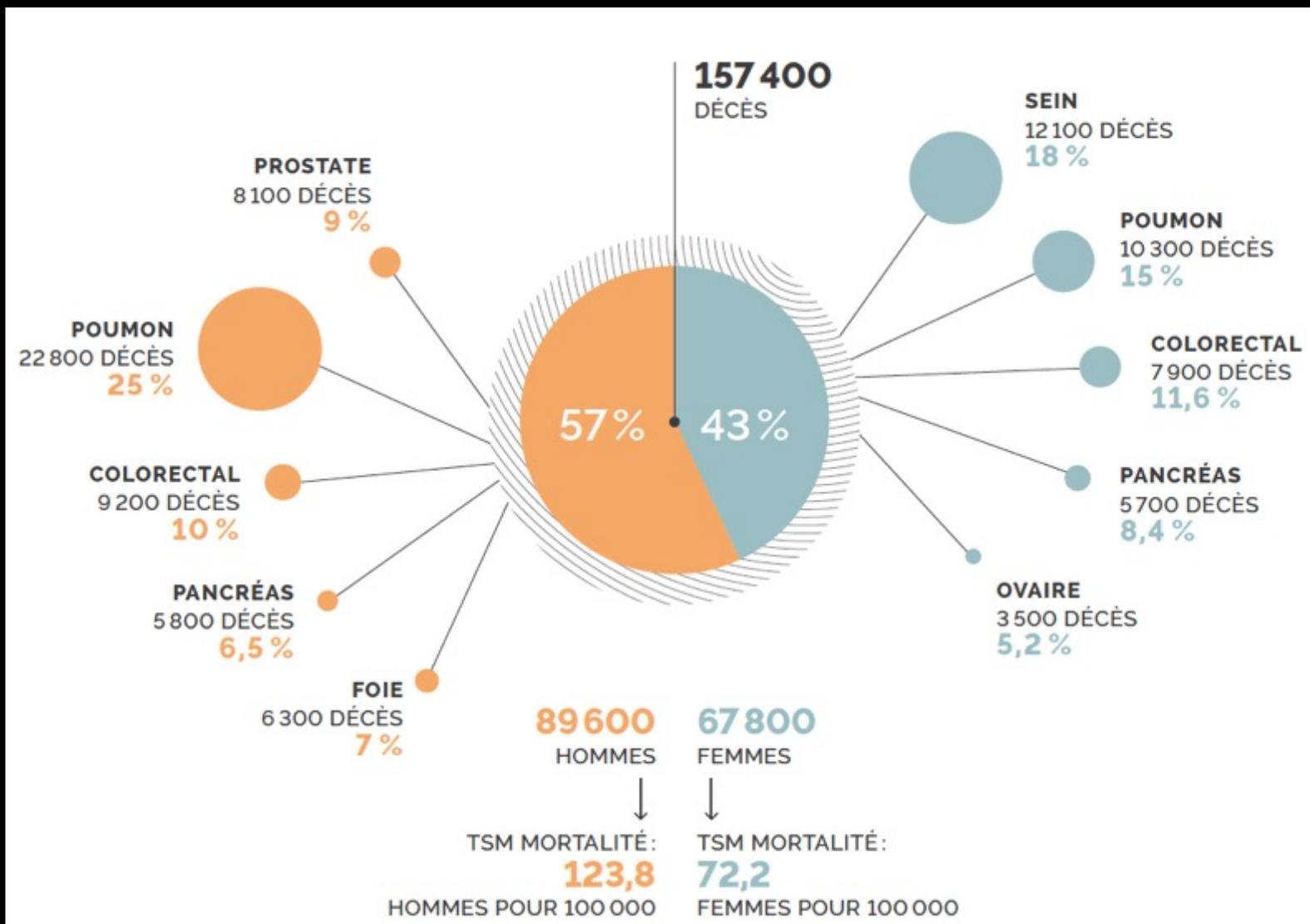
382 000
Nouveaux cas
En 2018

157 400
Décès
En 2018

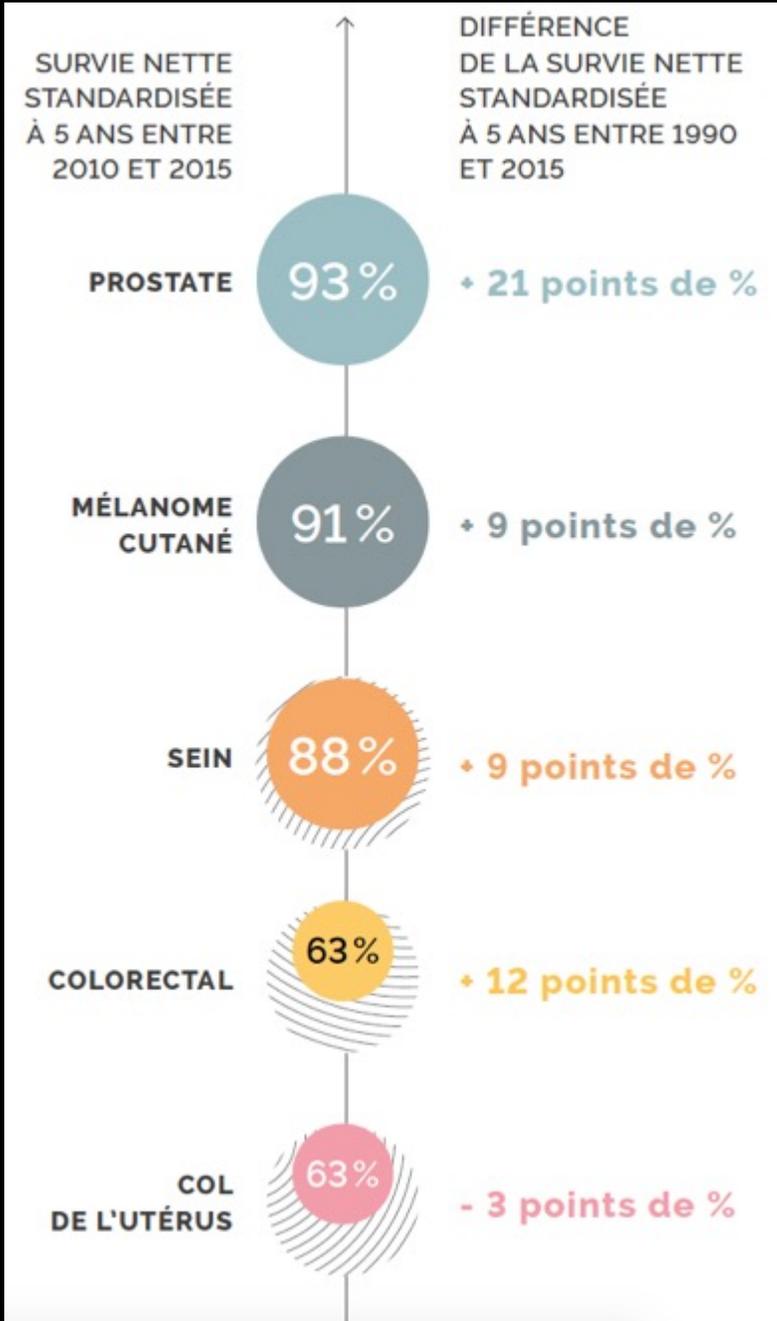
Les cancers les plus fréquents



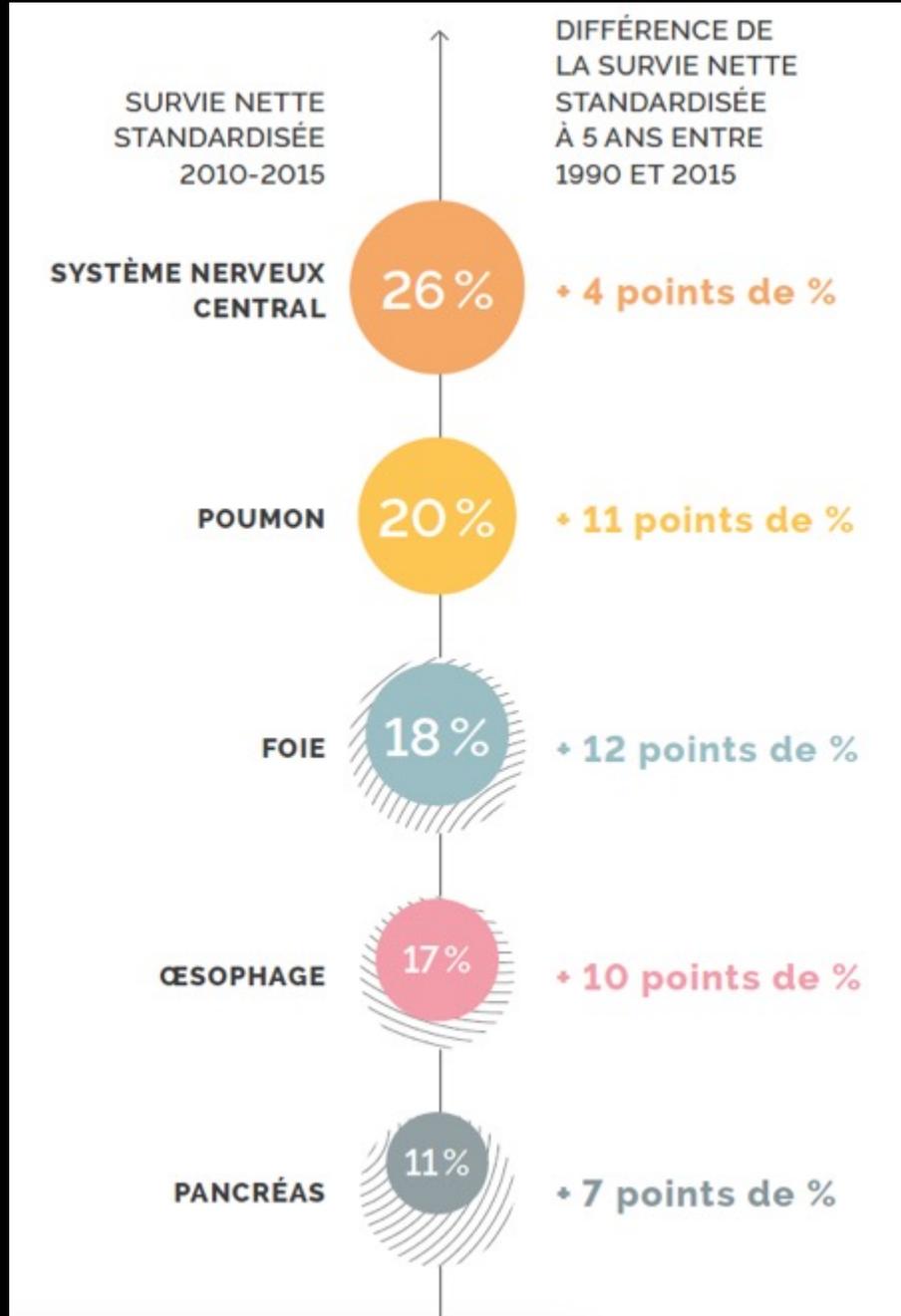
Les cancers les plus mortels



Bon pronostic



Mauvais pronostic



382 000
Nouveaux cas
En 2018

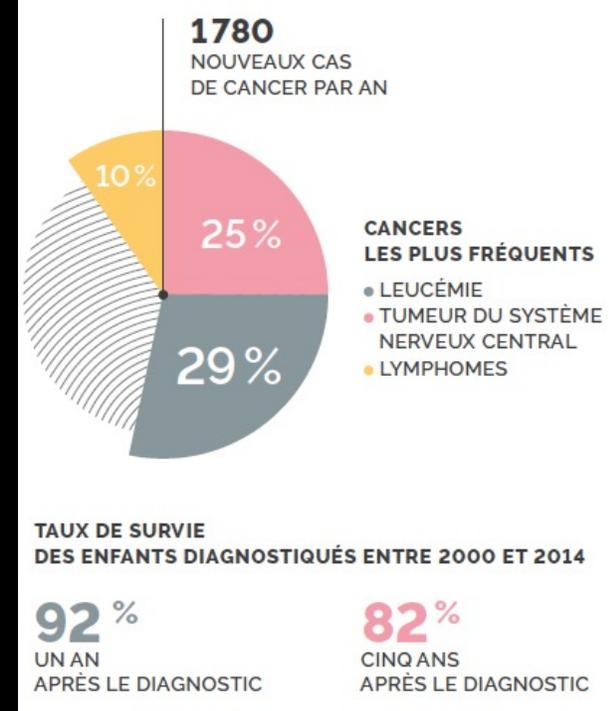
Age median au diagnostic

- Femmes: 67 ans
- Hommes: 68 ans

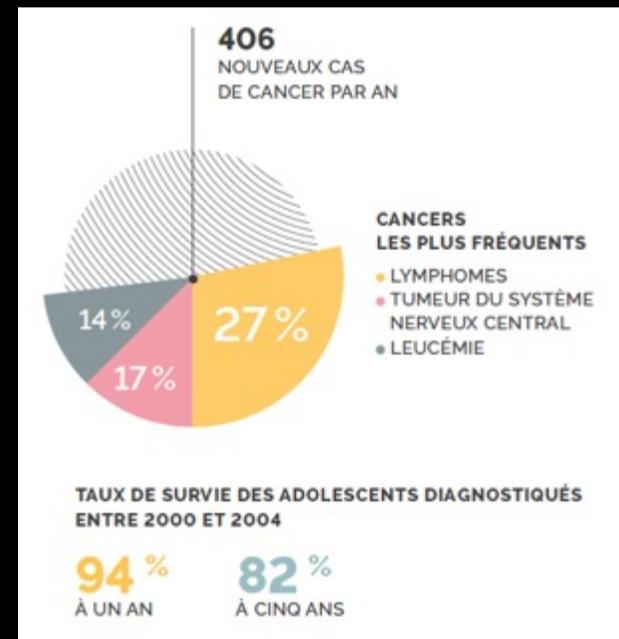
Age median au décès:

- Femmes: 75 ans
- Hommes: 73 ans

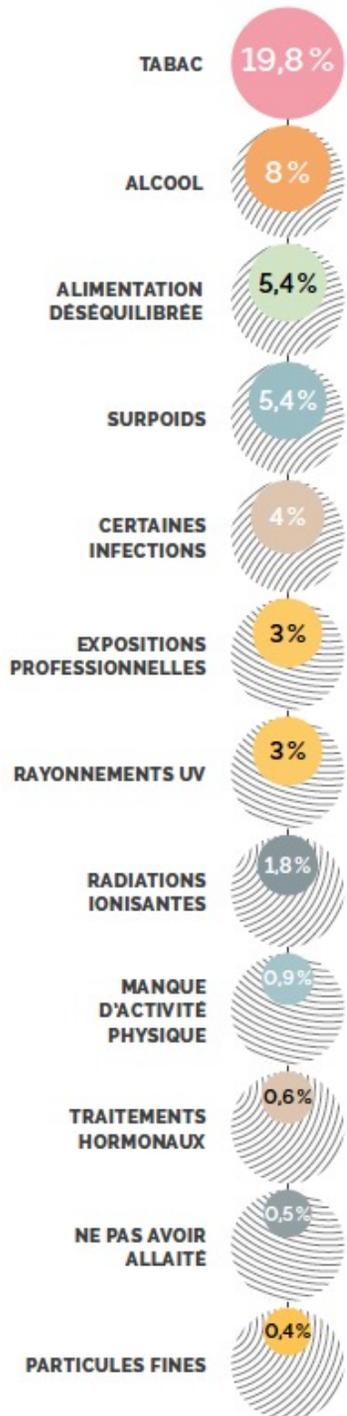
**Enfants
(0-15 ans)**



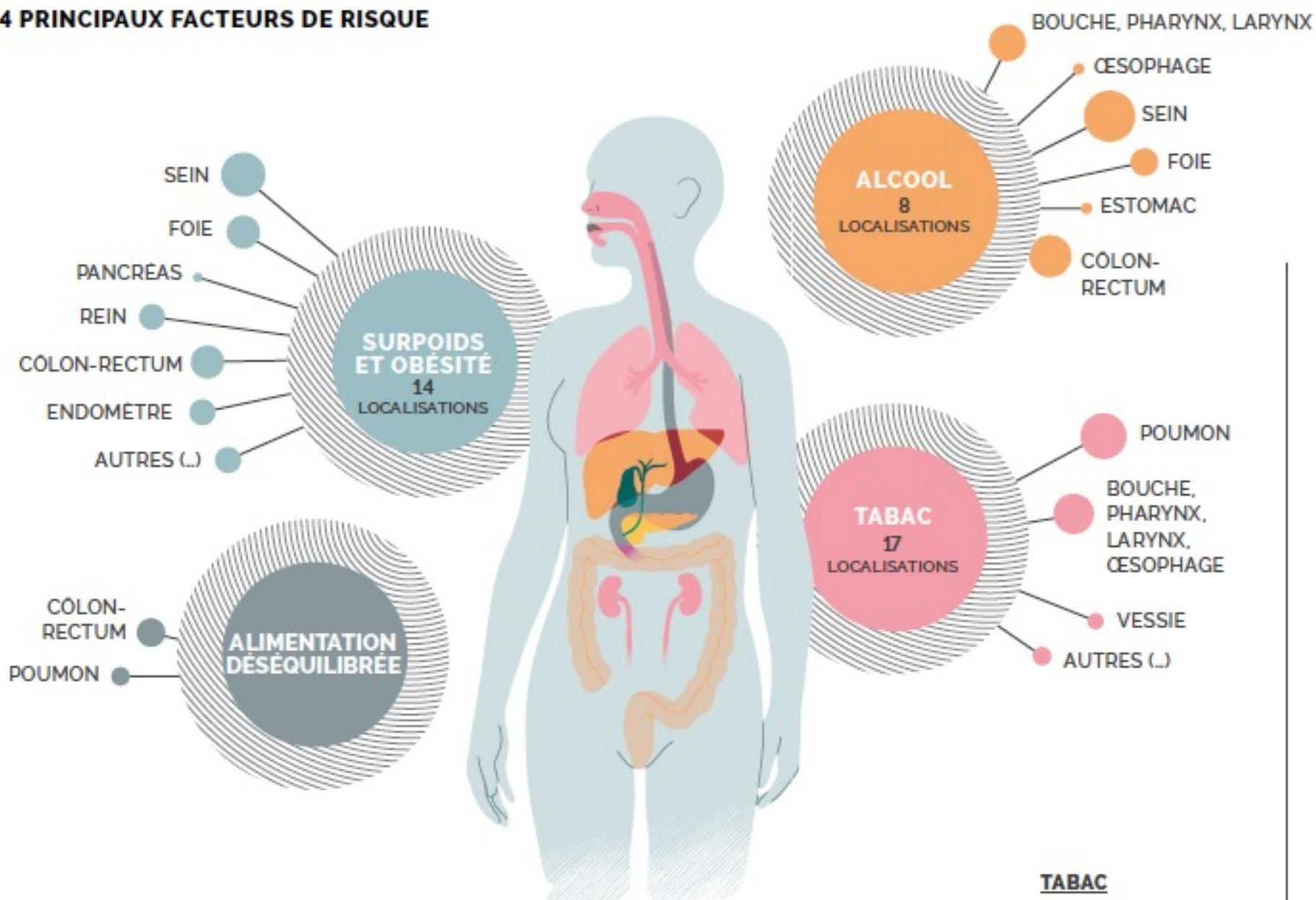
**Adolescents
(15-17 ans)**

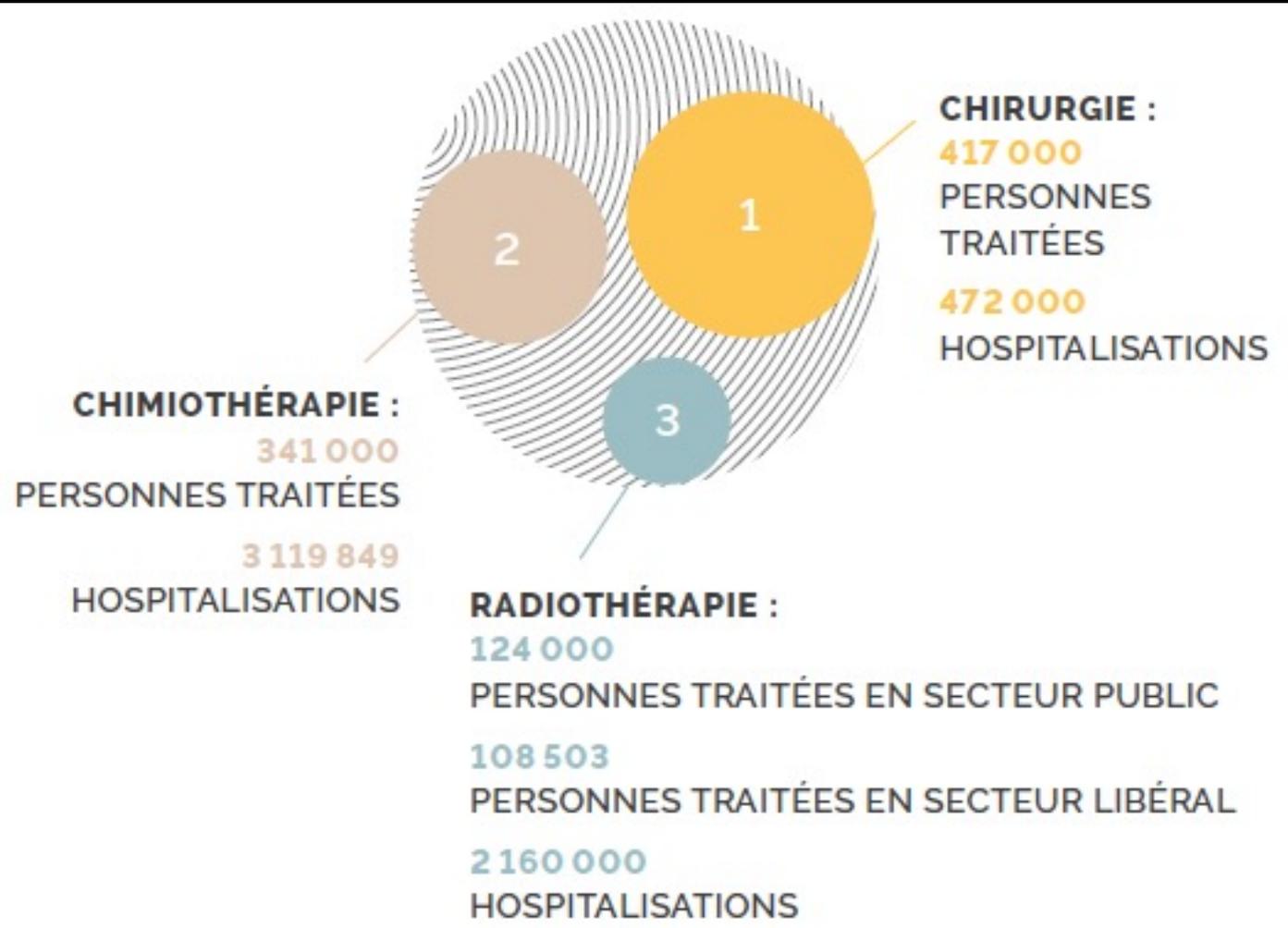


40% des cancers pourraient être évités



LES 4 PRINCIPAUX FACTEURS DE RISQUE





Immunothérapies:

- 36 315 inhibiteurs de points de contrôle
- 165 CAR-T

**LES SÉQUELLES DU CANCER
 OU DES TRAITEMENTS,
 5 ANS APRÈS**

63,5%

DES PERSONNES SOUFFRENT
 DE SÉQUELLES DUES AU CANCER
 OU AUX TRAITEMENTS,

3000 B.C. - 1890

Surgical Treatments

Surgical treatment or cauterization of tumors as the only therapeutic option



Radiotherapy

Marie and Pierre Curie started to treat tumor by using X-Rays

1900

1940

Chemotherapy

Development of antitumor drugs for the treatment of hematological and solid tumors



Targeted Therapy

Tyrosine Kinase Inhibitors and Monoclonal Antibodies directed to specific tumors and molecular alteration

1980

2010

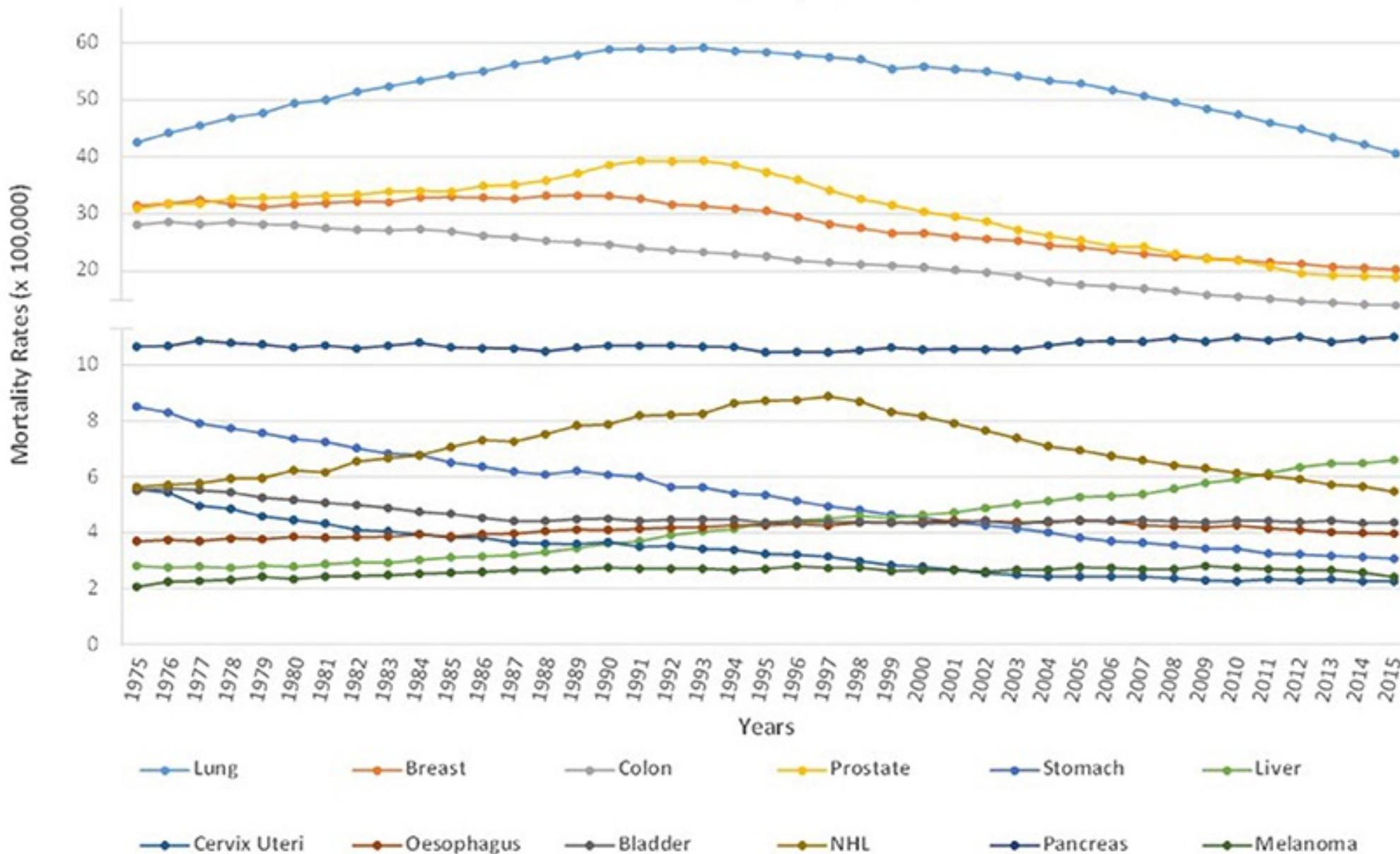
Checkpoint Inhibitors

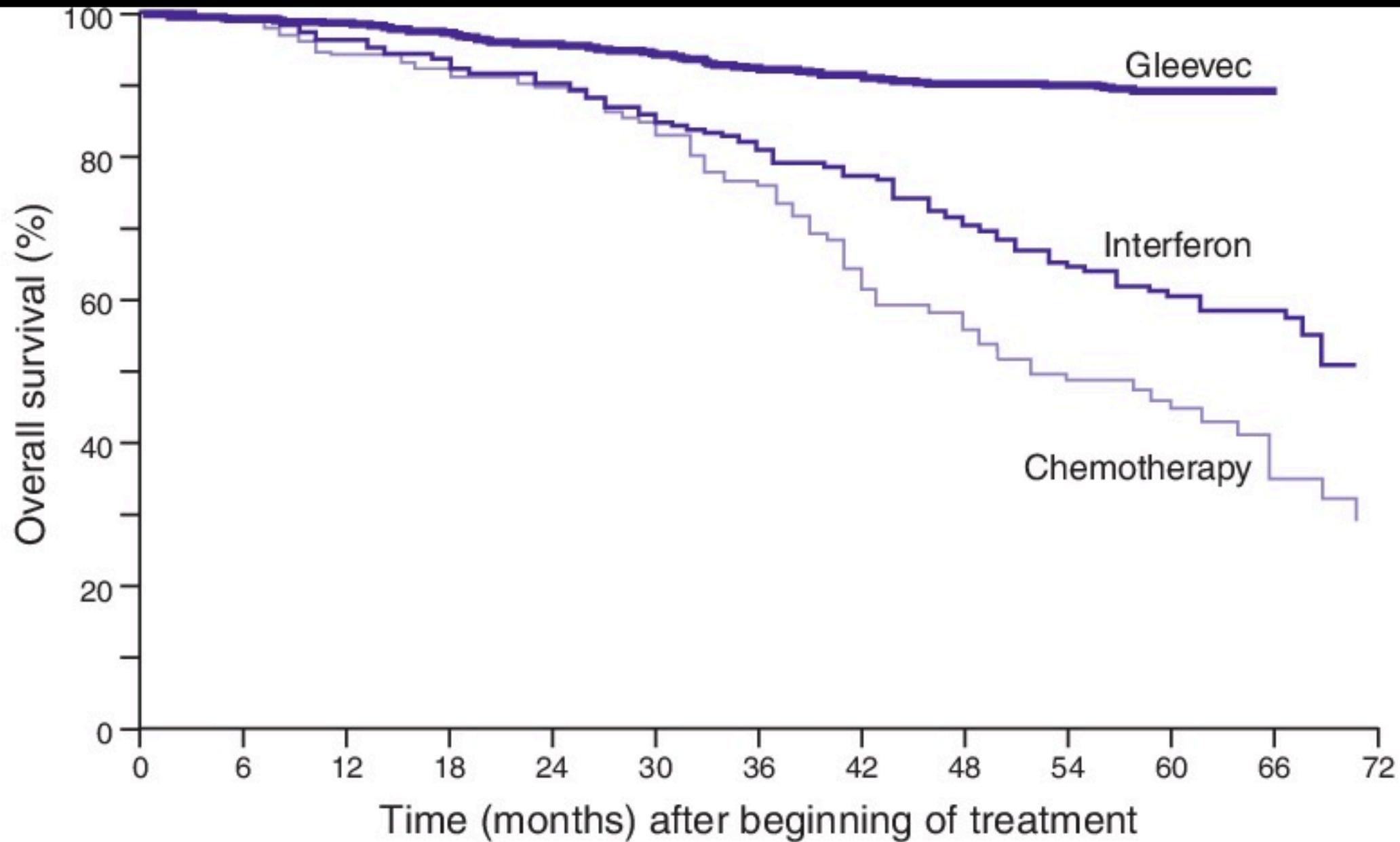
Use of Monoclonal Antibodies able to stimulate the immune system against cancers



B

Trend of Mortality 1975-2015





Qu'est-ce que le cancer ?

Le cancer est une maladie caractérisée par la prolifération incontrôlée de cellules, liée à un échappement aux mécanismes de régulation qui assure le développement harmonieux de notre organisme.

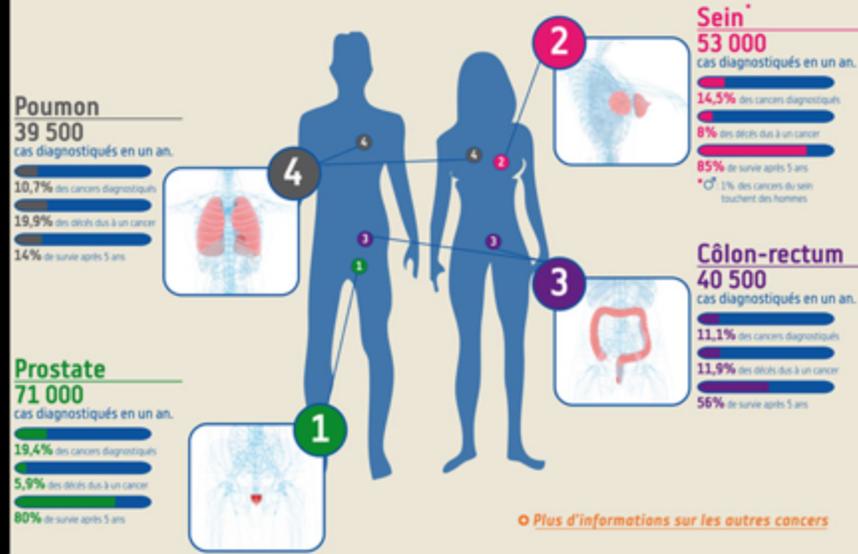


1 homme sur 2 & 1 femme sur 3 se verra diagnostiqué un cancer avant 85 ans



60% de guérison

Les quatre principaux cancers en France



Quels facteurs de risques pour ces cancers ?

Les cancers sont des maladies multifactorielles dans lesquelles interviennent à la fois des facteurs biologiques et des facteurs liés aux comportements individuels et à l'environnement au sens large. On distingue les facteurs de risque :

- **prouvés** : par des études épidémiologiques qui montrent des associations cohérentes avec peu de contradictions.
- **possibles mais non prouvés** : par des études épidémiologiques moins cohérentes ou en nombre insuffisant.
- **non prouvés** : car il y a une absence de relation avec le risque de cancers.

Les principaux facteurs de risques « prouvés »

