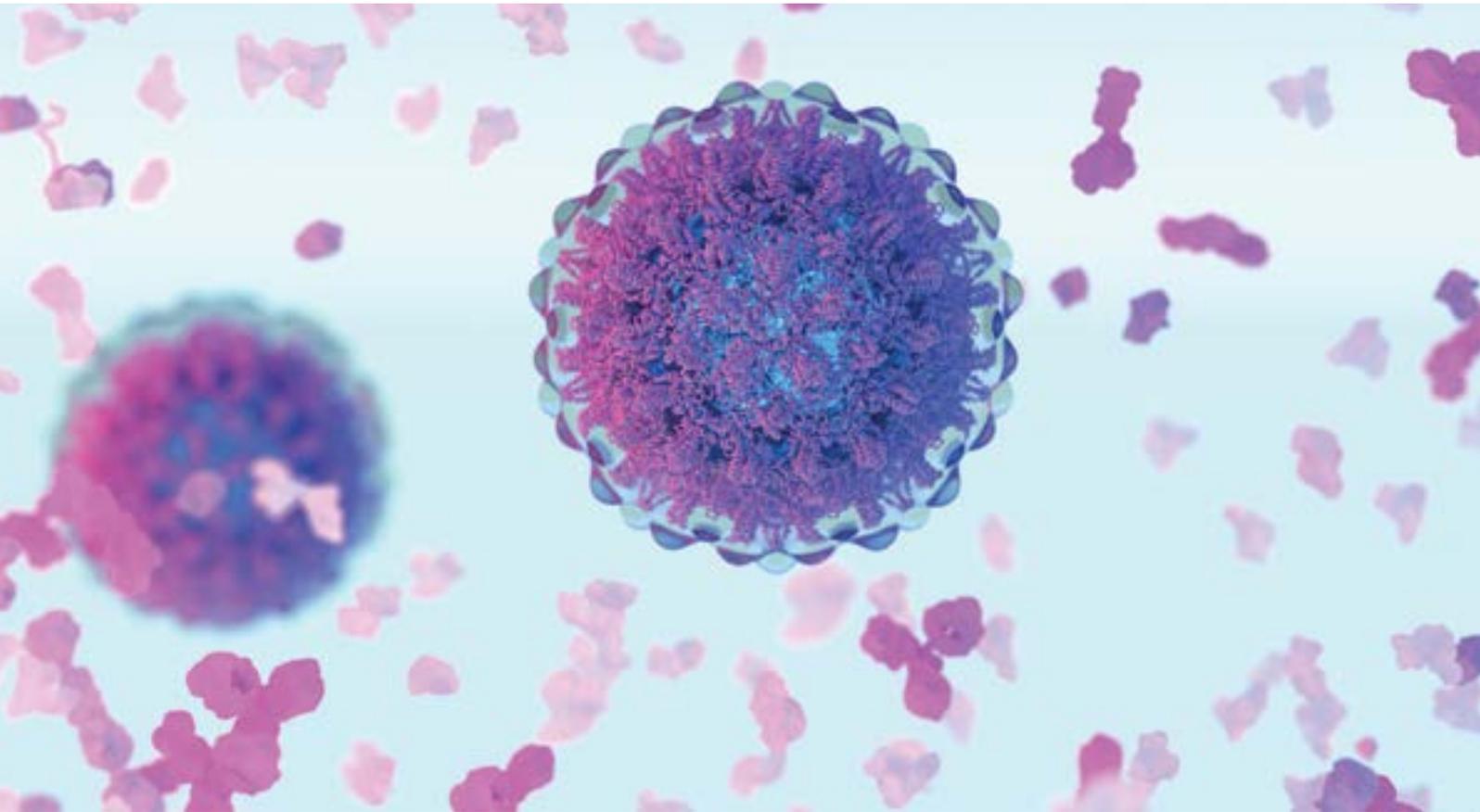




# ICE-HBV

International Coalition to Eliminate HBV

PROMOTING GLOBAL COLLABORATION IN HBV CURE RESEARCH



Worldwide, more than 257 million people are chronically infected with hepatitis B virus (HBV) and, even though a prophylactic vaccine and effective antiviral therapies have been developed, there is no cure.

HBV kills more people than malaria. Chronic HBV (CHB) infection results in 887,000 deaths per year from cirrhosis and liver cancer<sup>1</sup>. CHB cannot be cured today due in part to the continued presence of a viral reservoir which is not targeted by current therapies. CHB persists despite the best treatment, and risks of liver cancer remain. Current treatments must generally be taken for life to remain effective and fewer than 8 per cent of people who need them have access to them. Experts estimate that liver cancer deaths will substantially increase in coming decades while deaths from most other cancers and major communicable diseases are decreasing<sup>3,4</sup>.

This high burden of disease, in spite of the availability of effective interventions to prevent infection and treat adverse outcomes in those affected, warrants a coordinated international effort to cure CHB. ICE-HBV was created in 2016 to answer this need<sup>5</sup>.

RESEARCH

EDUCATION

COLLABORATION

INNOVATION

The push for a cure for CHB infection is particularly timely and builds upon a solid foundation.

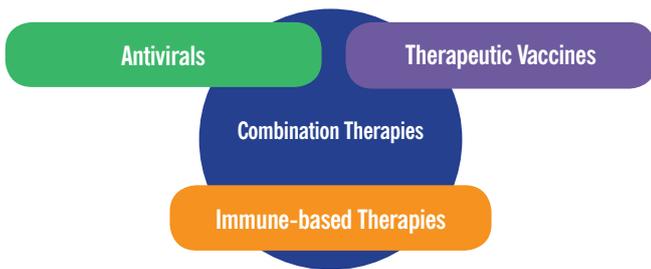
Recent scientific discoveries herald an exciting new era in HBV research. These include:

- Identification of the NTCP receptor, the point of entry the virus uses to infect cells,
- Improved cell culture and animal models,
- Characterization of the function of HBx, the viral protein that favours replication of the virus,
- Increased knowledge of HBV minichromosome biology.

Significant momentum in the global response to viral hepatitis and effective curative treatments for hepatitis C create fertile ground for a global push for an HBV cure.

A combination of strategies that target the virus and enhance the immune response will most likely be required to cure the infection<sup>5</sup>.

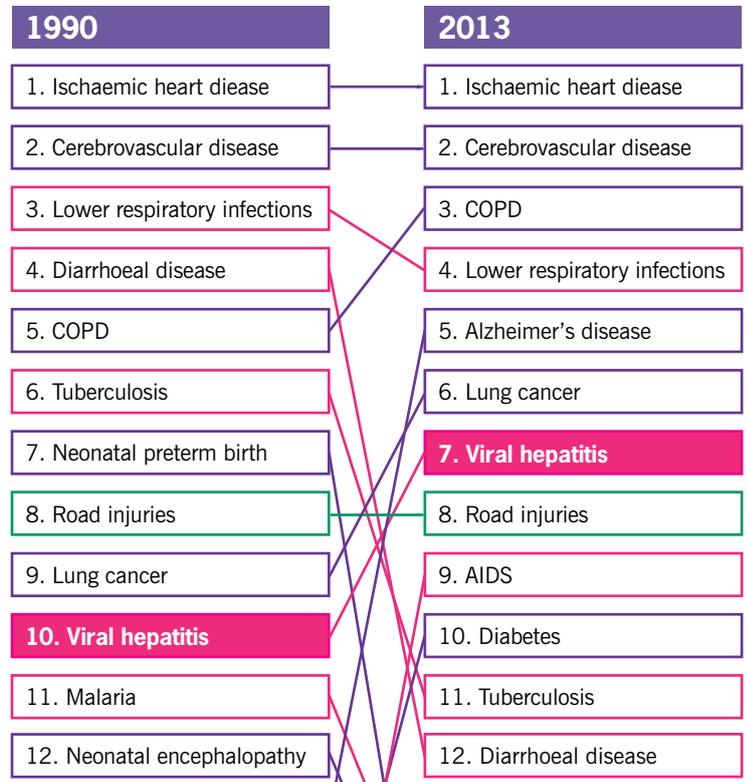
## HBV CURE STRATEGIES



## VISION

ICE-HBV aims to fast-track the discovery of a safe, effective, affordable and scalable cure to benefit all people living with CHB, including children and people living with HCV, HDV and HIV co-infection. ICE-HBV intends to contribute to the elimination of CHB as a global public health challenge.

Following an inclusive nomination process, ICE-HBV formed international multidisciplinary scientific working groups consisting of leaders in HBV virology, immunology, technology and clinical research who have collaborated to identify current strengths in the HBV field that can be built upon, as well as knowledge gaps that must be addressed to achieve a cure. Together, they have developed the first Global Scientific Strategy for an HBV Cure, which will be published in 2018.



Leading causes of mortality and trends, 1990-2013<sup>8</sup>.

■ Communicable & neonatal   ■ Non-communicable   ■ Injuries

ICE-HBV participates in the DZIF-ANRS international research project on the standardization of quantitative cccDNA measurements. The objective of this project is to develop reliable laboratory protocols for cccDNA quantification by comparing head-to-head different methodologies and by exploring new strategies to improve specificity of cccDNA qPCRs.

“ *Building on the current momentum, there could be a cure for HBV within a decade, which would save millions of lives and could reduce the economic burden of life-long therapy for CHB.* ”

Fabien Zoulim, ICE-HBV Vice-Chair



## WHAT CAN YOU DO

- 1 Support ICE-HBV activities: by funding our working groups, or donating towards one of our young investigators projects, and/or sponsoring our meetings.
- 2 Raise awareness and advocate for an HBV cure, asking your government to fund life-saving research on CHB.

## KEY GOALS

**Goal 1 – Generate knowledge, foster collaborations and perform research to accelerate scientific innovation in collaboration with key stakeholders.**

- 1.1 Perform basic science research and coordinate the development of essential research tools such as standardized assays for cccDNA, novel biomarkers to predict cure, new cell-culture models, non-human primate models, reagent databases and HBV DNA rapid diagnostics.
  - Set up project working groups, in partnership with key stakeholders, including ICE-HBV industry sponsors.
  - When required, encourage resource development efforts for these projects, including collaborative grant applications.
- 1.2 Promote and support the establishment of HBV reagent, material and standardized protocol repositories available to all.
  - Create a wish list for research agencies such as NIAID, including suggested sources.
- 1.3 Monitor scientific progress using the ICE-HBV scientific strategy as baseline.
  - Hold sessions to report progress at HBV cure symposia (ANRS, International HBV Meeting, Singapore, Toronto).

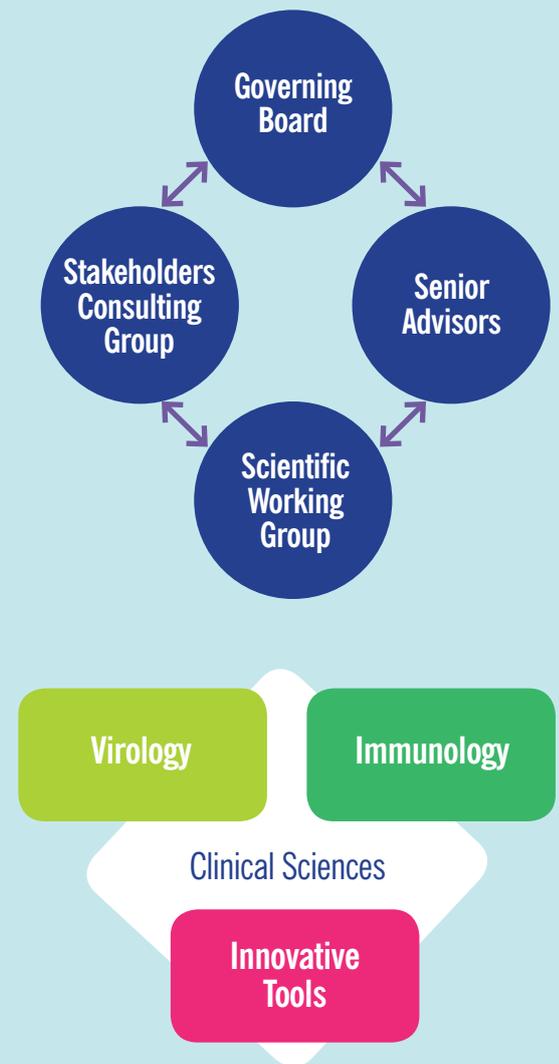
**Goal 2 – Disseminate knowledge and engage key stakeholders to ensure the timely translation of discoveries into positive health outcomes and quality of life.**

- 2.1 Support cure preparedness activities undertaken by key stakeholders working together in the stakeholders consulting group around the following three pillars:
  - Global health policy & advocacy, including access to medicines,
  - Community engagement, including trials and literacy,
  - Clinical care, including cost effectiveness.
- 2.2 Collaborate with key stakeholders and media to increase global awareness of HBV public health impact.
  - Support WHO's global health sector strategy on viral hepatitis, including providing scientific advice for the strategic information effort. Participate in the #NoHep movement.
  - Coordinate and support HBV cure-related events globally.
  - Disseminate HBV and HDV cure research among international stakeholders and national health systems:
    - » Focus on regions and populations most affected by the disease.
    - » Bring the HBV cure message to World Hepatitis Day.
  - Advocate for increased HBV cure research investments.

**Goal 3 – Support a sustainable international multidisciplinary scientific coalition to find a cure for HBV and HDV**

- 3.1 Ensure that the governance framework is supportive of ICE-HBV vision and values.
- 3.2 Develop multi-year resources for ICE-HBV sustainability.
- 3.3 Continue building the coalition.

## ICE-HBV STRUCTURE



“ Our aim is to inspire and support the discovery of a safe, scalable and effective cure for the benefit of all people living with CHB. To achieve this, we have created an international research-driven forum, which is coordinating, promoting and fostering collaborative partnerships among researchers and stakeholders, to accelerate the discovery of a CHB cure. ”

Peter Revill, ICE-HBV Chair,  
Peter Doherty Institute for  
Infection and Immunity  
(Doherty Institute)



# HBV PREVENTION, CARE, TREATMENT AND CURE

ICE-HBV supports the global health sector strategy on viral hepatitis (WHO, 2016)<sup>2</sup>. By no means should the strengthening of HBV cure research direct resources away from scaling up effective HBV prevention, care and treatment programmes. However, the HBV scientific community believes that governments, foundations and other research sponsors should work together to make a substantial investment in HBV cure research now. HBV research has been largely underfunded compared with other diseases; enhanced investments could make a big difference and create important resource savings by 2030<sup>6</sup>. Furthermore, scaling up deployment of current treatments is not enough to prevent adverse outcomes in all patients; a substantial risk of liver cancer remains<sup>7</sup>. Coupled with the implementation of the 2016 global health sector strategy on viral hepatitis, an HBV cure could help fully eradicate HBV, thus saving millions of lives.

## DONORS



## PARTNERS



## SENIOR ADVISORS

Marion Peters, USA  
Raymond F Schinazi, USA  
Stephen Locarnini, Australia  
Frank Chisari, USA

## STAKEHOLDERS CONSULTING GROUP CO-CHAIRS

Timothy Block, USA  
Veronica Miller, USA  
Ulrike Protzer, Germany

## MEMBERS

### Current Governing Board Members

Christian Bréchet, France (Honorary President)  
Peter Revill, Australia (Chair)  
Fabien Zoulim, France (Deputy Chair)  
Anna Kramvis, South Africa  
Joan Block, USA  
Massimo Levrero, Italy  
Wenhui Li, China  
T Jake Liang, United States  
John Tavis, USA  
Capucine Penicaud, Ex-Officio, France

### Scientific Working Groups Co-chairs

#### Virology

Maura Dandri, Hamburg University, Germany  
Haitao Guo, Indiana University, USA

#### Immunology

Adam Gehring, Toronto University, Canada  
Robert Thimme, Freiburg University, Germany

#### Innovative Tools

Jianming Hu, Pennsylvania State University, USA  
Fengmin Lu, Peking University Health Science Center, China

#### Clinical Studies

Harry L.A. Janssen, Toronto University, Canada  
Pietro Lampertico, Milan University, Italy  
Seng Gee Lim, National University Health System, Singapore



“The time is right for a coordinated and international research campaign such as ICE-HBV to find a cure. The almost one million deaths from hepatitis B worldwide each year is unacceptable, but recent advances in science make this a winnable battle. I am optimistic that a cure is possible and within reach if we all work together to make hepatitis B history!”

Joan Block, Co-founder and Senior Advisor, Hepatitis B Foundation

## REFERENCES

1. WHO. Hepatitis B Fact Sheet. <http://www.who.int/mediacentre/factsheets/fs204/en/> (accessed February 2018)
2. WHO, Global health sector strategy on viral hepatitis, 2016–2021 – the first of its kind. see <http://www.who.int/hepatitis/strategy2016-2021/ghss-hep/en/> (accessed February 2018)
3. Perz, J. F., et al. (2006). “The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide.” *J Hepatol* 45(4): 529-538.
4. Global Burden of Disease Cancer Collaboration, et al. (2015). *JAMA Oncol* 1(4):505-527.doi:10.1001/jamaoncol.2015.0735
5. Revill, P., et al. (2016). “Global strategies are required to cure and eliminate HBV infection.” *Nat Rev Gastroenterol Hepatol* 13(4): 239-248.
6. Nayagam, S. et al. Requirements for global elimination of hepatitis B: a modelling study. *The Lancet Infectious Diseases*, Volume 16, Issue 12, 1399 – 1408 (2016)
7. Arends, P., et al. (2015). “Entecavir treatment does not eliminate the risk of hepatocellular carcinoma in chronic hepatitis B: limited role for risk scores in Caucasians.” *Gut* 64(8): 1289-1295
8. Stanaway, Jeffrey D et al. (2016) The global burden of viral hepatitis from 1990 to 2013: findings from the Global Burden of Disease Study 2013. *The Lancet*, Volume 388, Issue 10049, 1081 - 1088