

MEDIVIR

A laboratory setting with two blue microplates in the foreground, each containing several small vials. A pipette is positioned above the plates. The background is dark and out of focus, showing more laboratory equipment.

Improving life for cancer patients
through transformative drugs

August 27, 2018

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Today's presenters



CHRISTINE LIND
President and CEO

- Joined Medivir 2015, CEO since 2017
- Extensive experience from strategic advisory and business development for biotech and pharma



RICHARD BETHELL
Chief Scientific Officer

- Joined Medivir 2013
- 28 years drug discovery and development in oncology and infectious disease



CHRISTINA HERDER
EVP, Strategic Business Development

- Joined Medivir 2017
- Experience in Corporate Development, Project & Portfolio Management, and as a biotech CEO



ERIK BJÖRK
Chief Financial Officer

- Joined Medivir 2018
- Global finance leadership roles in consumer and life sciences



LUNDS UNIVERSITET

Agenda

- 1 Medivir in brief
- 2 Birinapant – science and commercial opportunity
- 3 MIV-818 – science and commercial opportunity
- 4 Outlook and financial summary
- 5 Q&A session



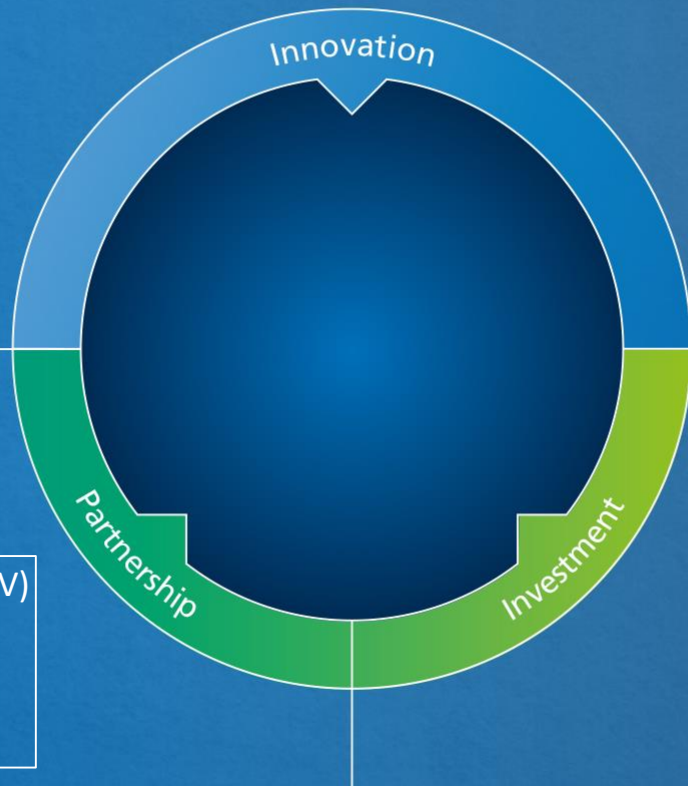
Medivir in Brief

Who is Medivir?

- Using **world-class scientific expertise** to bring new therapies to cancer patients
- **Clinical pipeline** composed of projects with **multi-billion dollar sales** potential as well as **orphan cancer drug candidates**
- Strong commercial focus – delivered more than **20 global partnerships** and **2 products from idea to market**
- Competences **from discovery through regulatory approvals**



Strategy



Discover

Leveraging scientific expertise to build pipeline in oncology

Protease inhibitors

Nucleoside prodrugs

Partner

Collaborations enhance the value of programs

Zoviduo® /
Xerclear



MIV-802 (HCV)



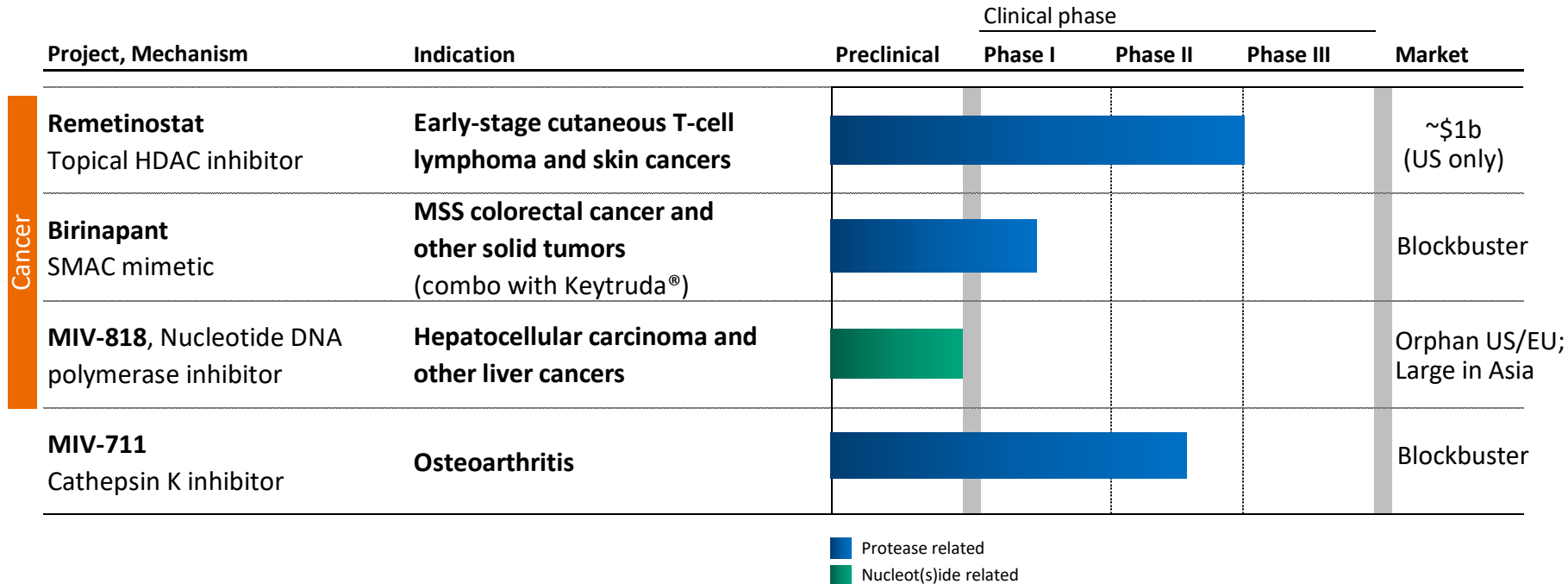
歌礼中国
ASCLETIS

Develop

Drug development in areas of high unmet patient need

Oncology drug development in areas of high unmet need

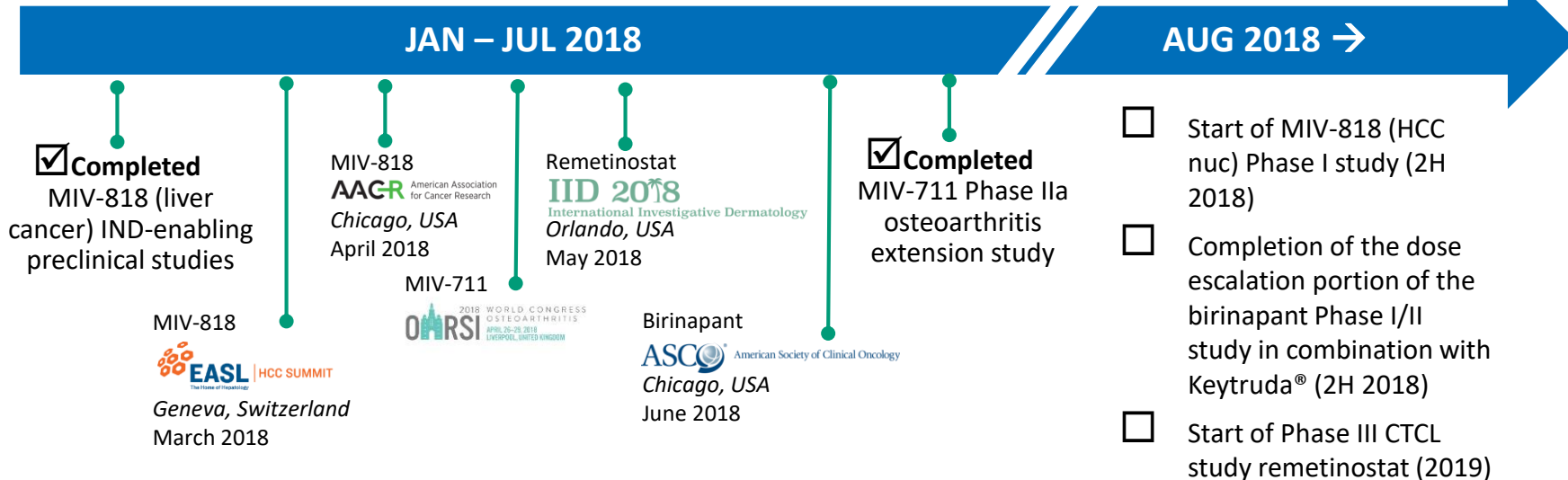
Strong and balanced development pipeline based around areas of scientific expertise and focused on cancer



Key milestones throughout the year

Track record of delivery

Coming events





Birinapant for solid tumors

Despite immuno-oncology breakthroughs patients have unmet needs

Multi-billion dollar market,
and growing for immuno-
oncology agents



< 1/2

of patients derive
meaningful clinical
benefit in approved
indications

0-5%

ORR in other indications
such as MSS colorectal
cancer

Combination
regimens to
enhance benefit
in underserved
patients

Linking targeted therapy with immuno-oncology

Uniquely potent molecule against a novel target

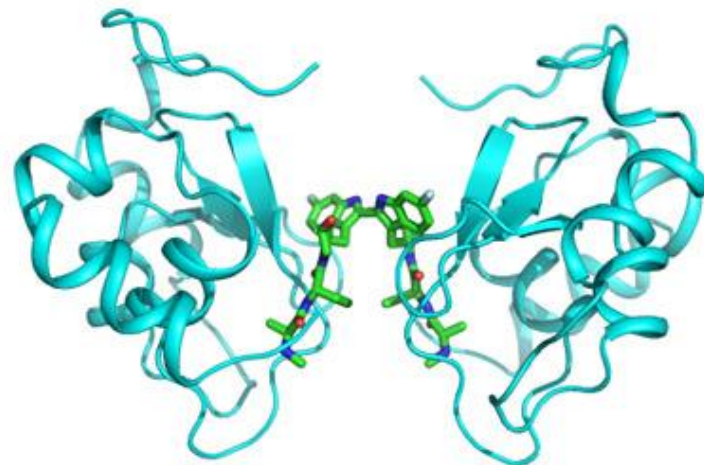
- Bivalent SMAC (second mitochondrial-derived activator of caspases) mimetic
- Upon binding to cIAPs, birinapant triggers their autoubiquitination, leading cIAP degradation by the ubiquitin proteasome system
- Reduction in cIAPs leads to effects on immune cells and tumor cells

Strong rationale for use in combinations

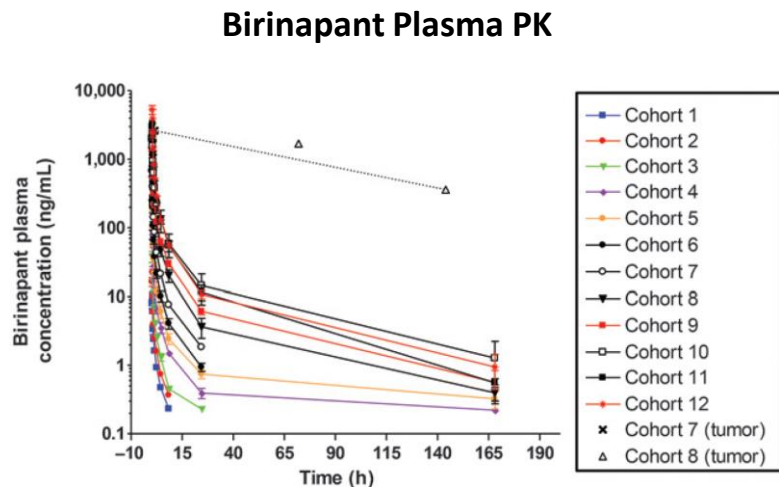
- Efficacy observed in both hematological and solid tumor models
- Synergistic with anti-PD1 and likely other IO pathways
- Phase I/II study in combination with Merck's Keytruda® underway

Blockbuster potential and strong patent position

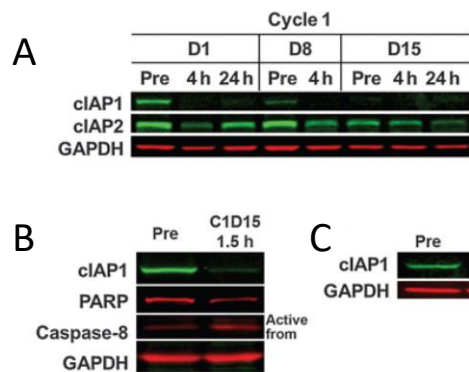
- Expected patent life to ~2034, including extensions



Birinapant: Clinical Pharmacodynamic Effects and PK



Birinapant Clinical Pharmacodynamics

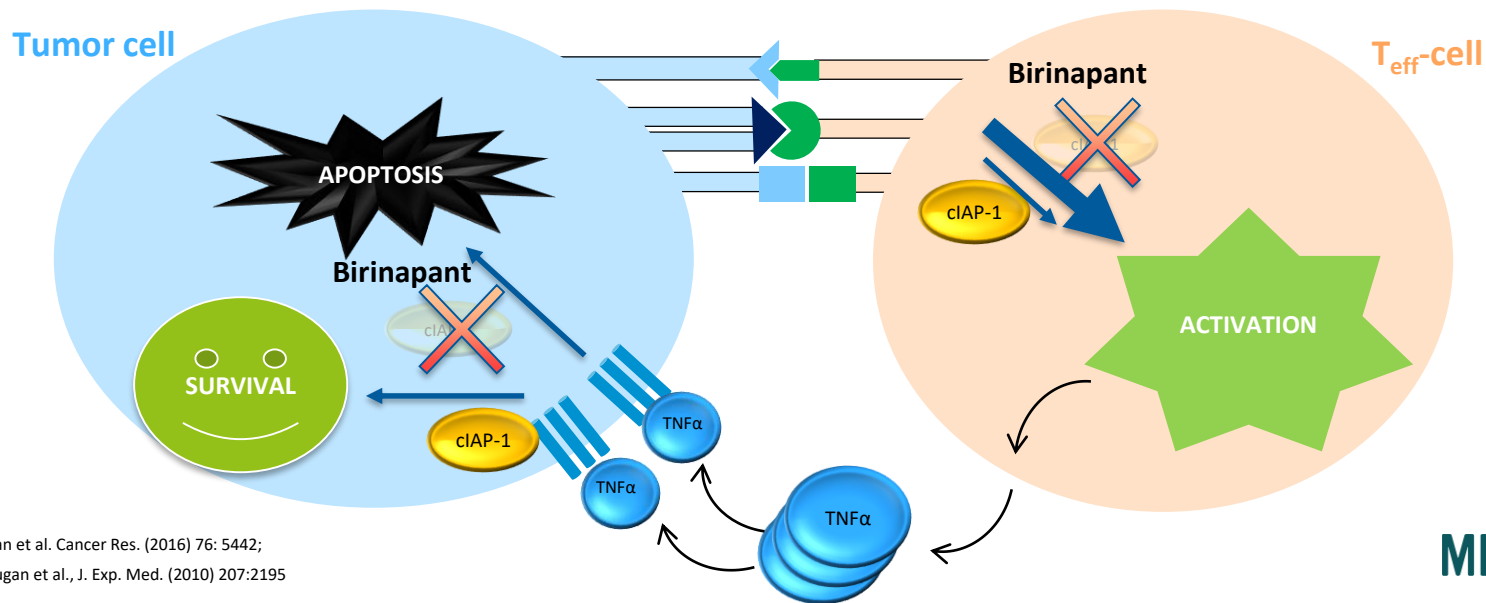


- Birinapant has been dosed to >400 cancer patients, generally well-tolerated up to doses of 22mg/m²
- Well characterized clinical pharmacokinetics, with elevated levels in tumours compared to plasma
- Birinapant treatment resulted in a greater than 75% reduction in clAP1 in PBMC samples at doses of 5.6 mg/m² and above

Dual action enhances cancer cell death

Targeting of cIAPs results in dual action on T-cells and tumor cells

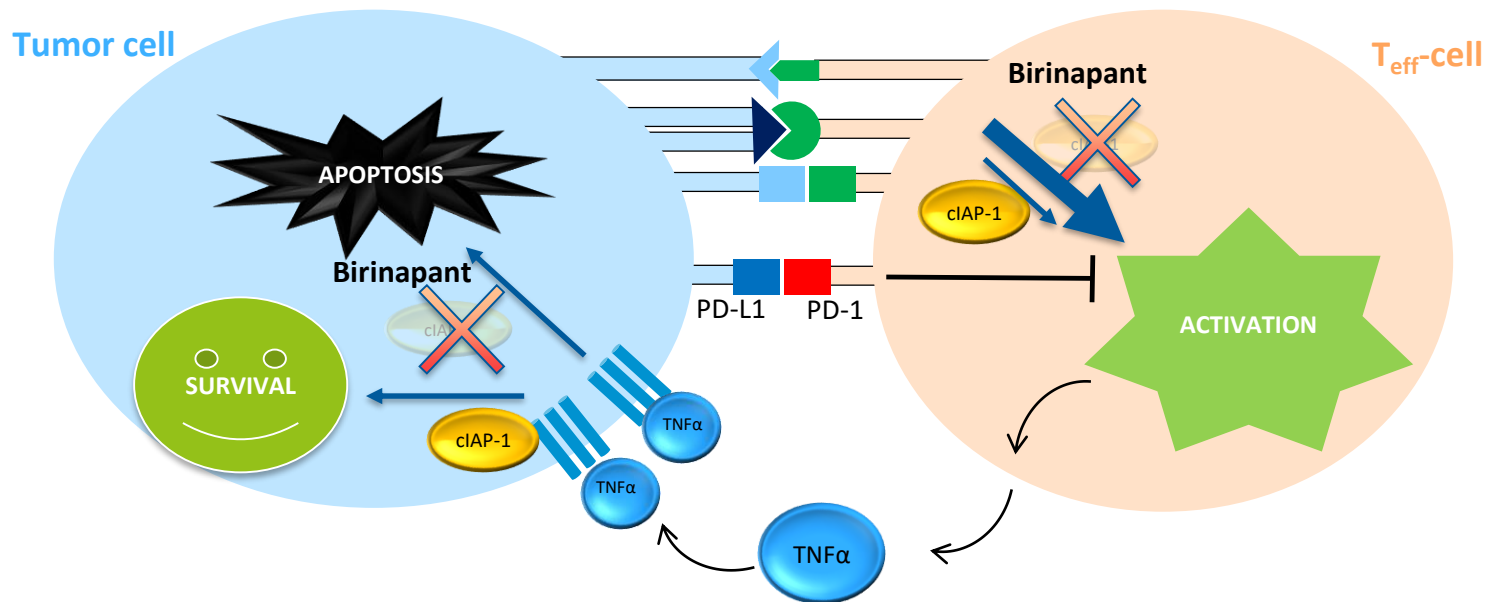
- Enhances pro-apoptotic, and suppresses pro-survival, signaling downstream of TNF- α
 - Rationale for combining birinapant with other cancer treatments in which efficacy could be enhanced by pro-apoptotic signaling, especially those known to enhance TNF- α expression, e.g. radiotherapy¹
- Augments human T cell responses to physiologically relevant stimuli²



ciAPs and PD-L1 cooperate to protect tumors from the CTLs

Tumor cells acquire resistance to T cell-derived cytokine-mediated antitumor effects to evade the immune response

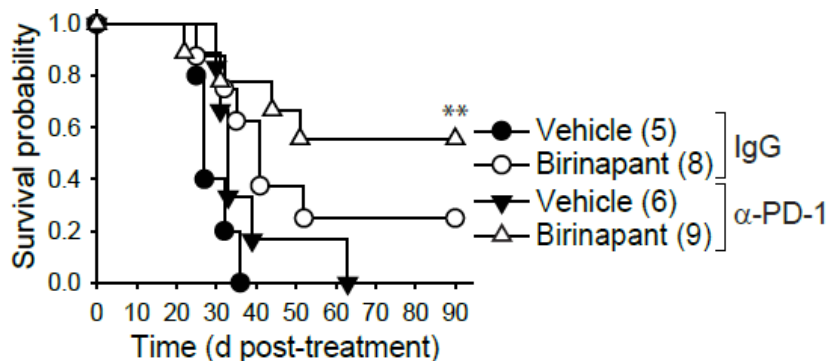
- PD-L1 expression down-regulates TNF- α release



Potential to enhance patient response with immune-oncology therapies

Strong rationale for combination with Keytruda®

- Birinapant/anti-PD1 mAb combo showed enhanced activity in preclinical models¹ compared to either agent alone



1. Solid tumor model: Beug et al., Nature Communications (2017) 8:14278;
Multiple myeloma model: Chesi et al., Nature Med. (2016) 22, 1411–1420

Phase I/II study underway in collaboration with MERCK

- Development collaboration for the Phase I/II study in solid tumors
- Keytruda® provided at no cost
- Joint Development Committee to oversee the study, bringing Merck's immuno-oncology expertise
- Medivir retains full global rights to birinapant and data

Birinapant/Keytruda[®] combination: Phase I/II Study underway



June 2018
ASCO American Society of Clinical Oncology
Chicago, USA



Phase I: Sequential group dose-escalation to determine the dose-limiting toxicity and recommended Phase II dose, in combination with Keytruda[®]

Phase II: Safety and tolerability of the recommended dose of birinapant, in combination with Keytruda[®] in defined disease cohorts:

- MSS metastatic Colorectal cancer
- Ovarian cancer
- Cervical cancer
- Other cancer types exploratory cohort

Birinapant/Keytruda[®] combination: Dose Expansion Cohorts

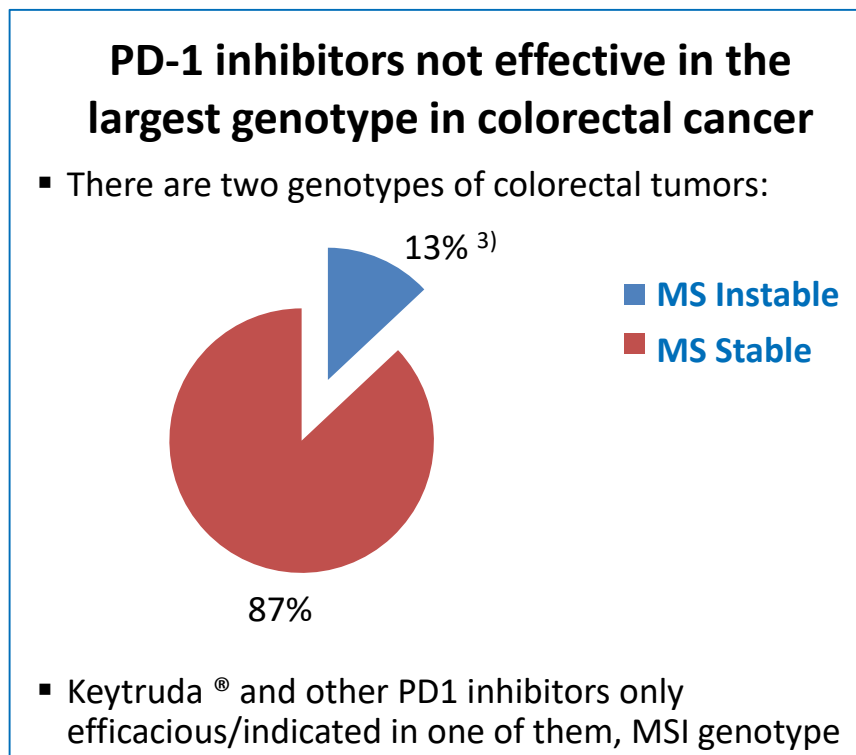
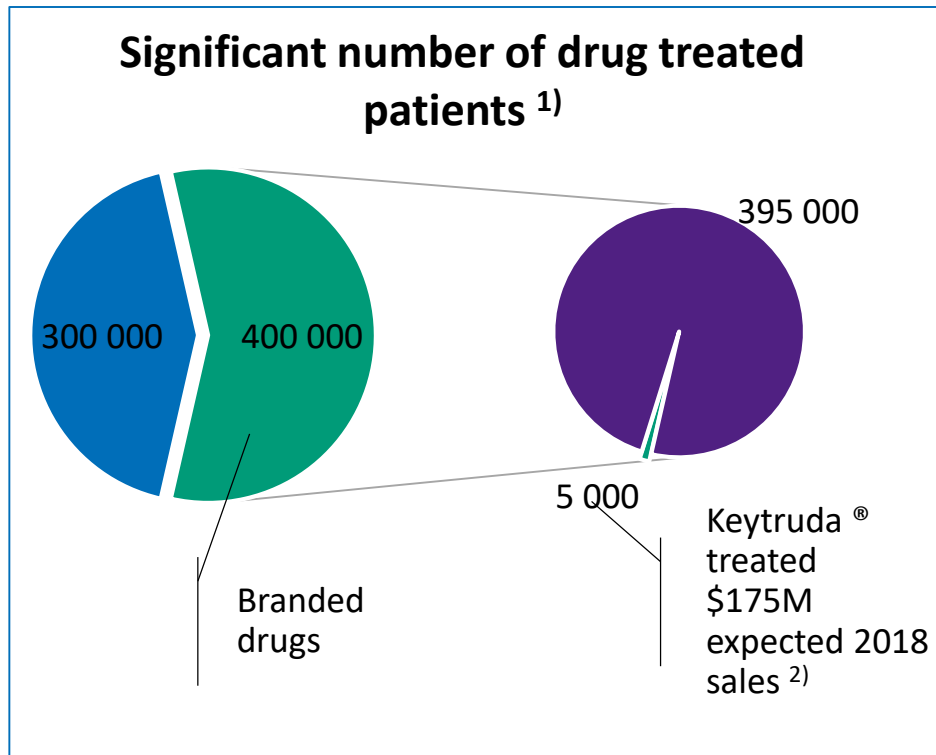
Rationale for the selection of the three principal dose expansion cohorts:

- Very low response rates to Keytruda[®] monotherapy,

AND either

- Evidence of amplification of cIAPs in those tumor types, or
- Clinical responses to birinapant administered as monotherapy or in combination with chemotherapy, or
- Clinical responses to birinapant and evidence of cIAP amplification

Keytruda® not able to reach the majority of colorectal cancer patients



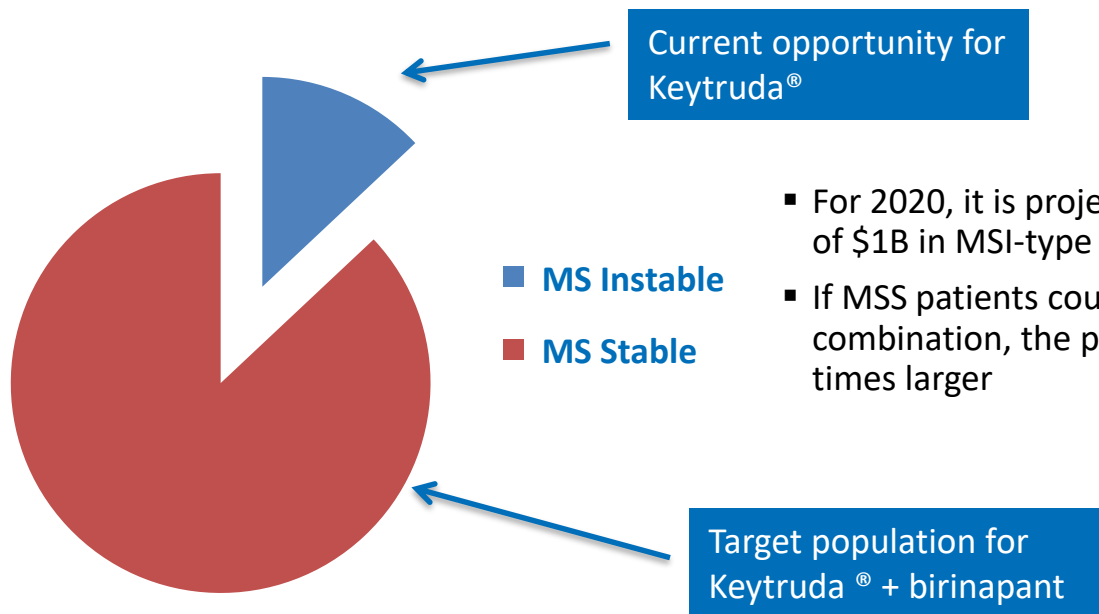
1) 7 major markets. Datamonitor Epidemiology 2016

2) Datamonitor Forecast Dec 2017

3) Merck ASCO Event June 6, 2016

Birinapant may offer access to larger market for Keytruda®

- One of the cohorts in the phase II part of the birinapant/Keytruda® combination study will be patients with MSS-type colorectal cancer



- For 2020, it is projected that Keytruda® will have sales of \$1B in MSI-type colorectal cancer ¹⁾
- If MSS patients could be effectively treated by the combination, the projected sales could be up to 7 times larger



MIV-818 for liver cancers

HCC is 3rd leading cause of cancer-related death worldwide

Hepatocellular Carcinoma

- Orphan disease in Western markets, but one of fastest growing and most deadly cancers in USA
- Increasing incidence of NASH is becoming the driver of HCC in the west, replacing chronic hepatitis C
- High incidence in China and other east Asian countries
- Genetically heterogeneous leading to limited effect of molecularly targeted therapies

Patients with advanced HCC are in need of new treatments:

1st line treatment



2nd Line Options

Multikinase Inhibitors

- Sorafenib
- Lenvatinib
- ~3 month survival benefit

(Multi)kinase Inhibitors

- Regorafenib
- *Cabozantinib*
- *Ramucirumab (AFP^{hi} patients only)*
- Incremental survival benefit

PD-1 antagonists

- Nivolumab
- 15-20% ORR
- Survival benefit yet to be defined

Medivir's Vision for MIV-818

MIV-818 has the potential to become the first liver-targeted orally administered drug to address HCC and other liver cancers

Current and Future Development

- MIV-818 is being developed for advanced HCC patients as a stand alone treatment or in combination with standard of care in 2nd or 3rd line
 - European Phase I/II as stand-alone agent about to start in patients with advanced liver cancer
 - Preclinical data support development in combination with sorafenib and other multikinase inhibitors in advanced HCC
 - Preferential conversion to the active metabolite under hypoxic conditions provides preclinical rationale for future development in combination with TACE and other embolic treatments for intermediate-stage HCC patients
- Development in patients with intra-hepatic cholangiocarcinoma and metastatic liver disease also planned

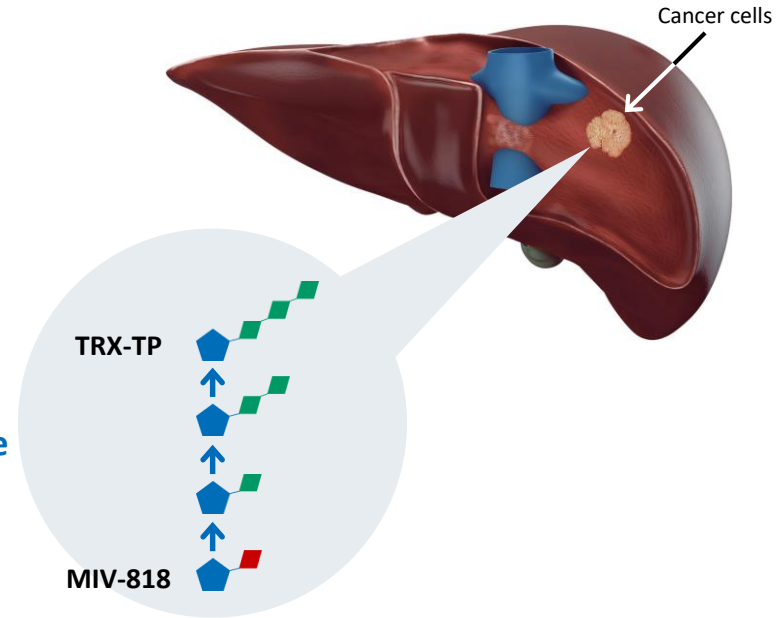
Mechanism of Action

Chain-terminating inhibition of DNA synthesis

- **MIV-818** is an orally administered nucleotide prodrug of the active metabolite **troxacitabine triphosphate (TRX-TP)**
- When incorporated into DNA, TRX-TP causes double strand DNA breaks and cell death
- Troxacitabine progressed to Phase II/III, with clinical responses observed in several cancers, but development halted due to narrow therapeutic window

Liver targeting to deliver high levels of the active metabolite to the liver while minimizing exposure elsewhere

- **MIV-818** has been designed to minimize systemic exposure and limit the toxicity of troxacitabine by primarily targeting liver cells



Prodrug – an inactive molecule that is converted into the active drug within the body

Potential to improve efficacy and safety for patients with liver cancers

Improve a nucleoside with Medivir prodrug technology

Troxacitabine

(nucleoside)

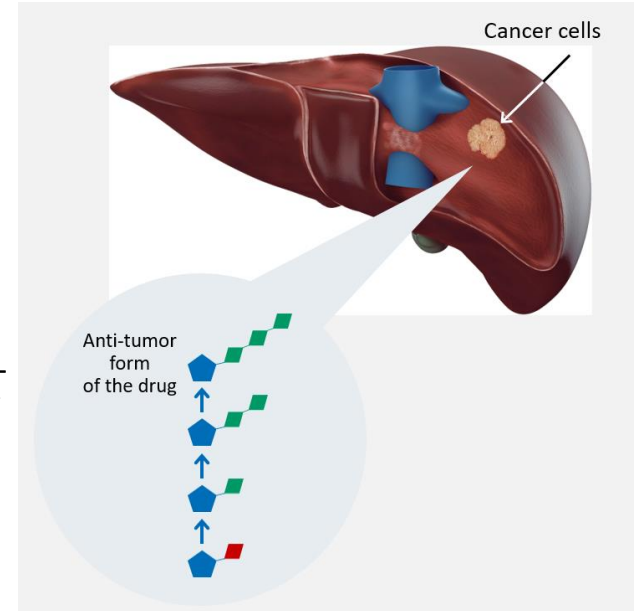
- **Active** in preclinical cancer models and in clinic
- Failed in clinic due to systemic dose-limiting **toxicities**
- Targets process essential for proliferation, so independent of driver mutations

Medivir
prodrug
technology

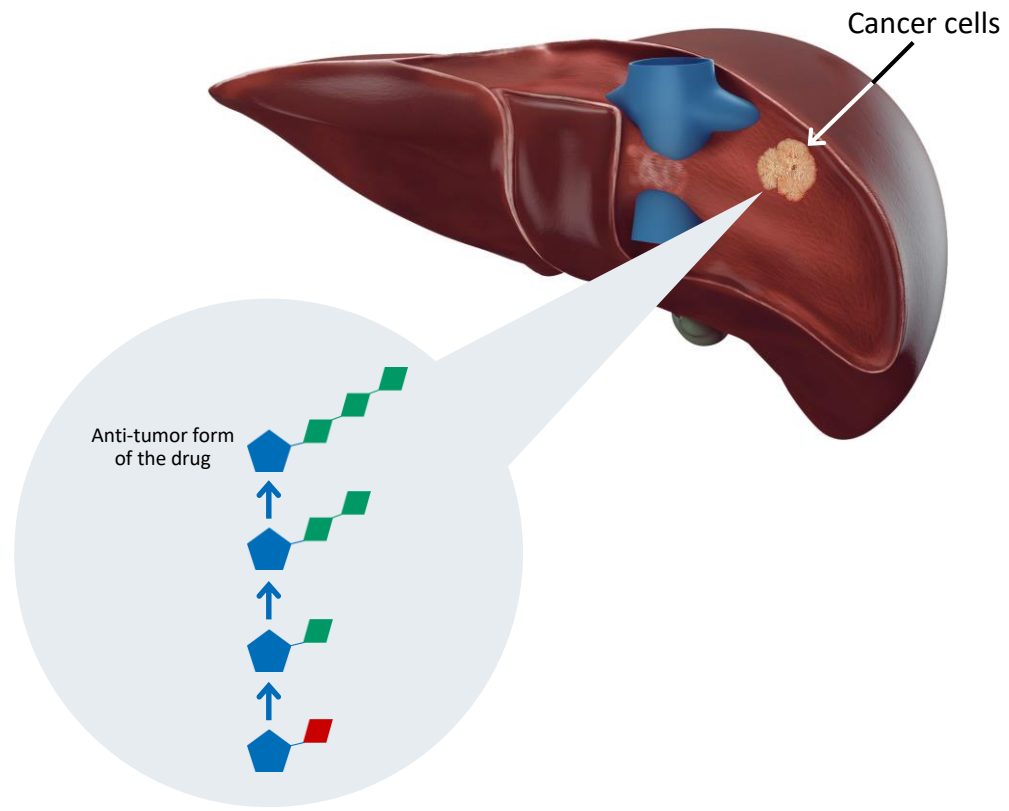
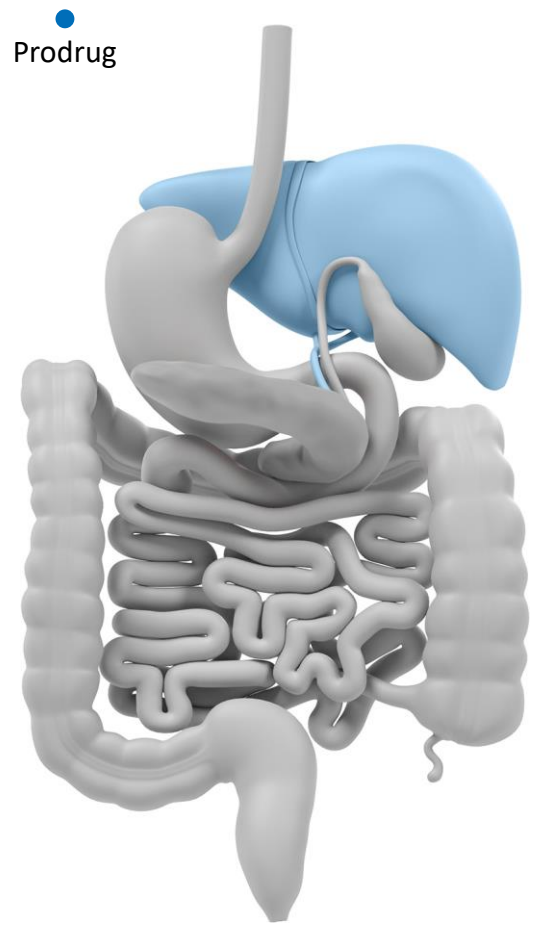
MIV-818

(liver-targeted nucleotide prodrug)

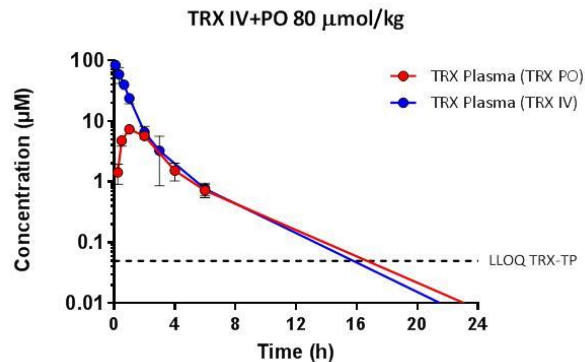
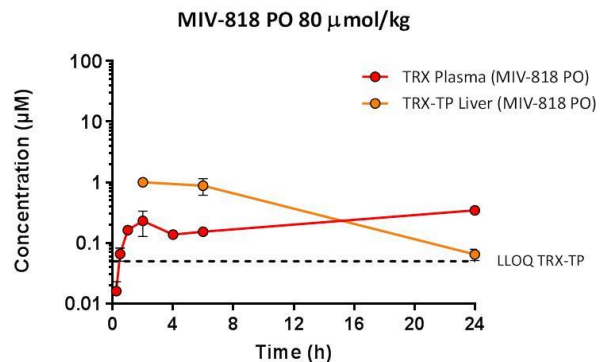
- **Enhanced activity** 10x more potent against HCC cell lines than parent troxacitabine
- **Selectivity for cancer** Active on HCC cells while sparing non-cancerous hepatocytes
- **Improved delivery to the liver** >100-fold relative to systemic exposure of troxacitabine
- **Synergy with multikinase inhibitors** (e.g. sorafenib)
- **Market exclusivity** with full new chemical entity patent protection



Prodrugging targets the active metabolite of MIV-818 to the liver

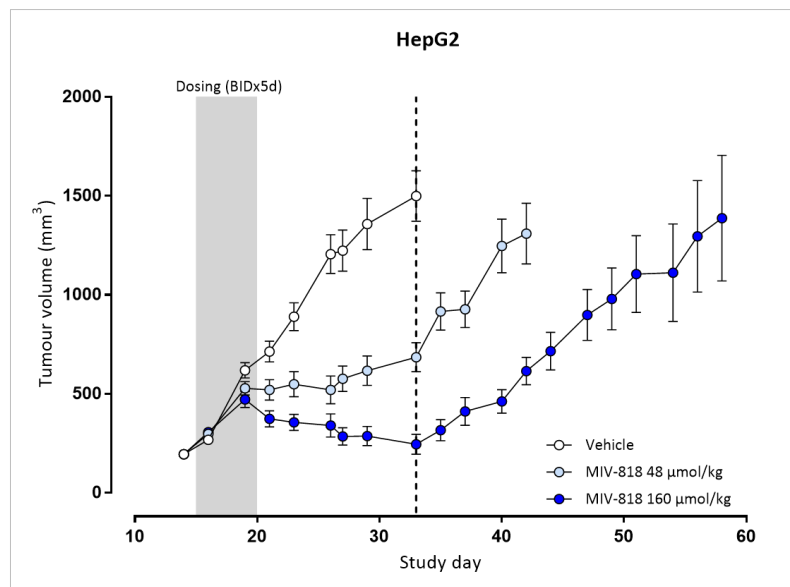


Demonstration of Liver Targeting in rats



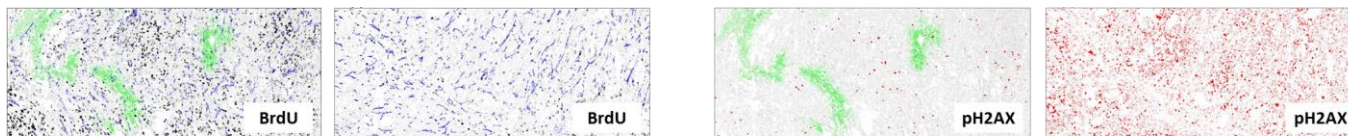
Drug	Dose ($\mu\text{mol/kg}$)	Adm Route	Analyte	Tissue	C_{max} (μM)	$\text{AUC}_{0-24\text{h}}$ ($\mu\text{M}\cdot\text{h}$)	$\text{TP}_{\text{liver}} / \text{TRX}_{\text{plasma}}$ ratio
MIV-818	80	PO	TRX TRX-TP	Plasma Liver	0.35 1.0	5.4 10	1.9
TRX	80	IV	TRX TRX-TP	Plasma Liver	102 <0.05	76 <1.2	<0.016
TRX	80	PO	TRX TRX-TP	Plasma Liver	7.4 <0.05	22 <1.2	<0.055

Dose-dependent tumour growth inhibition demonstrated with MIV-818

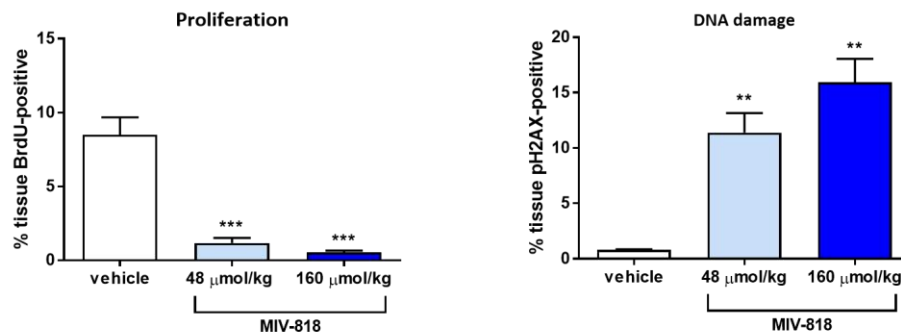


- Dose-dependent anti-tumor effect seen in HepG2 mouse xenograft model¹
- 96% tumour growth inhibition at study day 33 after 160 µmol/kg MIV-818 administered orally twice daily for 5 days¹
- Troxacitabine triphosphate also active in other mouse models of HCC^{1,2}

Inhibition of proliferation and induction of DNA damage



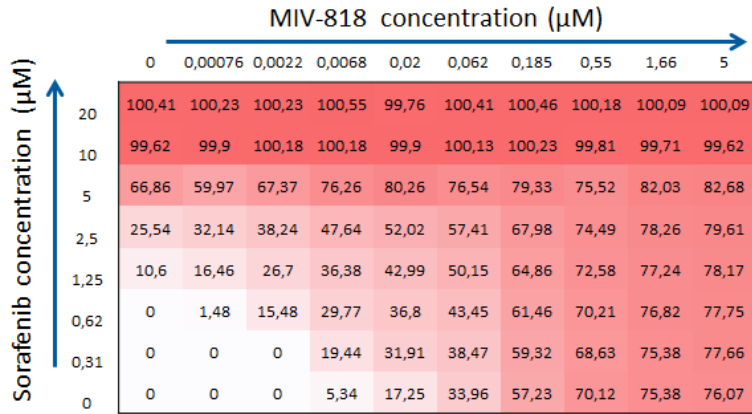
Photoimages of sections stained for BrdU (black), pH2AX (red), mouse vasculature (blue) and hypoxia (green) from control (vehicle) and MIV-818 (160 $\mu\text{mol/kg}$) treated mice



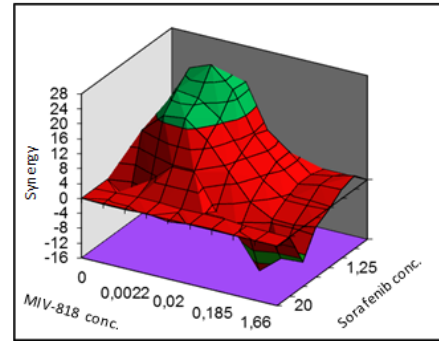
Data are presented as mean \pm SEM ($n=3$). ** $P<0.01$, *** $P<0.001$, compared to vehicle.

- MIV-818 shows dose-response effects on proliferation (BrdU) and DNA damage (pH2AX) in the HepG2 tumours after oral dosing at 48 and 160 $\mu\text{mol/kg}$ twice daily for 5 days¹

The combination of MIV-818 and sorafenib is synergistic



Hep3B Percent growth inhibition for each concentration combination (WST-8 assay, Kit8)



Synergy plot (MacSynergy II software)
Hills indicate synergistic interactions

- Synergy demonstrated in Hep3B (data shown above) and other HCC cell lines¹
- Synergy all observed between MIV-818 and other multikinase inhibitors
- Administration of the combination of MIV-818 and sorafenib leads to superior anti-tumor effect *in vivo* compared to either agent alone²

MIV-818: Gearing up for Phase I study start



Phase 1/2 Study

Study population

- Patients with advanced hepatocellular cancer (HCC) and other liver cancers

Objectives

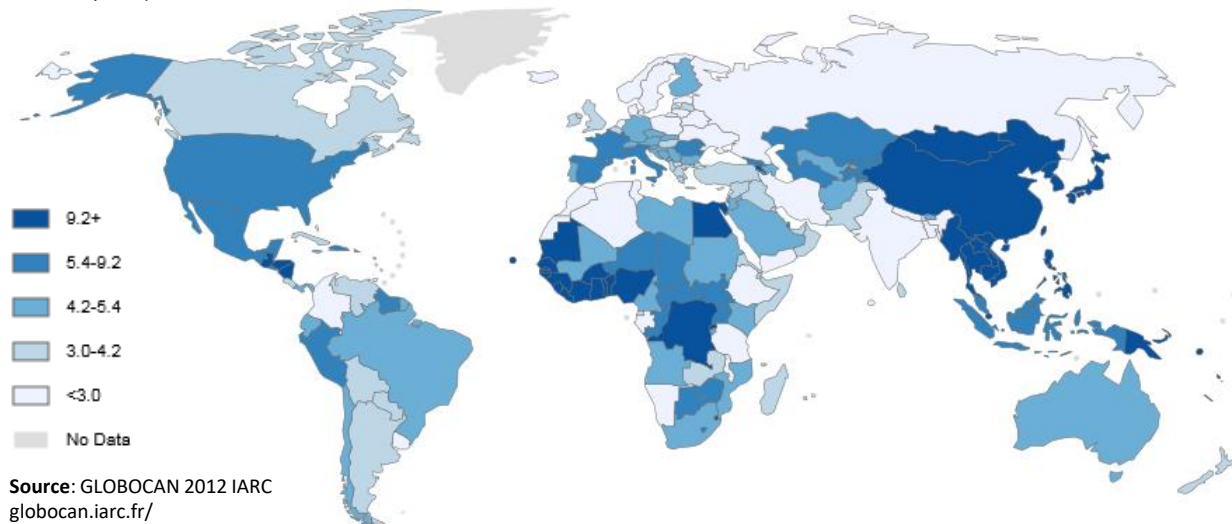
- Phase 1 part
 - Assess safety and tolerability of MIV-818
 - Determine the recommended Phase 2 dose (RP2D)
 - Assessment of clinical response
- Phase 2 part
 - Clinical activity of the RP2D will be assessed by RECIST 1.1
 - Separate dose expansion cohorts in HCC and intrahepatic cholangiocarcinoma
 - Panel of translational biomarkers

Study planned to start 2H 2018

MIV-818 with a unique opportunity in liver cancer

- Global annual incidence of primary liver cancer is 780,000
 - ~80% is hepatocellular carcinoma (HCC)
 - ~15% is intrahepatic bile duct cancer
- HCC is a orphan cancer in Western markets
- One of fastest growing and most deadly cancers in US ¹⁾

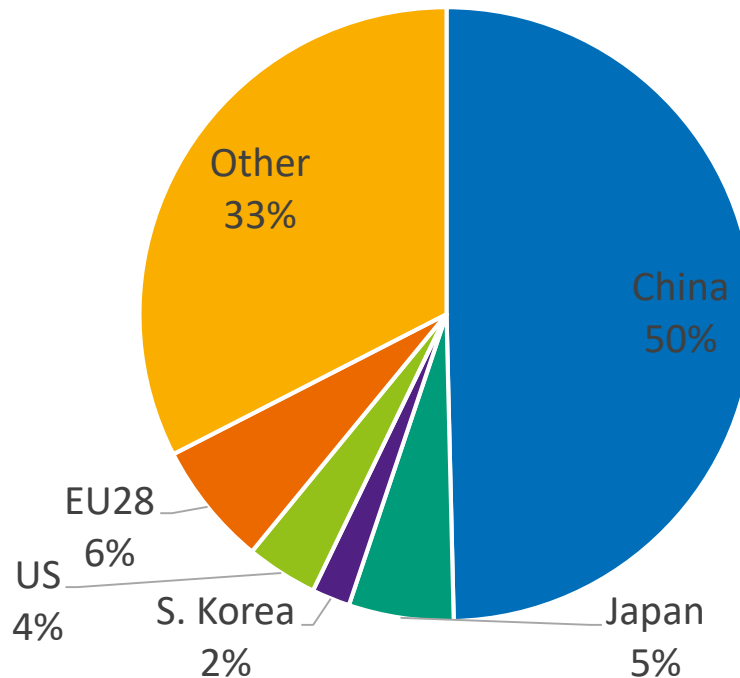
Liver cancer
incidence/100,000



Commercialization and co-development opportunity in Asia

- Incidence rate of liver cancer is significantly higher in Asia, there is a large market opportunity in this region with approximately 75% of liver cancer incidence occurs in Asia, with 50% in China alone
- Medivir plans to co-develop and commercialize in Asia with a partner

Global Liver Cancer Incidence



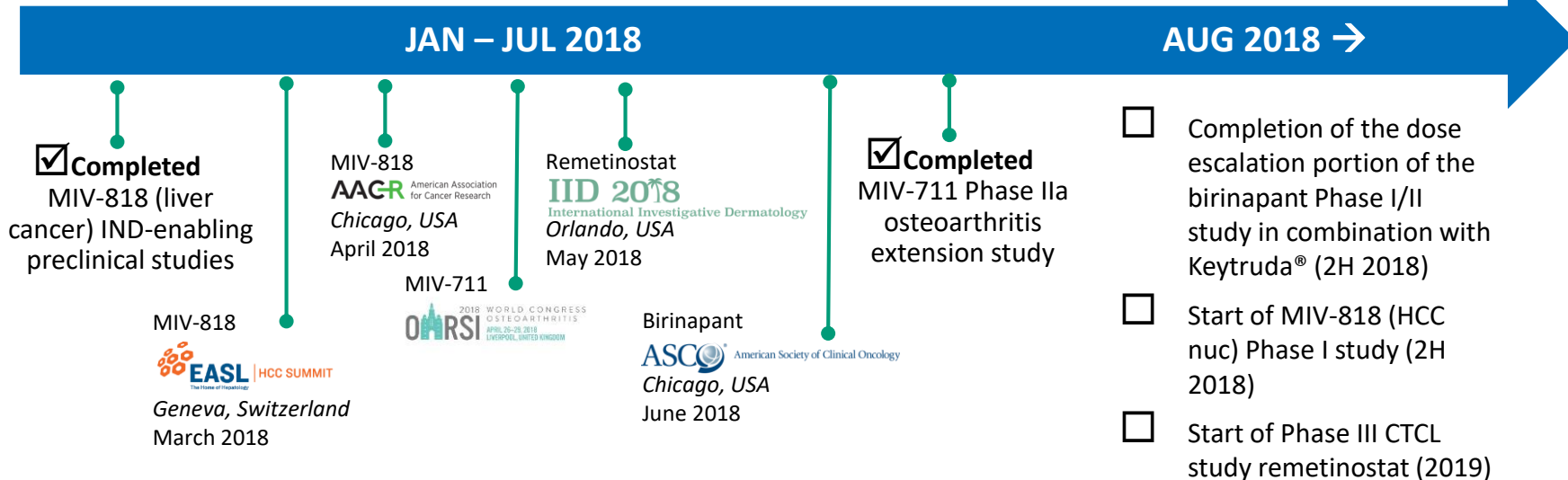


Outlook and financial summary

Key milestones throughout the year

Track record of delivery

Coming events



Cash position and shareholder base

CASH POSITION



THE SHARE





Sum up and Q&A

Why Medivir?

- Strong pipeline from discovery through clinical stages focused in oncology
- Upcoming catalysts with newsflow in multiple projects
- Near-term opportunities for revenues from partnerships