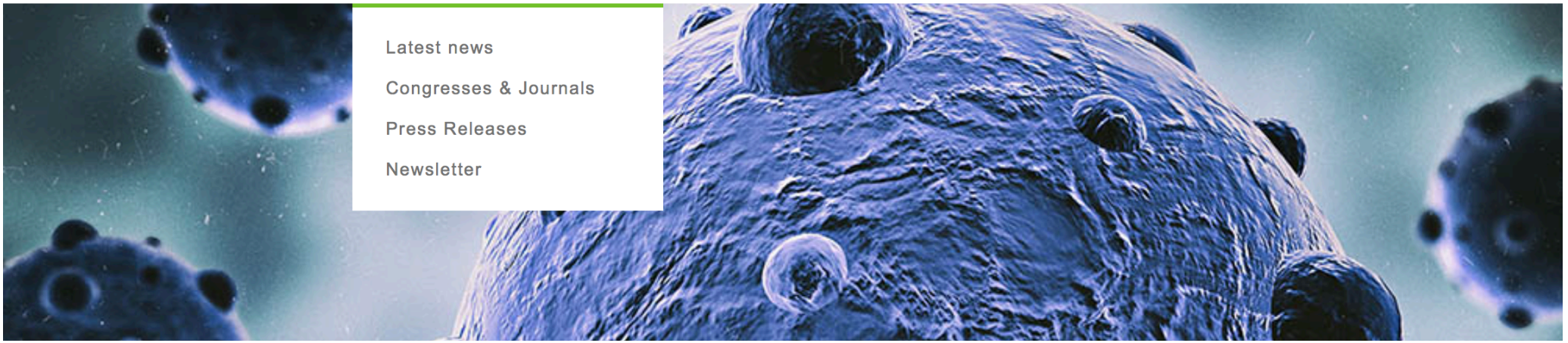
ONCOLOGY PIPELINE TOOL ONCOLOGY PIPELINE RESOURCES

OncologyPipeline
Every trial, result and timeline that matters



OncologyPipeline

Every trial, result and timeline that matters

www.oncologypipeline.com

Oncology Pipeline Tool

OncologyPipeline
Every trial, result and timeline that matters

- Oncology launches are increasing at an almost exponential rate: from **10 launches in Europe in 2010 to 60+ launches in 2018**
- The **Oncology Pipeline Tool** is an **online, easy to use** tool that **analyzes the entire Oncology pipeline of the pharmaceutical and biotech industry worldwide** (emphasis on EU and US)
- The database contains over **1.600 drugs in development from more than 600 companies**
- **User friendliness**: search engine combined with filters allow to analyze data by year of launch, tumor, line of treatment, company, budget impact etc. (one filter or all of the above combined)
- The database is updated on a daily basis and data from **clincialtrials.gov is fully integrated and updated automatically**

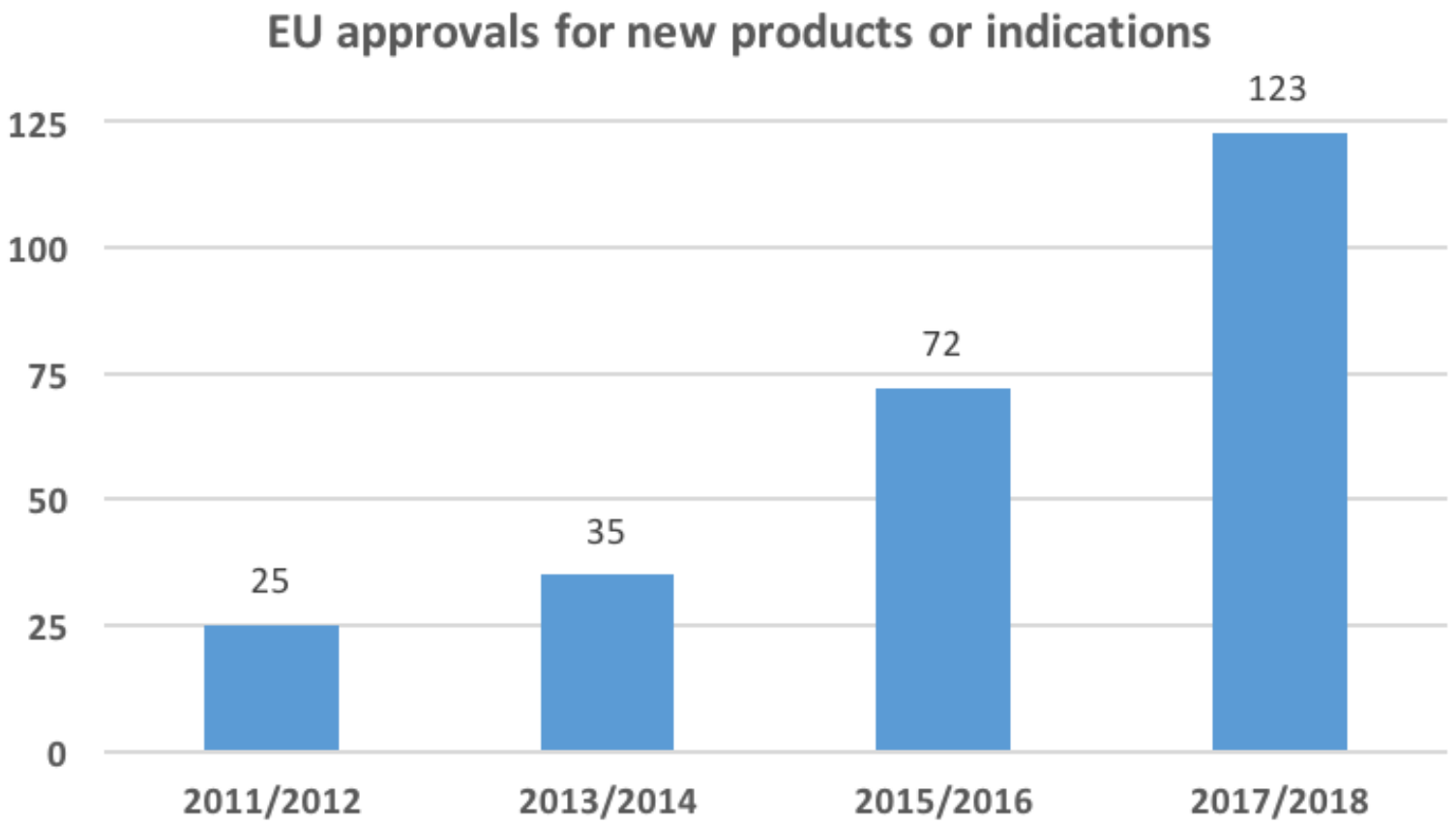
OncologyPipeline
Every trial, result and timeline that matters

Oncology Pipeline - methodology

- **New trials: we review every day all new clinical trials that are published on Clinicaltrials.gov and include them in our database**. We monitor changes in recruitment status and data readout timelines. **Our database is fully integrated with Clinicaltrials.gov and changes in recruitment status, sample size are updated automatically**. Other changes such as study readout timelines are revised manually
- **Scientific conferences and journals**: we monitor all key congresses and journals in Oncology and update our database accordingly. All relevant data are summarized and we provide a link to the original data source (abstract, publication etc).
- **Individual companies**: **every day we review hundreds of press releases.** Relevant news items are included in the database with a link to the original data source
- **Investor conferences**: we participate in investor conferences and quarterly webcasts. Study timelines are updated based on company information and comments from management. That's why **our data readout estimates are as accurate as possible and in many cases far more accurate than the information provided by the companies on Clinicaltrials.gov**

Oncology launches in Europe

OncologyPipeline
Every trial, result and timeline that matters

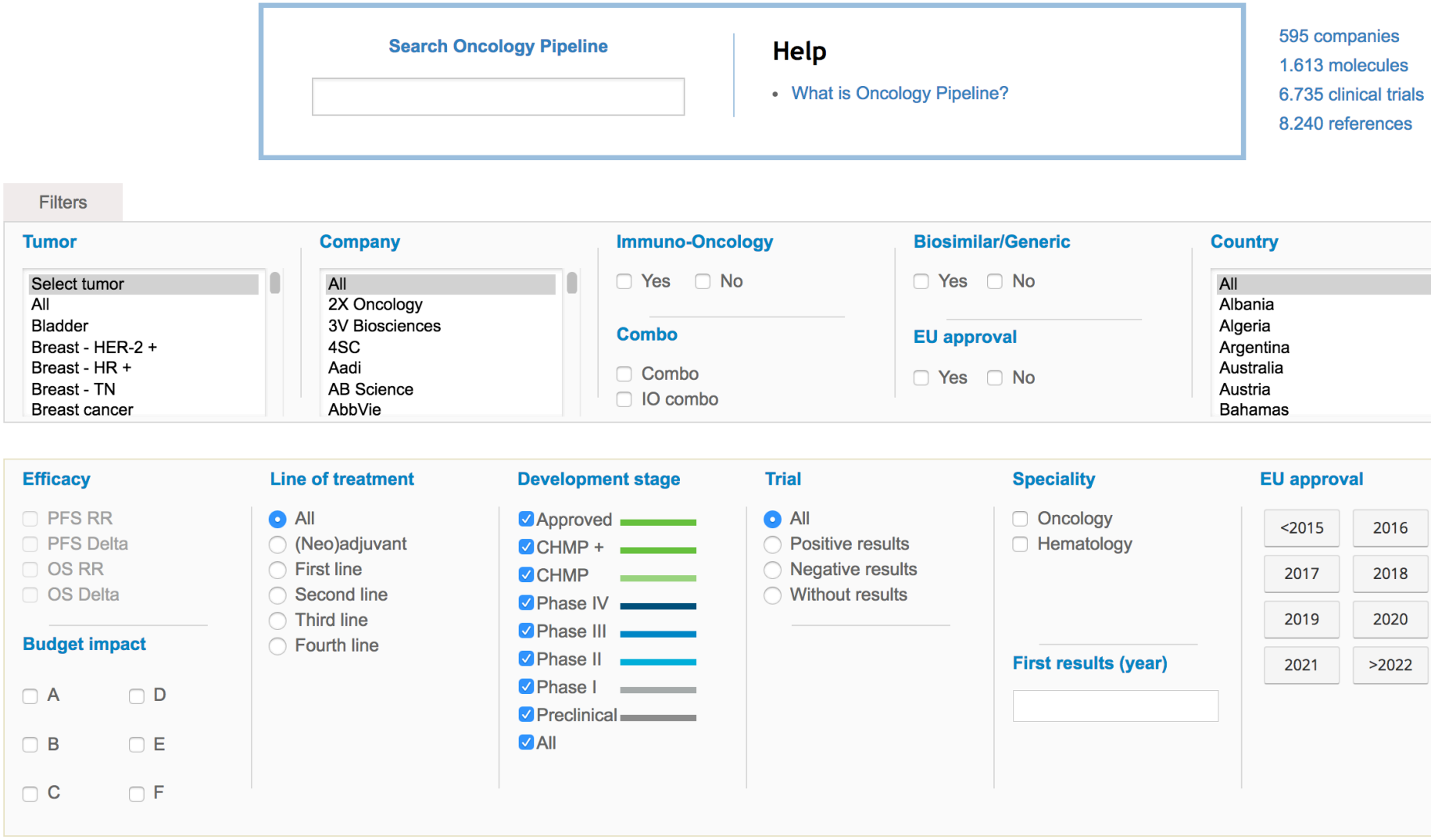


Launches for 2017 / 2018 are risk-adjusted for historical phase III success rates: 189 projects x 65% chance of success

Source: OncologyPipeline.com

OncologyPipeline
Every trial, result and timeline that matters

Oncology Pipeline: search engine and filters



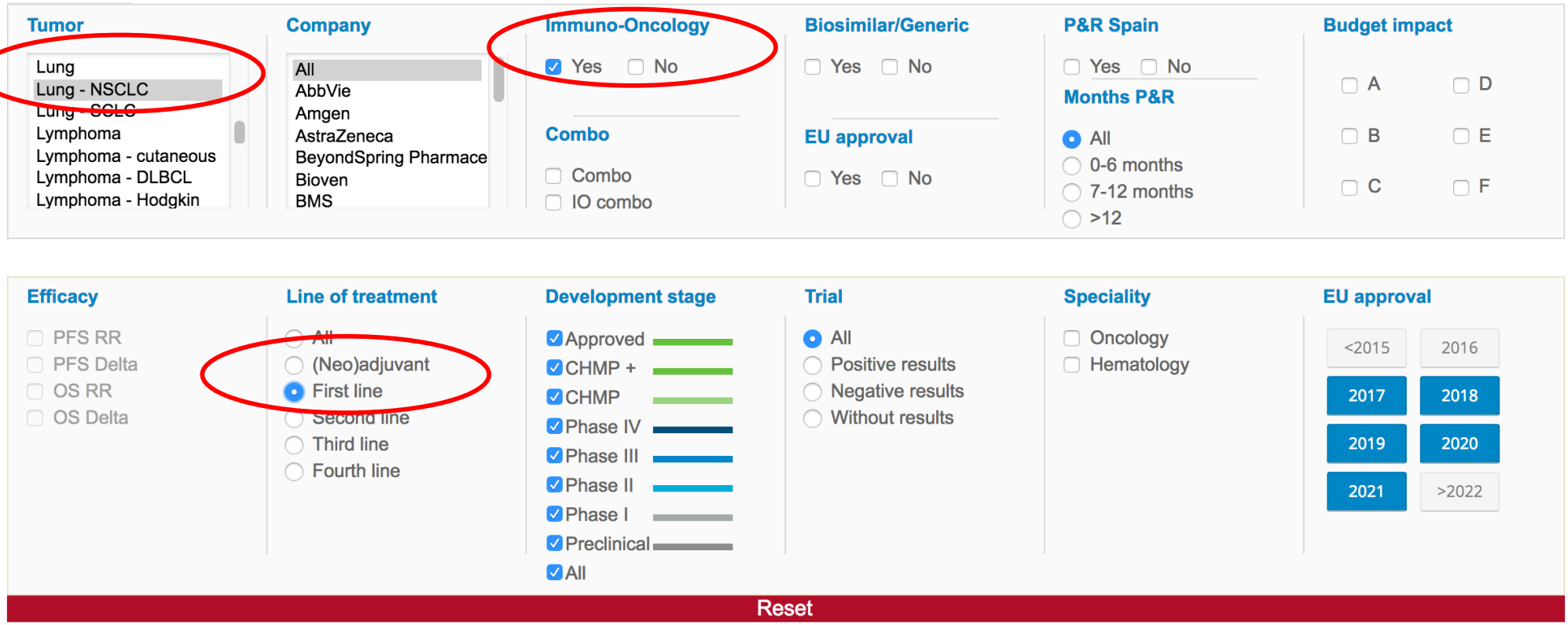
OncologyPipeline
Every trial, result and timeline that matters

Database: 40+ variables, 8.000+ trials

- Generic name, brand name, mode of action, company
- Country
- Immuno-Oncology (Yes/No), Biosimilar (Yes/No), Key trial (Yes/No)
- Budget impact (+5 bn WW, 2.5-5.0 bn WW, 1.0-2.5 bn WW etc.)
- Oncology or Hematology, Development stage (approved, phase III etc.)
- Tumor, Indication, Line of treatment
- Trial name, control arm, primary endpoint
- Key results (if available): PFS months, PFS delta, PFS HR (hazard ratio), OS months, OS delta, OS HR, ORR (%), ORR delta etc.
- Data readout date, Filing date (EU), approval date (EU), Months needed to obtain approval
- Data from **ClinicalTrials.gov**: NCT Number, Title, Recruitment, Study Results, Sponsor & Collaborators, Enrollment, First Received, Start Date, Completion Date, Last Update, Acronym, Primary Completion Date

Example: NSCLC, IO Yes, 1st line

OncologyPipeline
Every trial, result and timeline that matters



Only display projects with actual or foreseen approval date in Europe

Generic name	Brand	Company	Trial name	EU approval
Pembrolizumab	Keytruda	MSD	KEYNOTE-024	01/2017
Pembrolizumab	Keytruda	MSD	KEYNOTE-021	01/2018
Durvalumab	MEDI4736	AstraZeneca	PACIFIC	09/2018

OncologyPipeline
Every trial, result and timeline that matters

Phase III trials CDK4/6 inhibitors

Generic name	Mechanism of action	Company	Development stage	Tumor	Line of treatment	First results	EU approval
Palbociclib	CDK4/6 inhibitor	Pfizer	Approved	Breast cancer - HR +	Second line	April 2015	November 2016
Palbociclib	CDK4/6 inhibitor	Pfizer	Approved	Breast cancer - HR +	First line	April 2016	November 2016
Ribociclib	CDK4/6 inhibitor	Novartis	Approved	Breast cancer - HR +	First line		
Abemaciclib	CDK4/6 inhi		Phase III	Breast cancer - HR +	First line		
Abemaciclib	CDK4/6 inhibitor	Eli Lilly	Phase III	Breast cancer - HR +	First line	March 2017	August 2018
Ribociclib	CDK4/6 inhibitor	Novartis	Phase III	Breast cancer - HR +	First line	September 2017	October 2018
Ribociclib	CDK4/6 inhibitor	Novartis	Phase III	Breast cancer - HR +	First line	October 2017	November 2018
Abemaciclib	CDK4/6 inhibitor	Eli Lilly	Phase III	Lung cancer - NSCLC	Second line	November 2017	December 2018
Palbociclib	CDK4/6 inhibitor	Pfizer	Phase III	Breast cancer - HR +	First line	October 2018	November 2019

Green = positive results communicated

Expected data readout (left column) and expected launch date (right column)

Search tool for all combination trials

OncologyPipeline
Every trial, result and timeline that matters

Generic name or brand: Pembrolizumab x

Combined with: Epacadostat x

And with: Select an Option

And with: Select an Option

Reset

Showing 1 to 16 of 16 entries (filtered from 8,302 total entries)

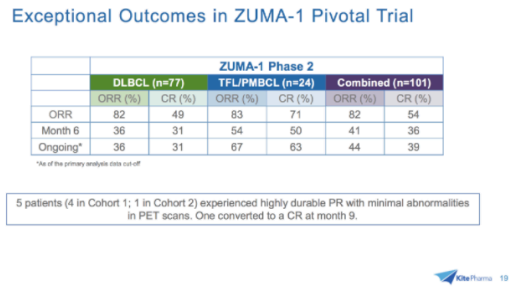
Generic name	NCT Number	Mechanism of action	Company	Development stage	Tumor	Line of treatment	First results	Combined with
Epacadostat	NCT03260894	IDO 1 inhibitor	Incyte	Phase III	Renal cancer - RCC	First line	May 2023	Pembrolizumab
Epacadostat	NCT02752074	IDO 1 inhibitor	Incyte	Phase III	Melanoma	First line	May 2018	Pembrolizumab
Epacadostat	NCT02178722	IDO 1 inhibitor	Incyte	Phase II	Melanoma	First line	November 2015	Pembrolizumab
Epacadostat	NCT02178722	IDO 1 inhibitor	Incyte	Phase II	Head & neck cancer	Second line	June 2017	Pembrolizumab

Project summary

Summary provided by experienced medical writers based on congress presentations, journal articles, company releases, investor events etc.

Company:	Kite Pharma
Oncology / Hematology:	Hematology
Development stage:	Phase II
Tumor:	Lymphoma - DLBCL
Line of treatment:	Second line
Trial name:	ZUMA-1
Primary endpoint:	ORR
ORR:	82%
Comments:	Kite announced early December 2016 that it has initiated the rolling submission with the U.S. Food and Drug Administration (FDA) of the Biologics License Application (BLA) for KTE-C19 (axicabtagene ciloleucel) as a treatment for patients with relapsed/refractory aggressive B-cell non-Hodgkin lymphoma (NHL) who are ineligible for autologous stem cell transplant (ASCT). **At the end of February 2017 Kite Pharma announced positive 6 months data from the primary analysis of the ZUMA-1 trial. Kite announced at the end of July 2017 that it has submitted a marketing authorization application (MAA) for axicabtagene ciloleucel for the treatment of relapsed or refractory DLBCL, PMBCL and TFL with the European Medicines Agency (EMA)**. The study met the primary endpoint of objective response rate (ORR), or rates of tumor response (complete response + partial response) recorded after a single infusion of axicabtagene ciloleucel, with 82 percent ($p < 0.0001$). These results demonstrate the treatment effect of axicabtagene ciloleucel in a patient population with multiple types of aggressive NHL, including diffuse large B-cell lymphoma (DLBCL) enrolled in Cohort 1, as well as primary mediastinal B-cell lymphoma (PMBCL) and transformed follicular lymphoma (TFL) enrolled in Cohort 2.

ZUMA-1 results overview


Exceptional Outcomes in ZUMA-1 Pivotal Trial

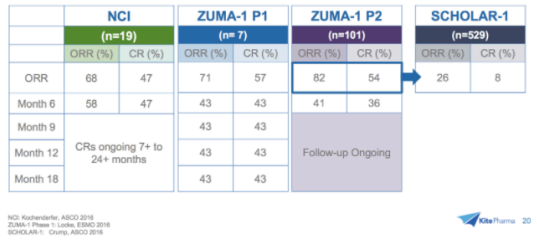
	ZUMA-1 Phase 2					
	DLBCL (n=77)		TFL/PMBCL (n=24)		Combined (n=101)	
	ORR (%)	CR (%)	ORR (%)	CR (%)	ORR (%)	CR (%)
ORR	82	49	83	71	82	54
Month 6	36	31	54	50	41	36
Ongoing*	36	31	67	63	44	39

*As of the primary analysis data cut-off

5 patients (4 in Cohort 1; 1 in Cohort 2) experienced highly durable PR with minimal abnormalities in PET scans. One converted to a CR at month 9.

Source: Kite investor presentation, June 2017

ZUMA-1 results vs historical controls


Results Largely Consistent with Phase 1 and NCI Data

	NCI (n=19)		ZUMA-1 P1 (n= 7)		ZUMA-1 P2 (n=101)		SCHOLAR-1 (n=529)	
	ORR (%)	CR (%)	ORR (%)	CR (%)	ORR (%)	CR (%)	ORR (%)	CR (%)
ORR	68	47	71	57	82	54	26	8
Month 6	58	47	43	43	41	36		
Month 9	CRs ongoing 7+ to 24+ months		43	43	Follow-up Ongoing			
Month 12			43	43				
Month 18			43	43				

NCI: Kochenderfer, ASCO 2016
ZUMA-1 Phase 1: Locke, ESMO 2016
SCHOLAR-1: Crump, ASCO 2016

Source: Kite investor presentation, June 2017

Project summary – external references

Links:

European Commission Approves KEYTRUDA (pembrolizumab) for First-Line Treatment of Patients with Metastatic Non-Small Cell Lung Cancer (NSCLC) Whose Tumors Have High PD-L1 Expression with No EGFR or ALK Positive Tumor Mutations
MSD | 31/01/2017
First Anti-PD-1 Therapy Approved in Europe for Previously Untreated Patients with Metastatic NSCLC

European Medicines Agency's CHMP Recommends Merck's KEYTRUDA (pembrolizumab) for the First-Line Treatment of Patients with Metastatic Non-Small Cell Lung Cancer (NSCLC) Whose Tumors Have High PD-L1 Expression with No EGFR or ALK Positive Tumor Mutations
MSD | 16/12/2016
Opinion Based on Findings from KEYNOTE-024 Trial, Which Showed Superior Overall Survival and Progression Free Survival with KEYTRUDA Compared to Chemotherapy

Pembrolizumab versus Chemotherapy for PD-L1–Positive Non–Small-Cell Lung Cancer
NEJM | 10/11/2016

FDA Accepts Supplemental Biologics License Application, Assigns Priority Review and Grants Breakthrough Therapy Designation to Merck's pembrolizumab for First-Line Treatment of Patients with Advanced Non-Small Cell Lung Cancer
MSD | 07/09/2016
Merck Has Also Submitted a Marketing Authorization Application to the European Medicines Agency for Keytruda in the Same Patient Population

Pembrolizumab Demonstrates Superior Progression-Free and Overall Survival Compared to Chemotherapy as First-Line Treatment in Patients with Advanced Non-Small Cell Lung Cancer
MSD | 23/06/2016
KEYNOTE-024 Studied Patients Whose Tumors Expressed High Levels of PD-L1

Key information

Status: Active, not recruiting

Number of patients: 305

OncologyPipeline
Every trial, result and timeline that matters

Project summary - ClinicalTrials.gov

Launch timelines are updated constantly based on information in clinicaltrials.gov and / or company disclosures

Key information

Status:	Recruiting
Number of patients:	142
Study start date:	January, 2015
First results:	September, 2016
EU filing date:	July, 2017
EU approval:	No
EU approval date:	July, 2018
Countries:	United States, Canada, Israel, Netherlands

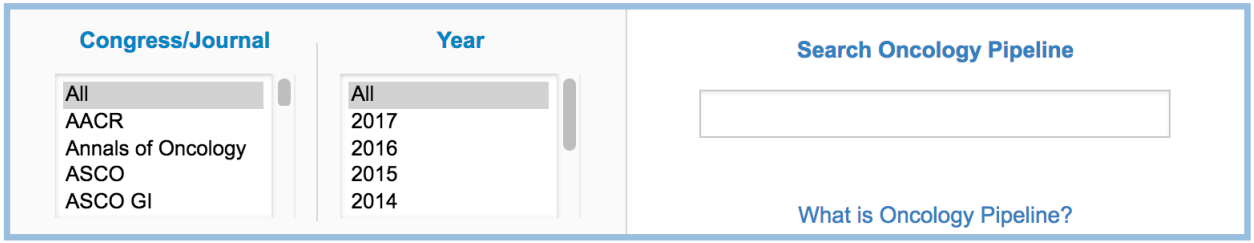
Clinicaltrials.gov is fully integrated and updated automatically

ClinicalTrials.gov

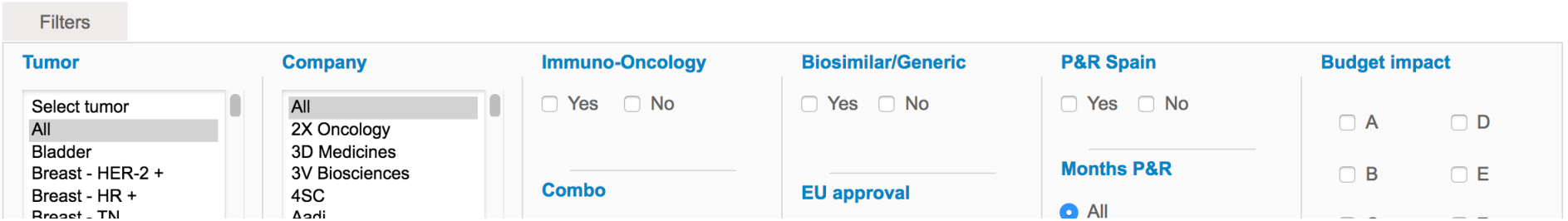
NCT Number:	NCT02348216
Title:	A Phase 1-2 Multi-Center Study Evaluating KTE-C19 in Subjects With Refractory Aggressive Non-Hodgkin Lymphoma (ZUMA-1)
Study Results:	No Results Available
Conditions:	Refractory Diffuse Large B Cell Lymphoma
Interventions:	Biological: KTE-C19
Sponsor/Collaborators:	Kite Pharma, Inc.
Gender:	All
Age Groups:	Adult|Senior
Phases:	Phase 1|Phase 2
Enrollment:	142
Funded Bys:	Industry

Congresses & journals

OncologyPipeline
Every trial, result and timeline that matters



645 companies
1.755 molecules
8.295 clinical trials
11.329 references



Generic name	Tumor	Line of treatment	Publication date	Congress Journal	Title
Pembrolizumab	Ovarian cancer	Fourth line	September 2017	ESMO	Evaluation of a predictive radiomics signature for response to immune checkpoint inhibitors (ICIs)
Regorafenib	Colorectal cancer	Second line	September 2017	ESMO	Clinical and pre-clinical biomarkers of Regorafenib (REG) efficacy in metastatic colorectal cancer (mCRC) in a phase II trial
Trastuzumab Emtansine	Breast cancer	Second line	September 2017	ESMO	Validity of HER2-amplified Circulating Tumor Cells to Select Metastatic Breast Cancer Considered HER2-negative for Trastuzumab-emtansine (T-DM1) Treatment.
Cetuximab	Colorectal cancer	First line	September 2017	ESMO	Predictive assay for anti-angiogenic agents (AADx) identifies molecular subgroups of RASwt mCRC with differential efficacy of FOLFIRI plus bevacizumab in the FIRE-3 (AIO KRK-0306) trial
Ipatasertib	Breast cancer - TN	First line	September 2017	ESMO	Cell-free (cf)DNA analysis identifies PIK3CA/AKT1 mutations associated with greater PFS improvement from the addition of ipatasertib (IPAT) to paclitaxel (P) in triple-negative breast cancer (TNBC)

Press releases

OncologyPipeline
Every trial, result and timeline that matters

Search Oncology Pipeline

Atezolizumab

Reset

Help

- What is Oncology Pipeline?

645 companies
1.755 molecules
8.297 clinical trials
11.335 references

Filters

Tumor

Select tumor
All
Bladder
Breast - HER-2 +
Breast - HR +
Breast - TN
Breast cancer

Company

All
2X Oncology
3D Medicines
3V Biosciences
4SC
Aadi
AB Science

Immuno-Oncology

Yes No

Combo

Combo
IO combo

Biosimilar/Generic

Yes No

EU approval

Yes No

P&R Spain

Yes No

Months P&R

All
0-6 months
7-12 months

Budget impact

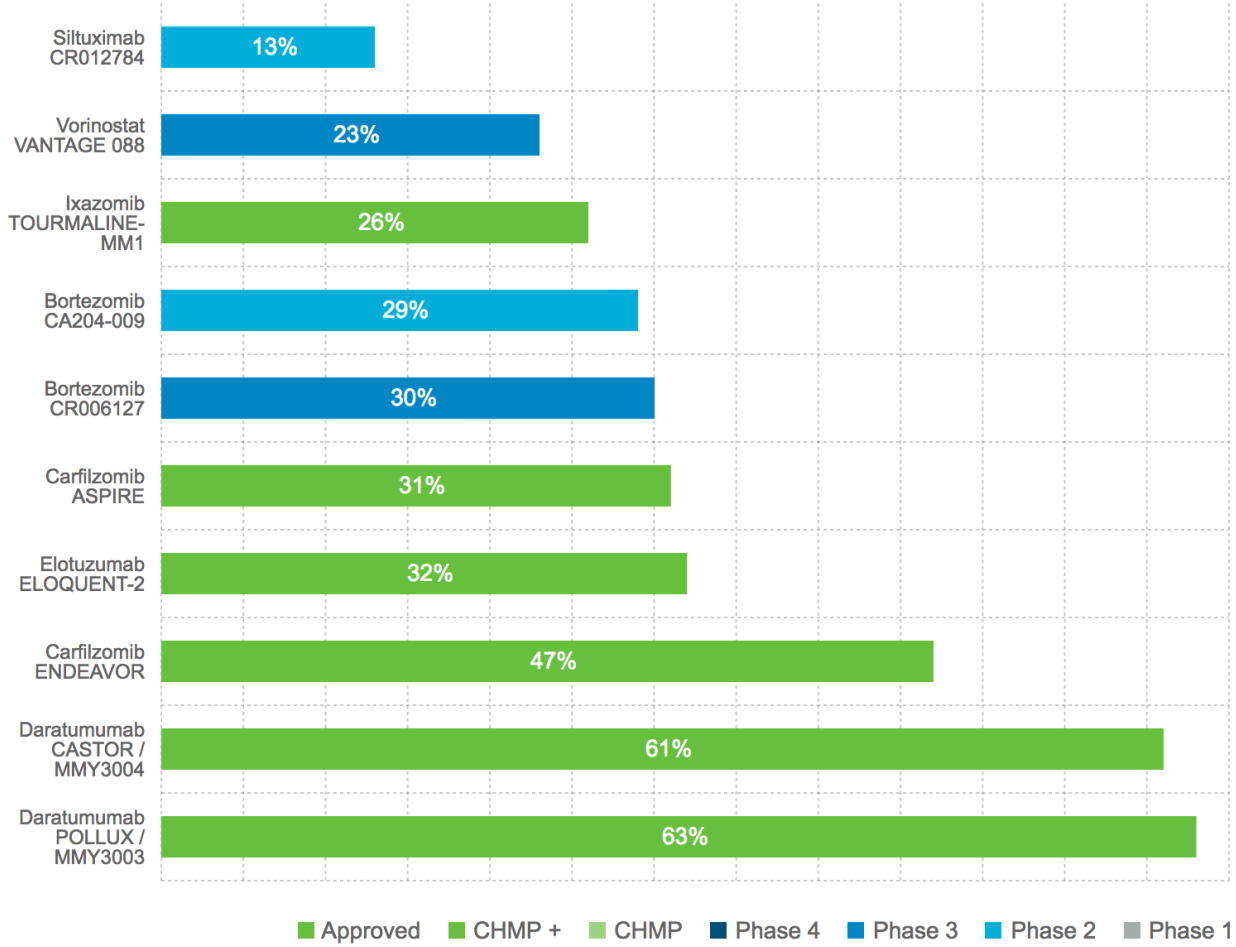
A D
B E
C F

Generic name	Tumor	Company	Publication date	Press Release
Atezolizumab	Bladder cancer	Roche	21 July 2017	CHMP recommends EU approval for Roche's TECENTRIQ (atezolizumab) in a specific type of metastatic lung and two types of metastatic bladder cancer
Atezolizumab	Lung cancer - NSCLC	Roche	21 July 2017	CHMP recommends EU approval for Roche's TECENTRIQ (atezolizumab) in a specific type of metastatic lung and two types of metastatic bladder cancer
Atezolizumab	Pancreatic cancer	Roche	13 July 2017	Initiation Of Clinical Trial Collaboration Evaluating Halozyme's PEGPH20 In Combination With Anti-PDL1 Immunotherapy
BL-8040	Leukemia - AML	BioLineRx	10 July 2017	BioLineRx Announces Initiation of Phase 1b/2 Trial of BL-8040 in Pancreatic Cancer Under Immunotherapy Collaboration
Cabozantinib	Renal cancer - RCC	Ipsen	12 June 2017	Exelixis Announces Initiation of Phase 1b Trial of Cabozantinib in Combination with Atezolizumab in Patients with Locally Advanced or Metastatic Solid Tumors

Clinical results by tumor, line of treatment etc.

Risk reduction (PFS)

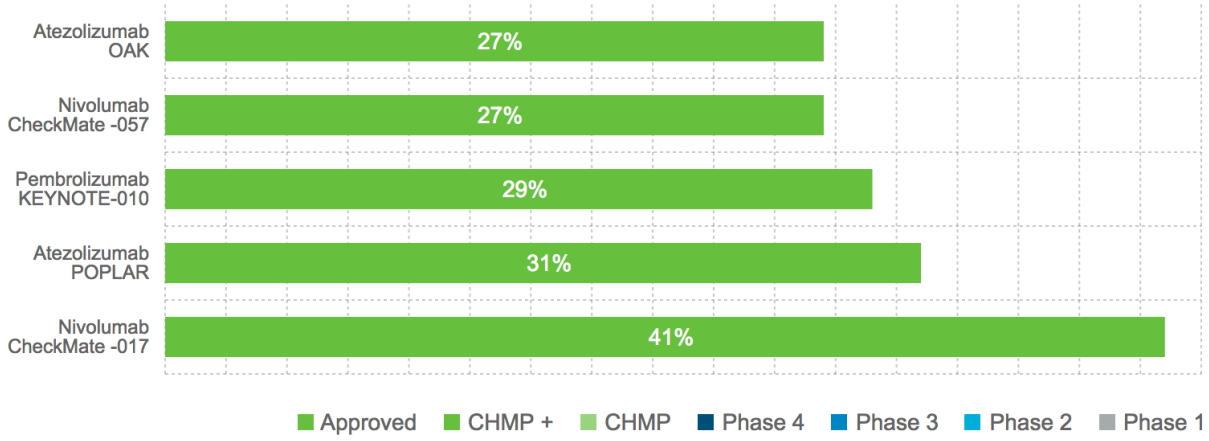
Multiple myeloma



Results	
Generic name Daratumumab	**Brand** Darzalex
Company Janssen	**Line of treatment** Second line
Trial CASTOR / MMY3004	**~~Negative trial~~** No
Primary endpoint PFS	**Control arm** Bortezomib + Dexametasone
Combination Combo	**Combined with** Bortezomib
Start date August 15, 2014	**First results** March 2016
Number of patients 500	**ORR** 83% vs 63%
PFS (months) NR vs 7.2	**PFS hazard ratio** 0.39
OS (months)	**OS hazard ratio**

Clinical results by tumor, line of treatment etc.

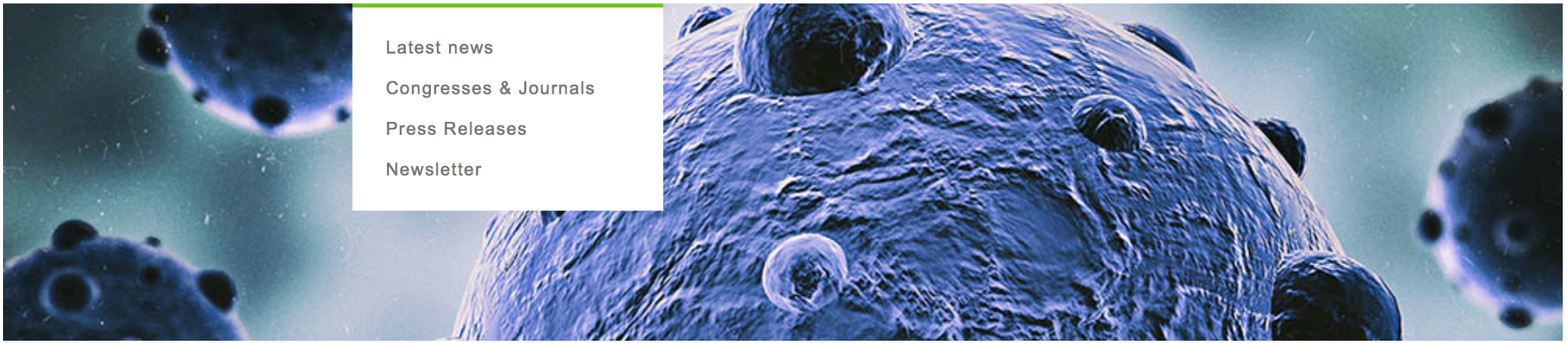
Risk reduction (OS)
Lung cancer - NSCLC



Results	
Generic name Atezolizumab	**Brand** Tecentriq
Company Roche	**Line of treatment** Second line
Trial OAK	**Negative trial** No
Primary endpoint OS	**Control arm** Docetaxel
Combination None	**Combined with** None
Start date March 11, 2014	**First results** July 2016
Number of patients 1225	**ORR** 14% vs 13%
PFS (months)	**PFS hazard ratio** 0.95
OS (months) 13.8 vs 9.6	**OS hazard ratio** 0.73

ONCOLOGY PIPELINE TOOL ONCOLOGY PIPELINE RESOURCES

OncologyPipeline
Every trial, result and timeline that matters



OncologyPipeline

Every trial, result and timeline that matters

www.oncologypipeline.com