Alliance for Regenerative Medicine

Overview

Janet Lambert

March 6, 2019

Alliance *for* Regenerative Medicine

Janet Lambert, CEO

- Joined ARM in 2017 as the organization's first CEO.
- With more than 25 years in public and private sector management, Janet most recently served as the Acting Head of Engagement for the All of Us Research Program at the National Institutes of Health and as head of the Outreach Office in the Office of the NIH Director.
- Prior to joining NIH, she was Vice President of Government Relations and head of the Washington office of Life Technologies, aiding the company in its growth from $300 million in annual sales to more than $3 billion.
- Janet has held leadership positions in government relations, marketing and business development at large and small life science organizations, including GE and InforMax. Her experience also includes legislative and staff leadership positions in the U.S. Senate and House of Representatives.
- Janet received her MBA in International Business from Georgetown University and her B.A. in Political Science from Stanford University. She lives in the Washington, D.C. area with her husband and two daughters.

Agenda

- Janet Lambert: Introduction
- ATMP Overview: Europe and Globally
- About the Alliance for Regenerative Medicine
- Resources for the Media
- Q&A

ATMP Overview

Europe & Globally

Alliance for Regenerative Medicine

What Are Advanced Therapeutic Medicinal Products (ATMPs)?

ATMPs include gene therapies, cell therapies, and tissue-engineered products intended to augment, repair, replace, or regenerate organs, tissues, cells, genes, and metabolic processes in the body. These therapies aim to alter the current practice of medicine by treating the root causes of disease and disorders.

ATMPs are now delivering benefits for patients, with further regulatory approvals for life changing and curative treatments expected soon

ATMP Technologies

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Gene Therapy

Gene Therapy seeks to modify or introduce genes into a patient's body with the goal of durably treating, preventing, or potentially even curing disease, including several types of cancer, viral diseases, and inherited disorders.

Genome Editing

Genome Editing is a technique by which DNA is inserted, replaced, removed, or modified at particular locations in the human genome for therapeutic benefit in order to treat cancer, rare inherited disorders, HIV, or other diseases.

Cell Therapy

Cell Therapy is the administration of viable, often purified cells into a patient's body to grow, replace, or repair damaged tissue for the treatment of a disease. A variety of different types of cells can be used in cell therapy.

Tissue Engineering

Tissue Engineering seeks to restore, maintain, improve, or replace damaged tissues and organs through the combination of scaffolds, cells, and/or biologically active molecules.

By ARM's standards, the following therapies are not considered ATMPs: Molecular medicines, including mRNA, RNAi, siRNA, and diagnostics-based products

Recently Approved ATMPs in Europe

Kymriah

gene-modified cell therapy for the treatment of R/R DLBCL, R/R B-Cell ALL

Approved by the EMA in 2018; reimbursed in Germany, England, Wales, & Scotland

3,100
people in the EU potentially eligible

Yescarta

gene-modified cell therapy for the treatment of R/R B-Cell NHL

Approved by the EMA in 2018; reimbursed in Germany, England, & Wales

7,700
people in the EU potentially eligible

LUXTURNA

gene therapy for the treatment of inherited retinal blindness

Approved by the EMA in 2018; reimbursed in Germany

1,000 to **2,000**
people in the EU potentially eligible

Select Anticipated Near-Term EMA ATMP Approvals

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bluebird bio's
LentiGlobin
gene therapy for the treatment of beta thalassemia

Decision expected:
mid-2019

Kiadis Pharma's
ATIR101
gene-modified cell therapy for the treatment of leukemia

Decision expected:
1H 2019

AveXis / Novartis's
Zolgensma
gene therapy for the treatment of spinal muscular atrophy type 1

Decision expected:
late 2019

Orchard's
OTL-101
gene therapy for the treatment of ADA Deficiency / ADA-SCID

Anticipated filing
MAA in 2020

Orchard's
OTL-200
gene therapy for the treatment of meta-chromatic leukodystrophy

Anticipated filing
MAA in 2020

Total Financings: Europe & Israel 2018

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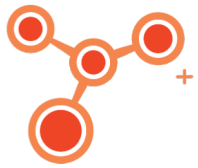
€1.9B

Total Global Financings 2018

▲40%
from 2017



€1.7B

Gene-Based Therapies 2018 Financings

▲117%
from 2017

€885M

Cell Therapy 2018 Financings

▼2%
from 2017

€73M

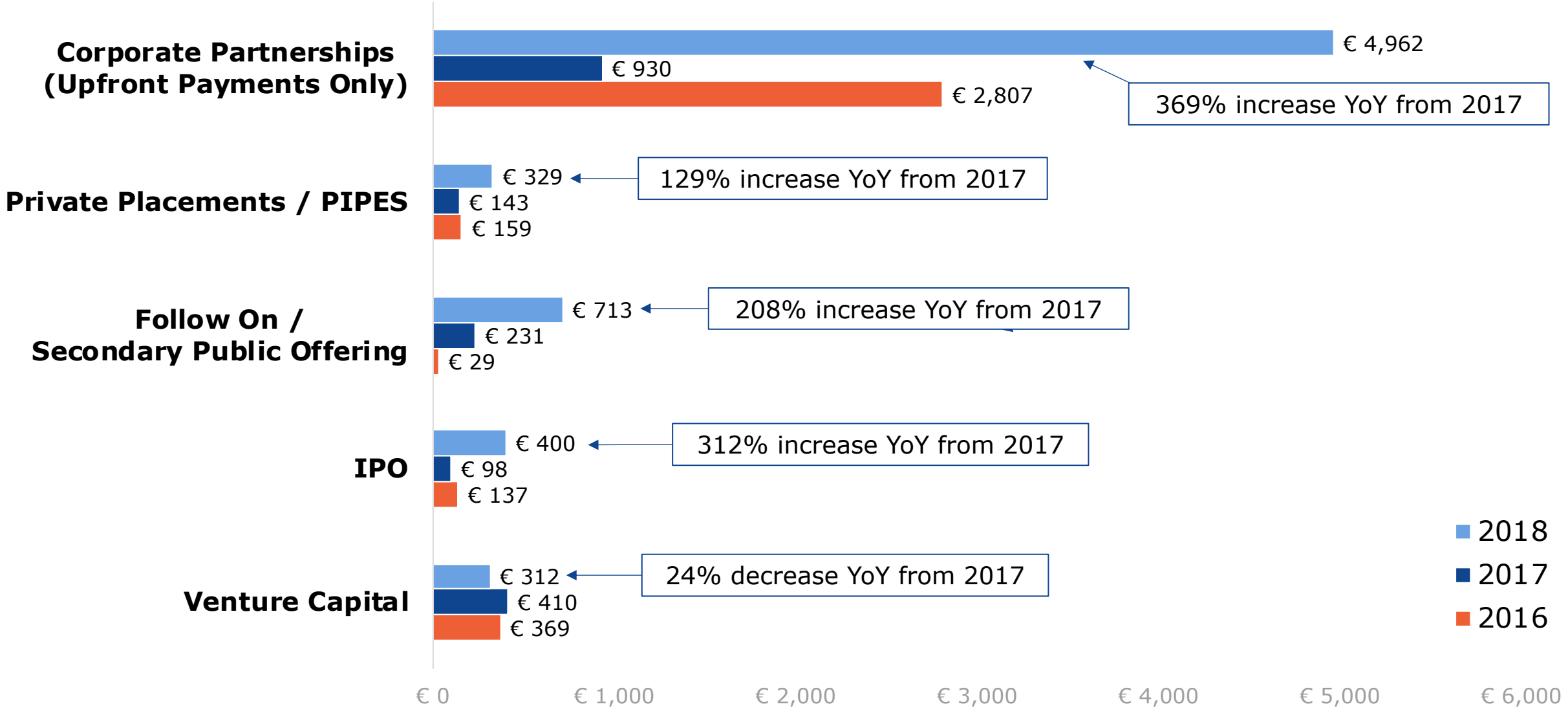
Tissue Engineering 2018 Financings

▼41%
from 2017

Source data provided by: informa

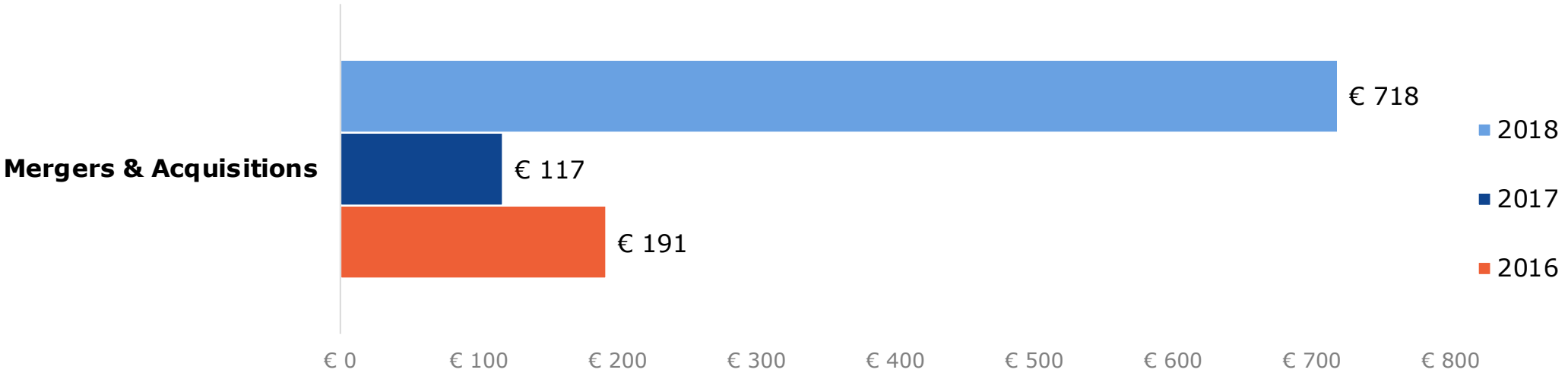
**both Gene-Based Therapies & Cell Therapy categories include financings from companies active in developing gene-modified cell therapies*

Total European/Israeli Financings by Type and Year



Source data provided by: informa

Total European & Israeli M&A Transactions Values, By Year

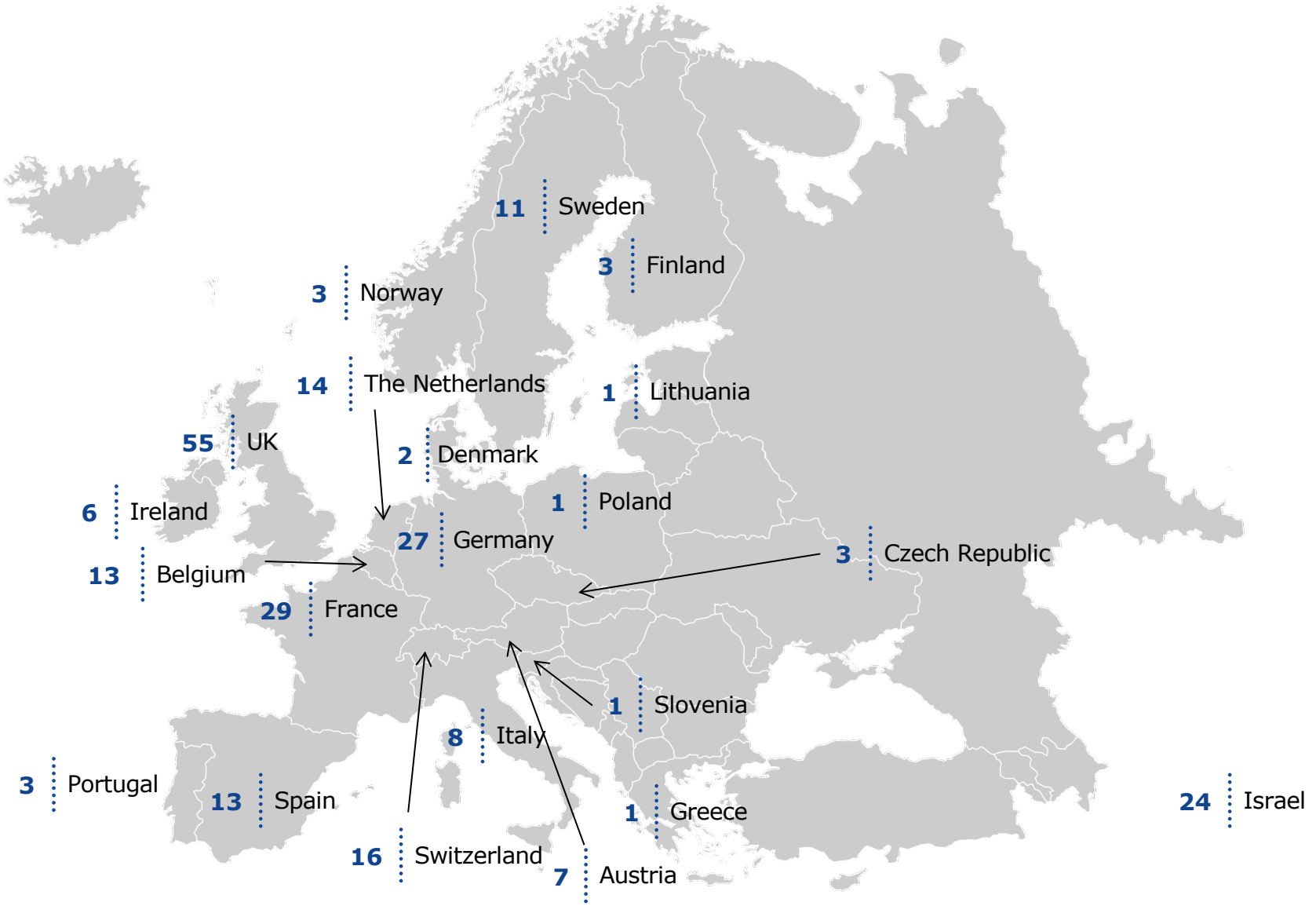


Source data provided by: informa

ATMP Therapeutic Developers

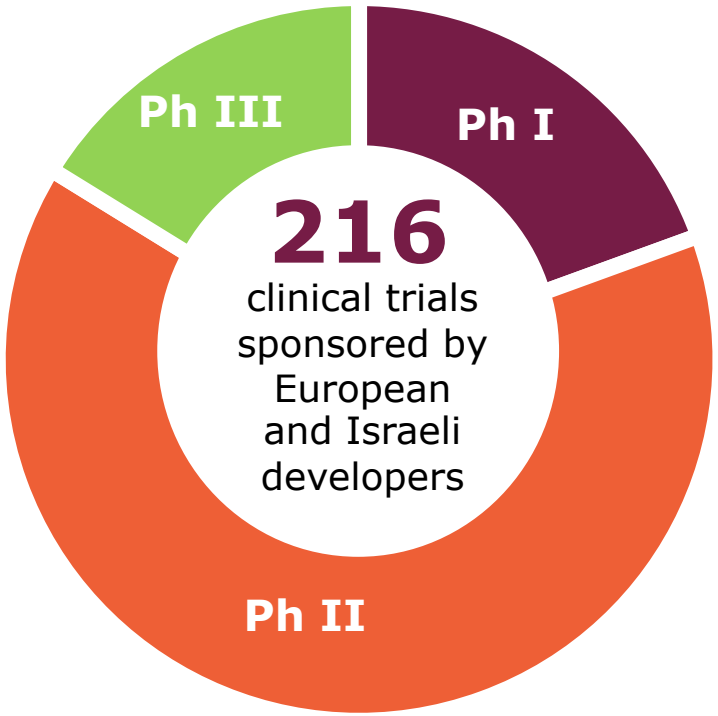
241

Regenerative Medicine Companies in Europe and Israel, of 906 Companies Worldwide



Source data provided by: informa

ATMP Clinical Trials
Sponsored by European and Israeli Developers



1,028 total clinical trials worldwide

Phase I: 42
across all tech types and indications

Gene Therapy: 17
Gene-Modified Cell Therapy: 19
Cell Therapy: 5
Tissue Engineering: 1

Phase II: 139
across all tech types and indications

Gene Therapy: 61
Gene-Modified Cell Therapy: 34
Cell Therapy: 37
Tissue Engineering: 7

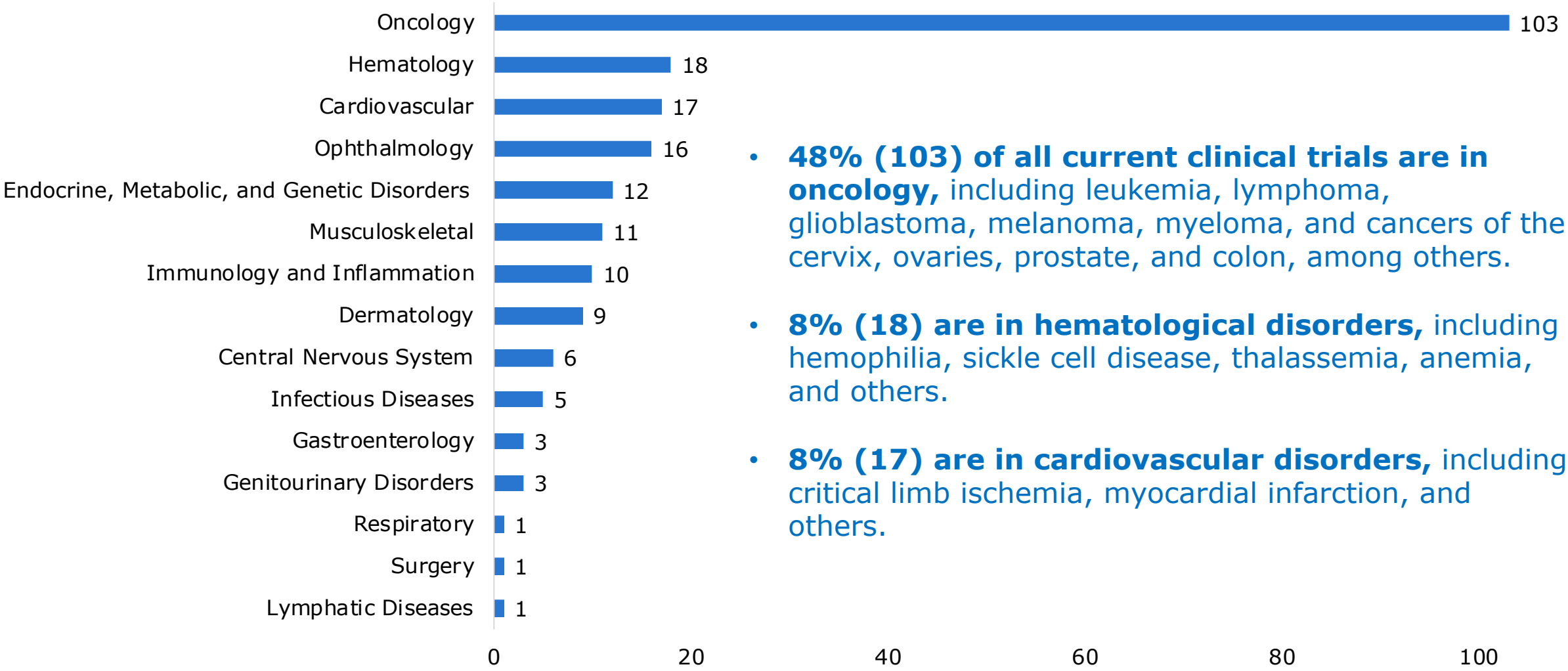
Phase III: 35
across all tech types and indications

Gene Therapy: 17
Gene-Modified Cell Therapy: 5
Cell Therapy: 11
Tissue Engineering: 2

Source data provided by: informa

ATMP Clinical Trials by Therapeutic Category

European & Israeli-based industry-sponsored trials

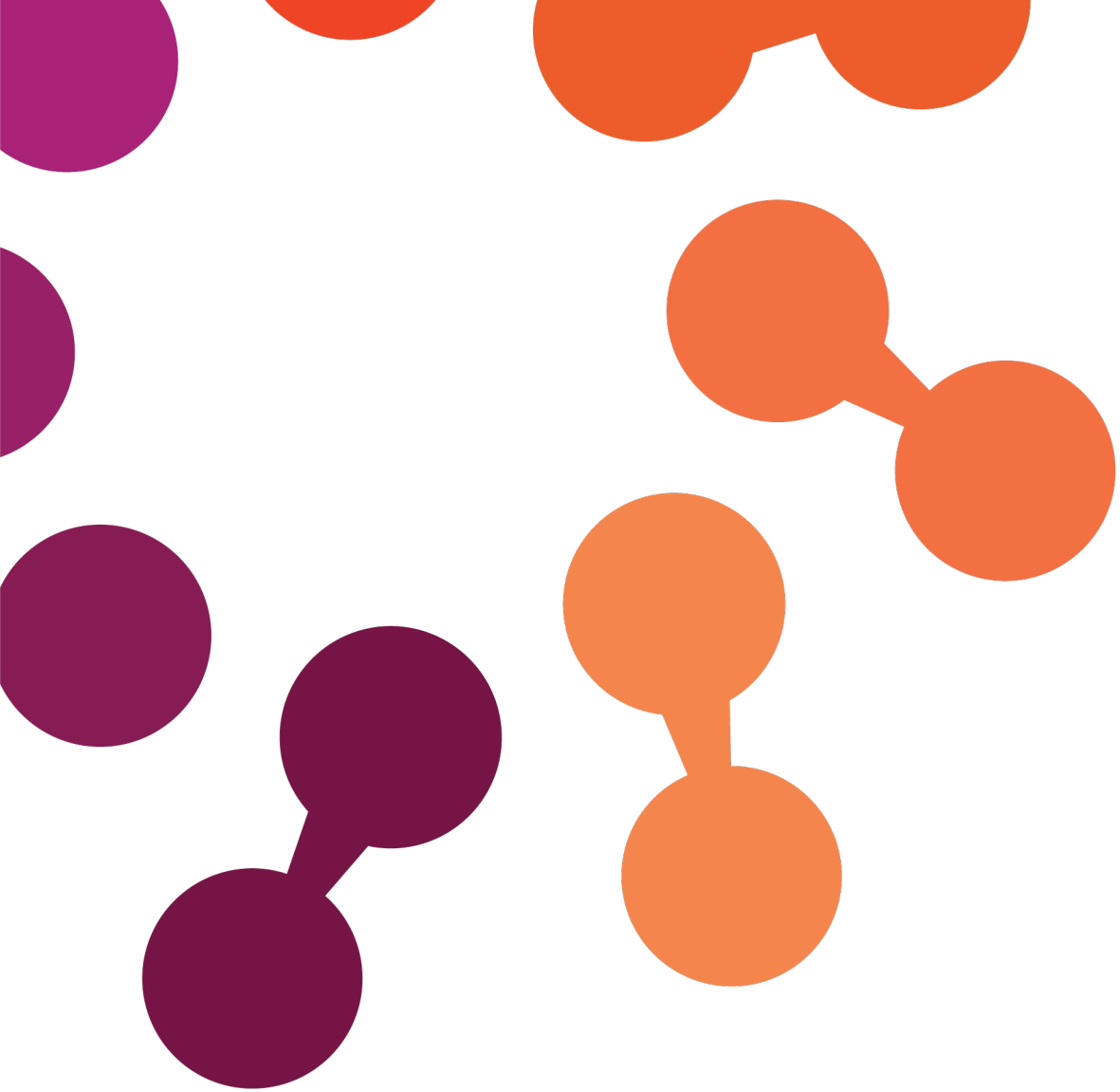


- **48% (103) of all current clinical trials are in oncology,** including leukemia, lymphoma, glioblastoma, melanoma, myeloma, and cancers of the cervix, ovaries, prostate, and colon, among others.
- **8% (18) are in hematological disorders,** including hemophilia, sickle cell disease, thalassemia, anemia, and others.
- **8% (17) are in cardiovascular disorders,** including critical limb ischemia, myocardial infarction, and others.

Source data provided by: informa

About the Alliance

Alliance *for* Regenerative Medicine



Mission Statement

The Alliance for Regenerative Medicine (ARM) is the preeminent global advocate for regenerative and advanced therapies. ARM fosters research, development, investment and commercialization of transformational treatments and cures for patients worldwide.

By leveraging the expertise of its membership, ARM empowers multiple stakeholders to promote legislative, regulatory and public understanding of, and support for, this expanding field.

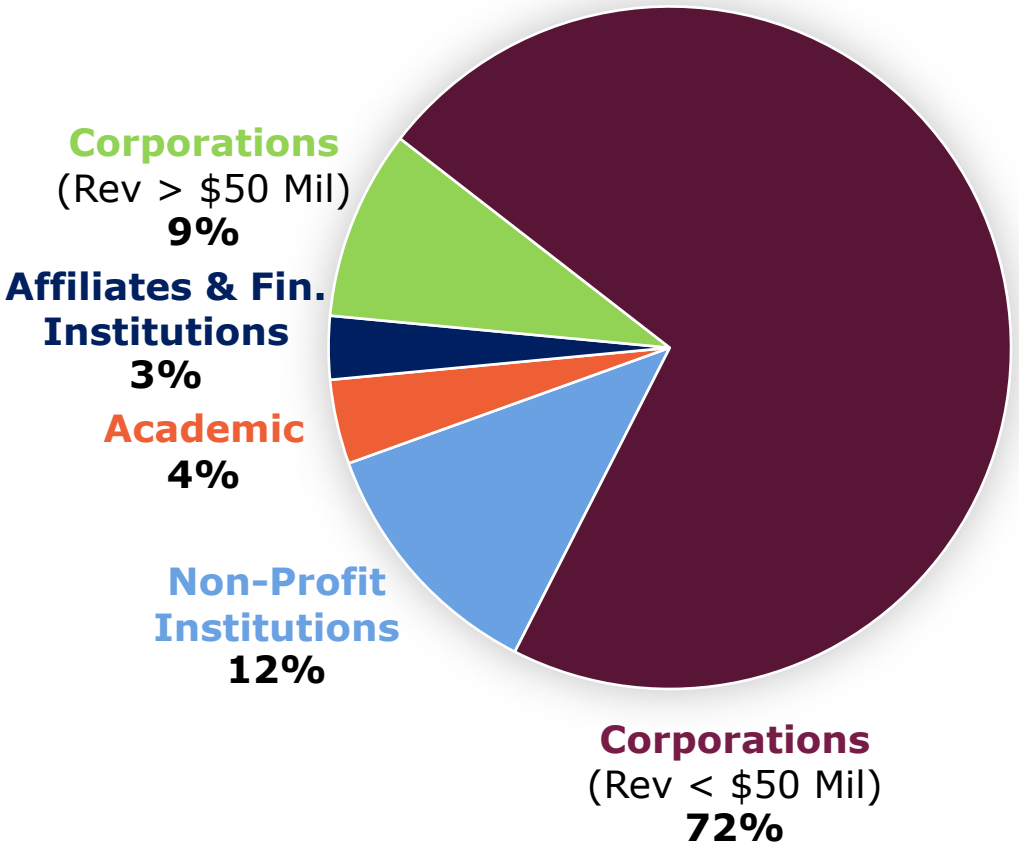
About ARM

- **International advocacy organization**
  - Dedicated to realizing the promise of safe and effective regenerative medicines for patients around the world
- **300+ members across 25 countries worldwide**
  - Small and large companies, non-profit research institutions, patient organizations, and other sector stakeholders
- **Priorities:**
  - Clear, predictable, and harmonized **regulatory** pathways
  - Enabling market access and value-based **reimbursement** policies
  - Addressing industrialization and **manufacturing** hurdles
  - Conducting key stakeholder outreach, **communication**, and education
  - Facilitating sustainable access to **capital**

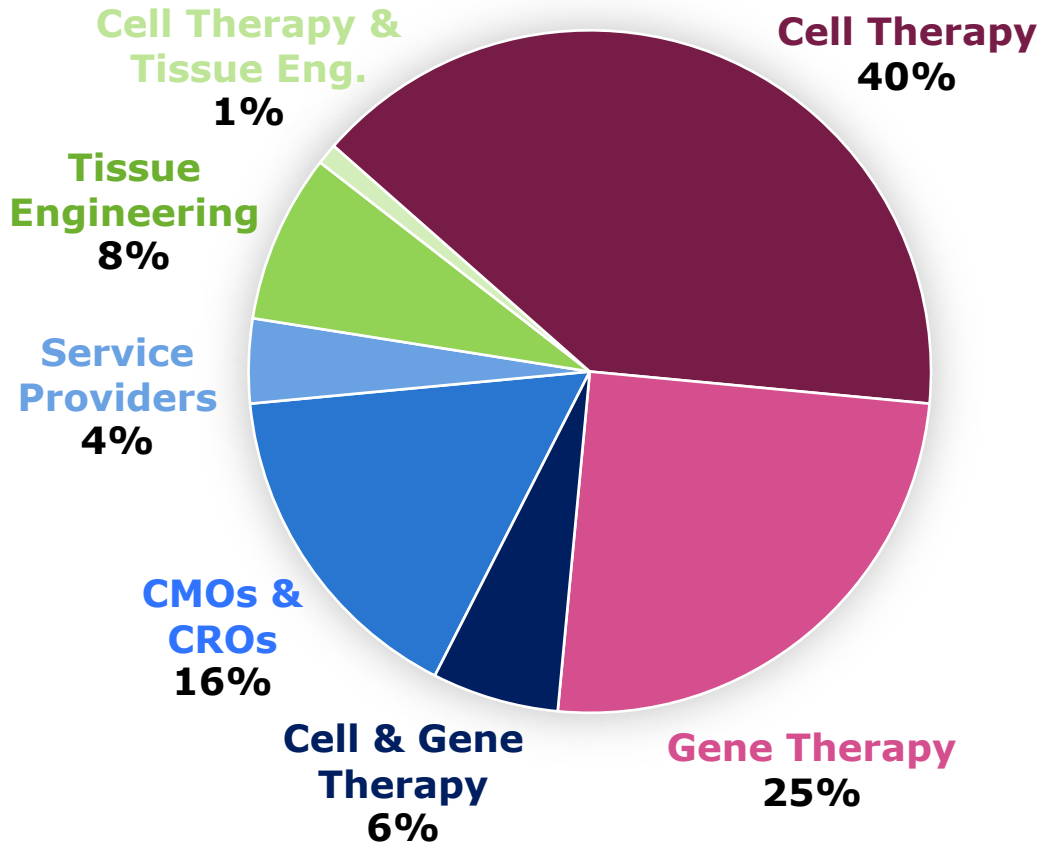
Alliance for Regenerative Medicine

ARM European Membership Composition

Diversity of Membership
N = 68 Organizations



Corporate Membership
N = 55 Organizations



Examples of European/Israeli ARM Members

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Gene Therapy	Cell Therapy	Tissue Engineering	CMOs & CROs	Non-Profits & Gov. Organizations
• Adaptimmune • CombiGene • GENETHON • GenSight Biologics • GSK • Lysogene • MolMed • Nightstar Therapeutics • Orchard Therapeutics • Oxford BioMedica • Sanofi / Bioverativ • Synpromics • Trizell • uniQUre • Vivet Therapeutics • Xintela	• Albumedix • Avectas • BrainStorm Cell Tx • Celixir • Froceth • GammaDelta Tx • InRegen • Kiadis Pharma • Novadip Biosciences • Novartis / AveXis • Orbsen Tx • PDC*line Pharma • Pluristem Tx • Promethera • ReGenesys • ReNeuron • Rexgenero • Unicyte • Zelluna	• Avita Medical • Bone Therapeutics • TikoMed • VERIGRAFT • Vidregen	• CellGenix • Cell Medica • Celonic • Lonza Biologics • MaSTherCell • TrakCel • Vive Biotech • Yposkesi	• Andalusian Institute for Advanced Therapies • CGT Catapult • Chemelot Campus • European Society for Cell & Gene Therapy • Fondazione Telethon • Fraunhofer Insitute • GENETHON • Institut Clayton de la Recherche • Ludwig Boltzmann Institute • REMEDI

ARM Works With Stakeholders to Solve Key Issues

How to create better conditions for timely access to ATMPs in Europe

- EU: Ensure more robust and effective real-world data infrastructure
  - Advocacy on the need to increase public and private investment in real-world data infrastructure
  - Contribution to IMI call on registries
  - Engagement with EUnetHTA on use of registries for HTA purposes
- Main EU countries: identify and publish recommendations by country to remove national barriers to market access
- Leverage ARM foundation to educate policy makers on ATMP specificities and value proposition

Develop strong stakeholder support around ARM access recommendations

- Finalize and publish consensus report on access to ATMPs in Europe
- Organize workshops and other events to present and discuss consensus report, communications campaign, in-person meetings with relevant stakeholder groups, publications

ARM Works With Stakeholders to Solve Key Issues

Promote clear, predictable and efficient regulatory framework across Europe

- Clinical trials:
  - Document and characterize delays/issues of CT approvals of ATMPs
  - Hold regulatory panel at the meeting on the Med
  - Engage with key stakeholders at national level, e.g. through national trade organizations
  - GMO: assess implementation of recommendations at national levels and revisit ARM position as required
- Analyze and make recommendations on key draft guidelines and consultation documents relevant to ATMPs

Promote international convergence of key regulation and guidance

- Identify and address main inconsistencies between US and EU incl. between different EU Member States on
  - GMP for ATMPs,
  - donor eligibility requirements
  - long-term F/U and use of registries
- Advocate for implementation of a DMF-like system for critical materials in Europe

Resources for the Media

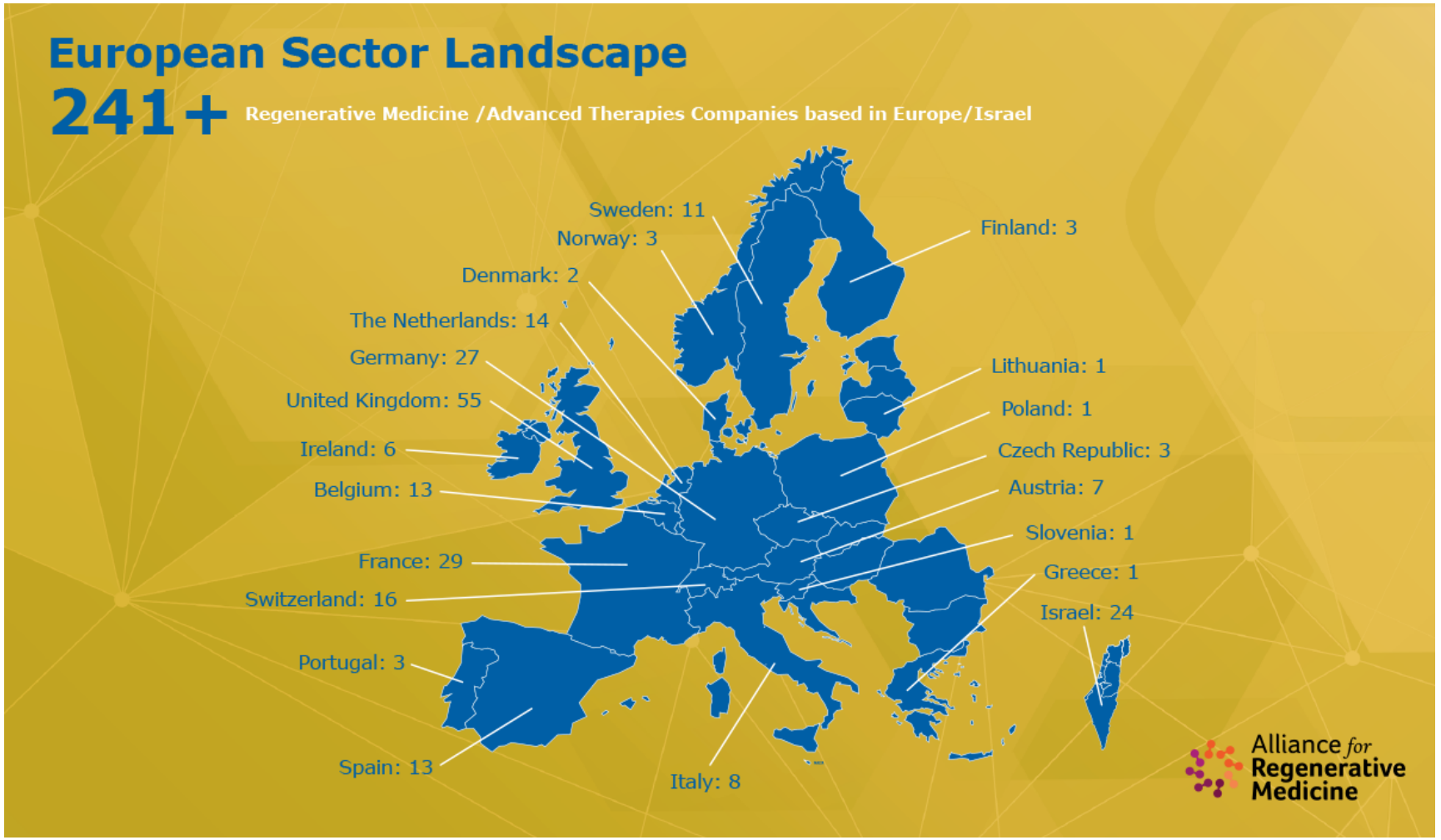
Alliance for Regenerative Medicine

ARM Quarterly & Annual Reports

ARM's Data Reports, released quarterly, include valuable sector data including:

- Number of ATMP companies active worldwide
- Clinical pipeline data
- Commentary from sector experts

ARM's annual reports (released in Q1 each year) also include a Europe-specific data overview



ARM's 2018 Annual Report just released 28 February 2019!

Other Resources

- List of near-term anticipated clinical data readouts and trial milestones, updated quarterly – http://alliancerm.org/anticipated-data
- Indication-specific data reports highlighting the role of regenerative medicine in different disease areas – Regenerative Medicine & Rare Disease launched February 25, 2019
    - Reports on cardiovascular disorders, central nervous system disorders, dermatological disorders, diabetes, hematological disorders, musculoskeletal disorders, oncology, and ophthalmological disorders all scheduled to launch in 2019
- Weekly sector newsletter highlight business news, clinical updates, scientific advances, policy news and more – email kdonaldson@alliancerm.org to sign up
- All ARM presentations, publications, policy recommendations, and webinars are publicly available at http://alliancerm.org/publications-presentations
- Contacts with leading experts in cell therapy, gene therapy, gene editing, and tissue engineering

Upcoming ARM Events

Upcoming: ARM's Inaugural Meeting on the Mediterranean!

- Complimentary attendance for members of the press – contact lscull@alliancerm.org
- Webcast will be available at www.meetingonthemed.com
- Keynote address from Guido Rasi, Director General of the EMA
- Programming includes expert panels on hot tops in the ATMP sector:
  - Pricing & Reimbursement Landscape
  - Manufacturing & the CDMO Perspective
  - Recent Developments & Predictions for the Future of ATMPs
  - European Clinical Trials in a Global Context
  - Regulating ATMPs in a Post-Brexit World

Cell & Gene Investor Day
21 March 2019 | New York, NY

ARM's Cell & Gene Meeting on the Mediterranean
23-24 April 2019 | Barcelona, Spain

ARM's Reception at BIO
3 June 2019 | Philadelphia, PA

ARM's Cell & Gene Meeting on the Mesa
2-4 October 2019 | Carlsbad, CA

Cell & Gene Therapies State of the Industry Briefing
13 January 2020 | San Francisco, CA

Q&A