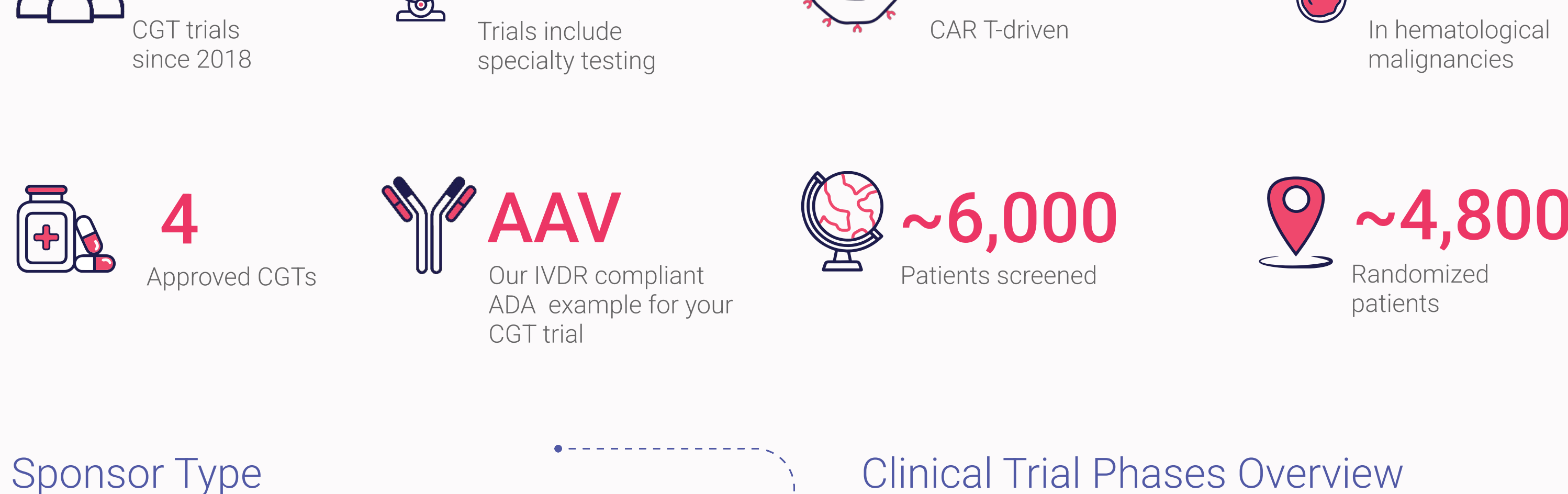


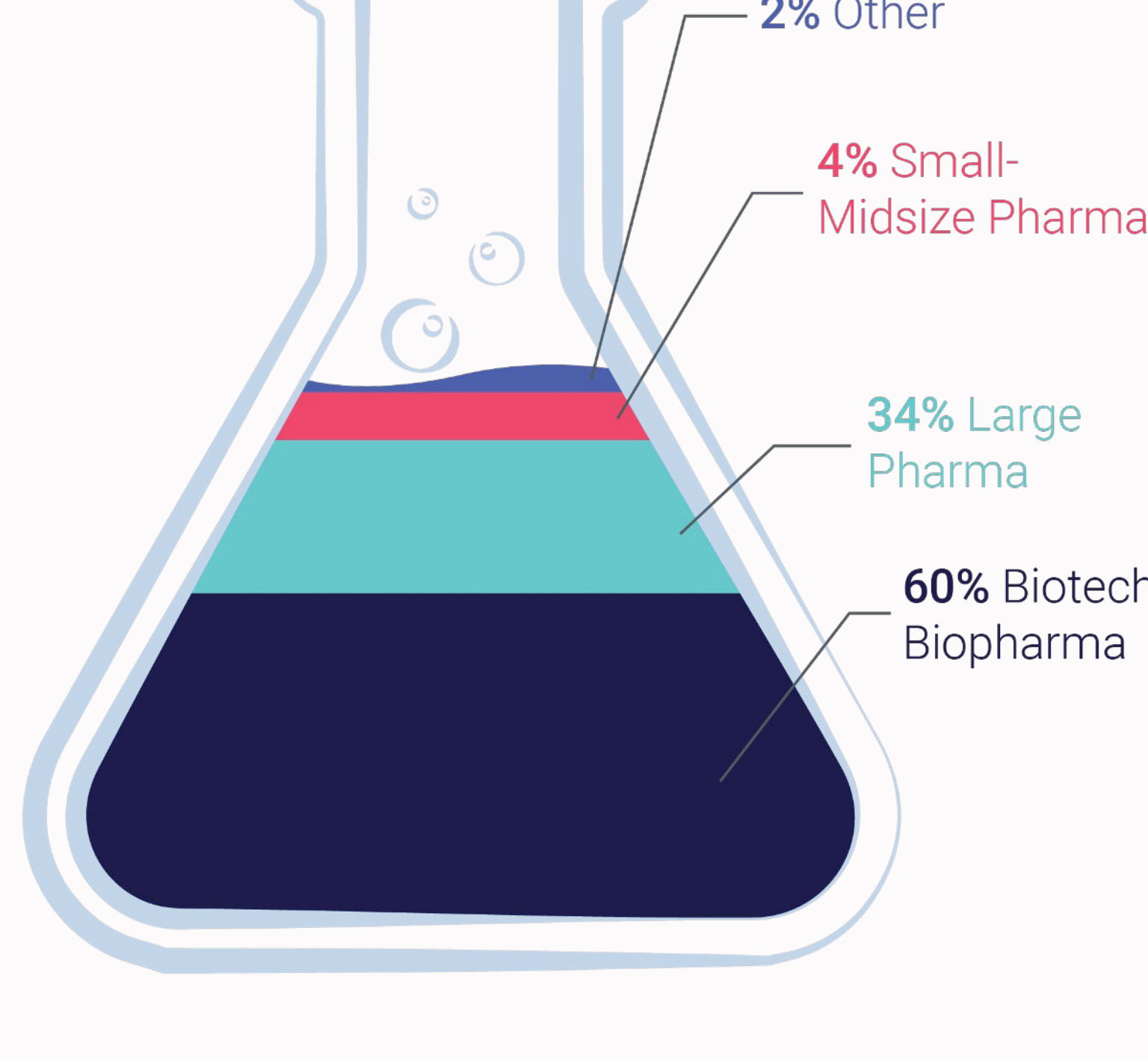
Advancing Cell & Gene Therapy Trials With Confidence

Cerba Research is uniquely positioned to support your cell & gene therapy trial with a wide range of in-house laboratory services, supported by bespoke logistics solutions. We are also able to support sponsors with their assay development, including our regulatory and IVDR certification capabilities. One IVDR example is related to AAV (ADA) ELISA assay.

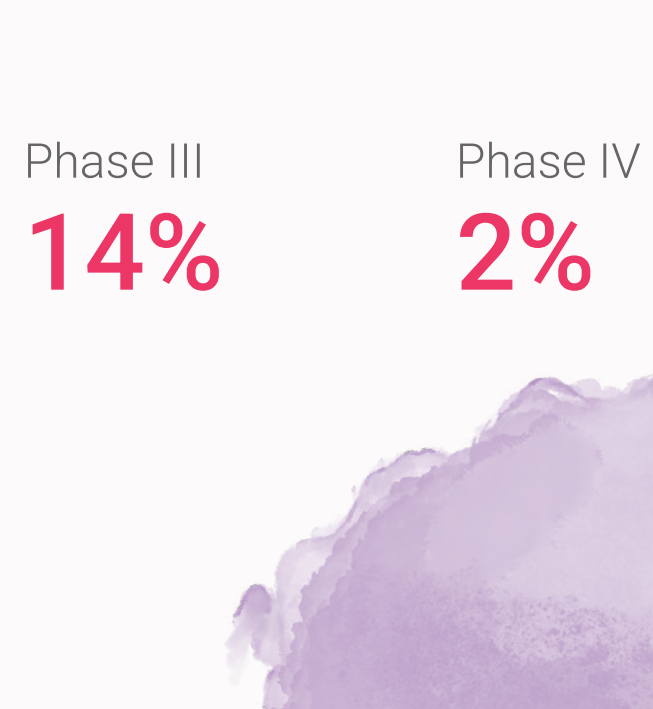
Our Track Record



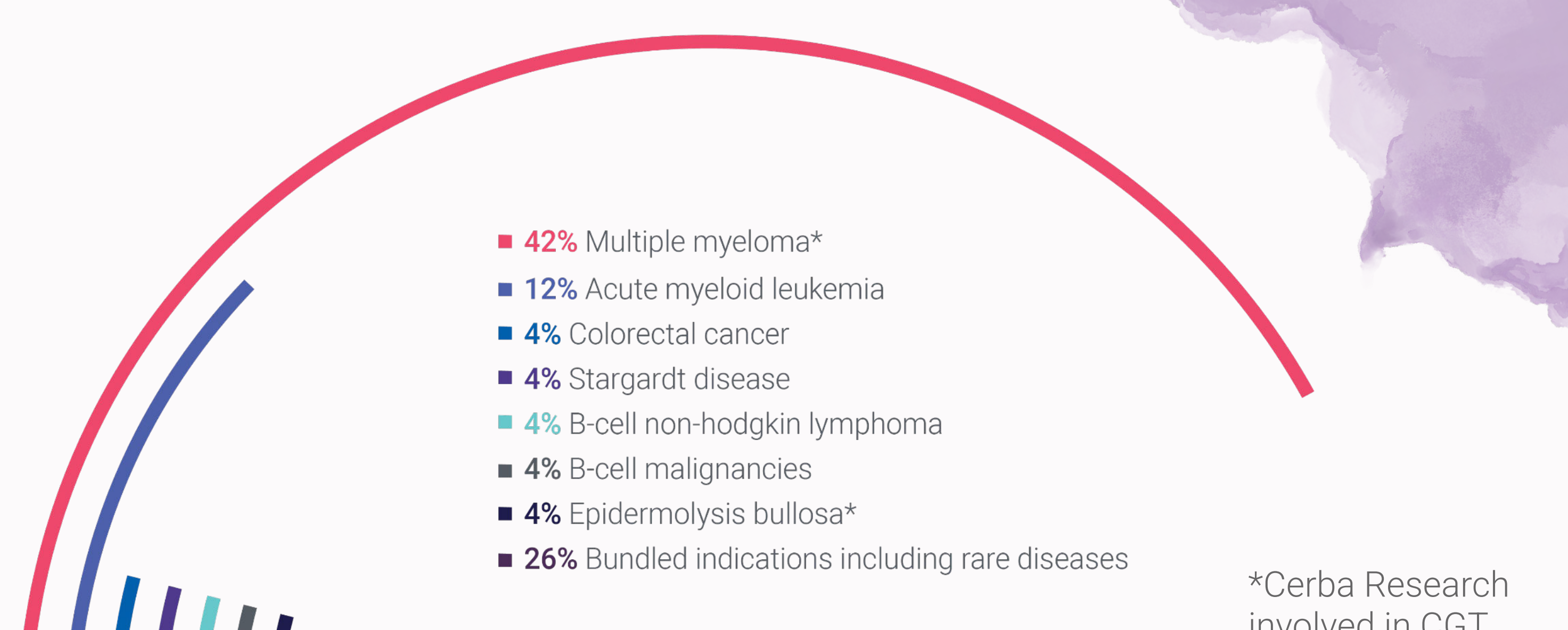
Sponsor Type



Clinical Trial Phases Overview



CGT Trials By Indications Since 2018

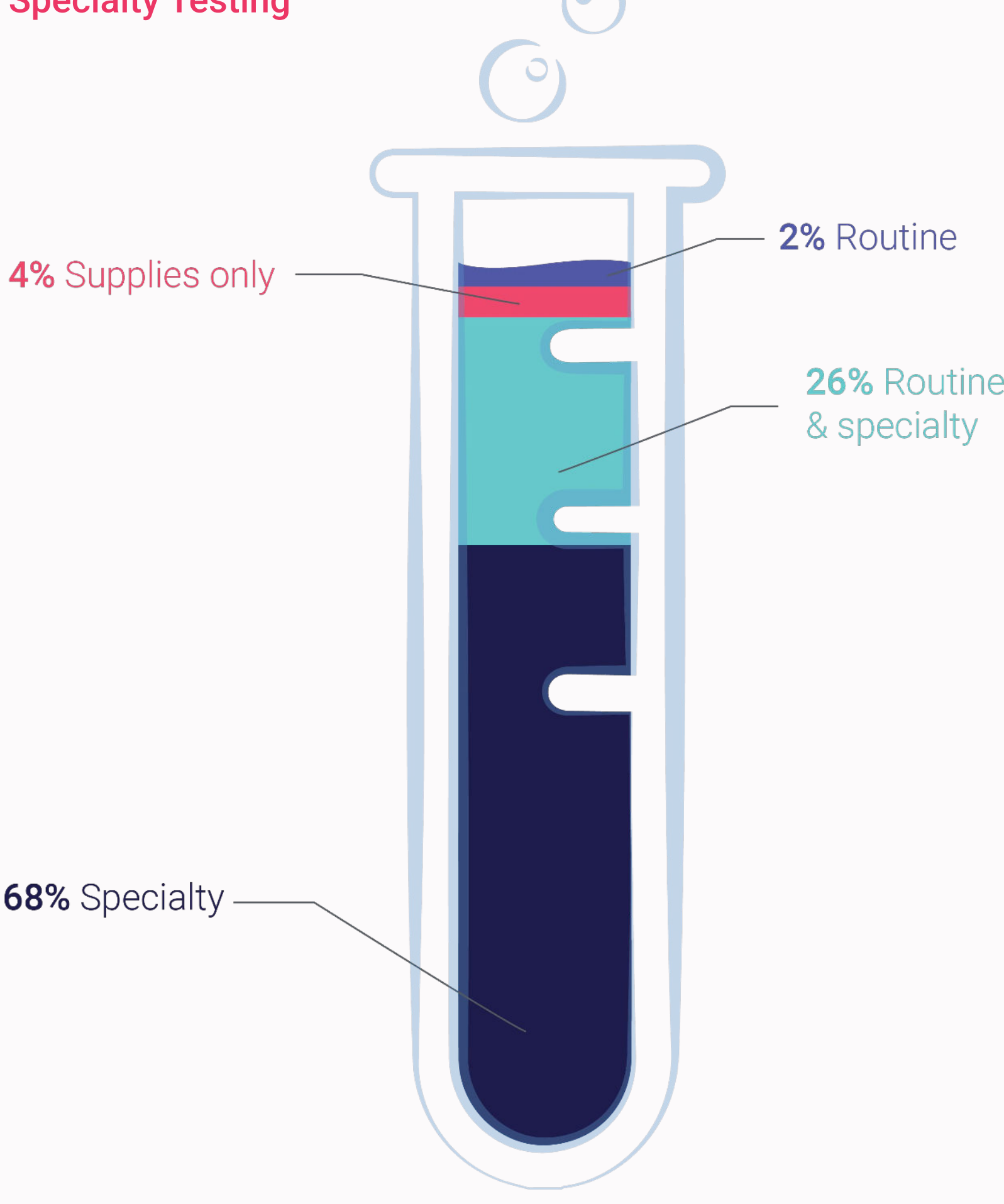


HLA Typing Vs Anti-HLA Antibodies Vs HLA Class I & II Available at Cerba Research

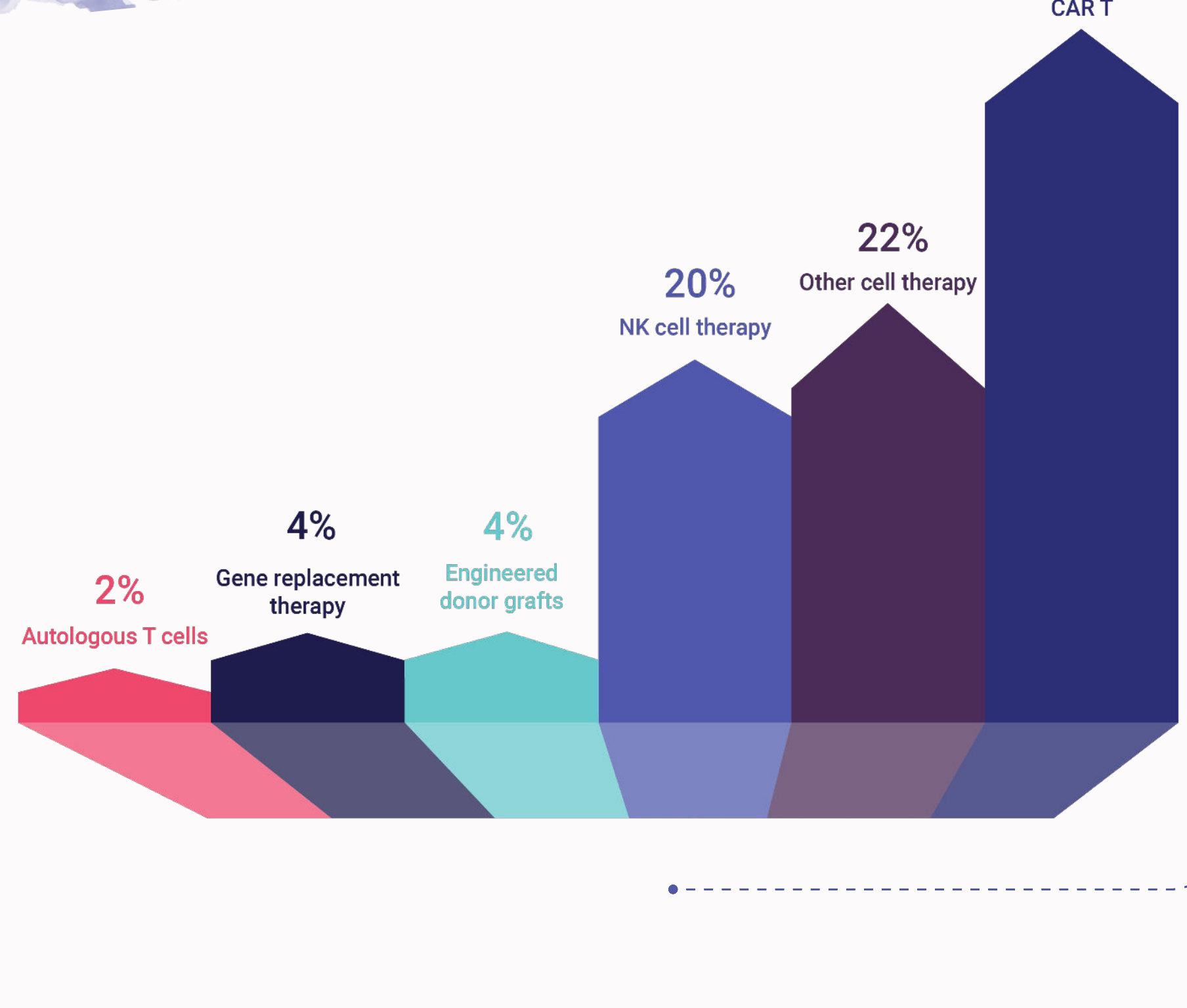
- 1 Cerba NL: 2 HLA typing NGS kits (CareDx® AlloSeq™ Tx17 & GenDx HLA typing)
- 2 Cerba Paris: HLA typing used for both routine & clinical trials use (AllType™ FASTplex NGS)
- 3 Our US lab (CA) which is CAP/CLIA, also offers the CareDx® AlloSeq™ Tx17 & GenDx HLA typing

Project Type

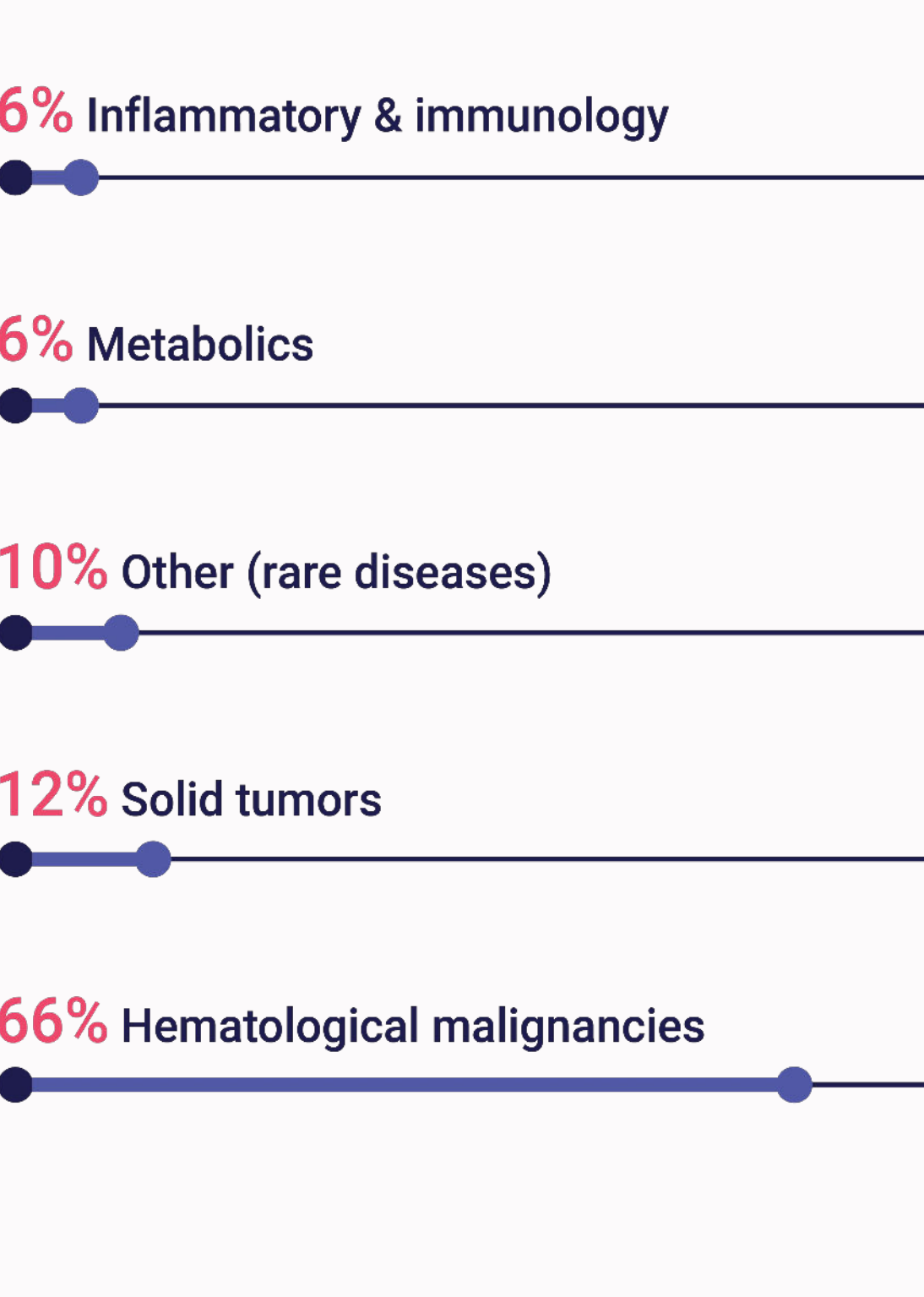
Extensive Experience In Specialty Testing



Asset Class



Therapy Area



Our Off The Shelf 37-plex MSD Panel

CRS Is Critical For Pharmacodynamics Within CGT Trials

Many diseases are characterized by inflammatory processes. Cytokines, as mediators of inflammation may serve as biomarkers (PD) to characterize disease progression and therapy response. The 37-plex MSD panel is also relevant for cytokine release syndrome (CRS) safety assessment for CGT trials. CRS may include fatal or life-threatening reactions occurring following treatment with investigational CGTs.

37-plex panel MSD (matrix : EDTA plasma / serum)

Proinflammatory	Chemokine	Cytokine	Angiogenesis	Vascular
TNF-α	Eotaxin	GM-CSF	VEGF-A	SAA
IFN-γ	Eotaxin-3	IL-5	VEGF-D	CRP
IL-1β	MIP-1α	IL-7	Tie-2	VAM-1
IL-2	MIP-1β	IL-12/IL23p40	Fit-1	ICAM-1
IL-4	IP-10	IL-15	PlGF	
IL-6	MCP-1	IL-16	bFGF	
IL-8	MCP-4	IL-17A		
IL-10	MDC	TNF-β		
IL-12p70	TARC			
IL-13				

Case Study

Global Customized AAV Screening Services

Gene therapy study/clinical support

- Rare disease diagnostics requires fast turn-around time from sampling to test results in order to make swift decisions to avoid disease progression.

Features of our value proposition

- Viral vectors
- Sample kits distributed world-wide
- Specialized pick up and transport on dry ice
- Global coverage
- Import and export support
- Set-up to support medical urgencies
- Specialized account management team
- 24/7 logistics, support and diagnostics services
- Rapid turn-around times
- Report anti-AAV9: On average within 2 business days (<4 business days)

Case Study

Registration Trial With A CAR T Therapy In Multiple Myeloma

The Collaboration Continues With ~25 Other Trials

Cerba Research involved in 200+ routine & specialty assays (Relapsed or Refractory MM)

Lab Solutions Performed In-house

Key Achievements

Specialty

- Standard TBNK
- PBMC isolation
- BMCM isolation
- DNA extraction
- BM, EMP biopsy
- CD138+/Kappa/Lambda IHC
- BMA smear
- CD138+ isolation & count
- FISH

Safety

- Hematology
- Coagulation
- Biochemistry
- CRS panel
- Serology
- sPEP/uPEP
- Serum & urine immunofixation
- Serum Igs
- sFLC
- Urinalysis
- Beta2 microglobuline
- BNP

Logistics

- Collaborating with 10+ referral labs
- Complex logistics schema

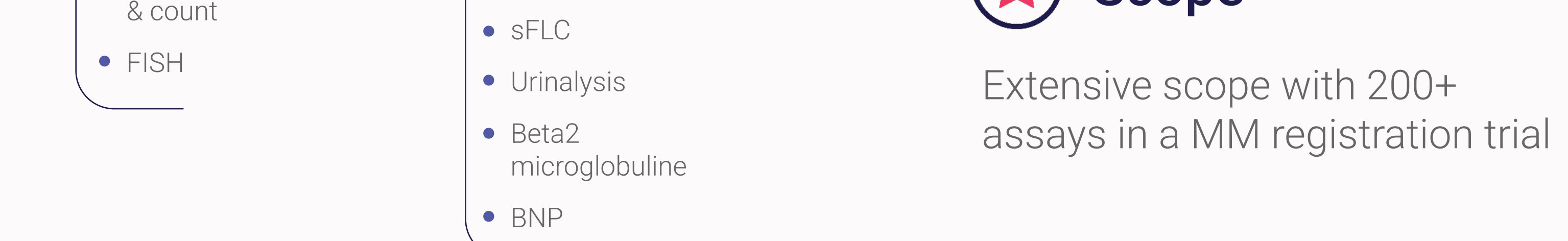
- Strong collaboration with the maker of a newly approved CAR T asset
- Collaboration continues with different assets, routine, specialty & FFP validation projects in ~25 trials with the same sponsor



Scope

Extensive scope with 200+ assays in a MM registration trial

Timeline



Intracellular Cytokine (ICS) Detection

Reported Cell Populations

Cell Subset	Parent Gate	Immunophenotype	Reportable Units
Total T-cells	SSC-low/FSC-mid*	CD3+	% of Lymphocytes
Cytotoxic T-cells	CD3+	CD3+CD8+	% of Total T cells
IL-2+ Total T-cells	CD3+	CD3+IL-2+	% of Total T cells
IFNγ+ Total T-cells	CD3+	CD3+IFNγ+	% of Total T cells
TNFα+ Total T-cells	CD3+	CD3+TNFα+	% of Total T cells
IFNγ+TNFα+ Cytotoxic T-cells	CD3+CD8+	CD3+CD8+IFNγ+TNFα+	% of Cytotoxic T cells

*First gated: Time -> Singlets -> Viability
Note: For this example, only the above cell populations were evaluated and reported.

Cerba Research Offers An Extensive Array Of CGT Laboratory Solutions

DNA/RNA

- HLA typing
- Broad panel NGS
- TCR/BCR seq
- RCR/RCL
- VCN/VIS
- DNA/RNA extraction & seq
- ctDNA processing & seq
- ...

Cell

- FCM
- Cytek Aurora
- Intracellular cytokine detection by FCM
- CAR T cell detection & count (expression of CAR protein on cell surface)
- PBMC isolation
- BMCM isolation
- Optical genome mapping, our next-generation cytogenetics
- PK/ADA/Nabs
- ...

Routine/safety

- RCR/RCL testing
- CRP & ferritin (CRS)
- Coagulation
- Hematology
- Biochemistry
- Urinalysis (renal function)
- Pregnancy test
- Thyroid function
- sPEP, uPEP
- D-dimer (clotting)
- ...

Protein

- CRS by means of multiplex cytokine profiling (37-plex)
- 50+ ligand binding assays
- ELISA
- ELSA
- MSSA
- ELISpot
- AAV
- PK/ADA/Nabs
- ...

Tissue

- Biomarker identification & selection
- Multiplex/simplex IHC
- 250+ biomarkers/protocols
- Full histopathology service
- Spatial analysis in the tumor microenvironment
- NanoString® GeoMX, FISH, ISH
- ...

Acronyms

AAV: Adeno-associated viruses, ADA: Antibody-drug antibody, BCR: B cell receptor, BM: Bone marrow, BMA: Bone marrow aspiration, BMCM: Bone marrow mononuclear cells, BNP: B-type natriuretic peptide, CA: California, CAR: Chimeric antigen receptor, CART: Chimeric antigen receptor T cell, CGT: Cell & gene therapy, CRP: C-reactive protein, CRS: Cytokine release syndrome, ctDNA: Circulating tumor DNA, DBL: Database lock, DNA: Deoxyribonucleic acid, EDTA: Ethylenediaminetetraacetic acid, FCM: Flow cytometry, FFP: fit-for-purpose, FISH: Fluorescence *in situ* hybridization, FPFV: First patient first visit, HLA: Human leukocyte antigens, ICS: Intracellular Cytokine, IHC: Immunohistochemistry, ISH: *In situ* hybridization, LPLV: Last patient last visit, MM: Multiple myeloma, MSD: Mesoscale discovery, Nab: Neutralizing antibody, NGS: Next-generation sequencing, NK: Natural killer, PBMC: Peripheral blood mononuclear cells, PK: Pharmacokinetics, RCL: Replication-competent lentivirus, RCR: Rolling circle replication, RNA: Ribonucleic acid, Seq: Sequencing, sFLC: Serum free light chain, sPEP: Serum protein electrophoresis, TCR: T cell receptor, uPEP: Urine protein electrophoresis, US: United States, VCN: Vector copy number, VIS: Vector integration site.