

2023 글로벌 제약·바이오 신약 개발 동향 : R&D, Deal

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I. Biopharma Dealmaking in 2023

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I-I. Overall current deals

❖ Dealmaking

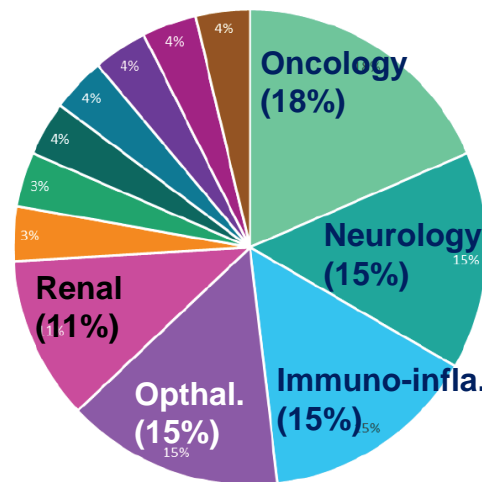
- M&As & Partnerships(2021, 2022, 2023) -

Deals in 2021, 2022, 2023

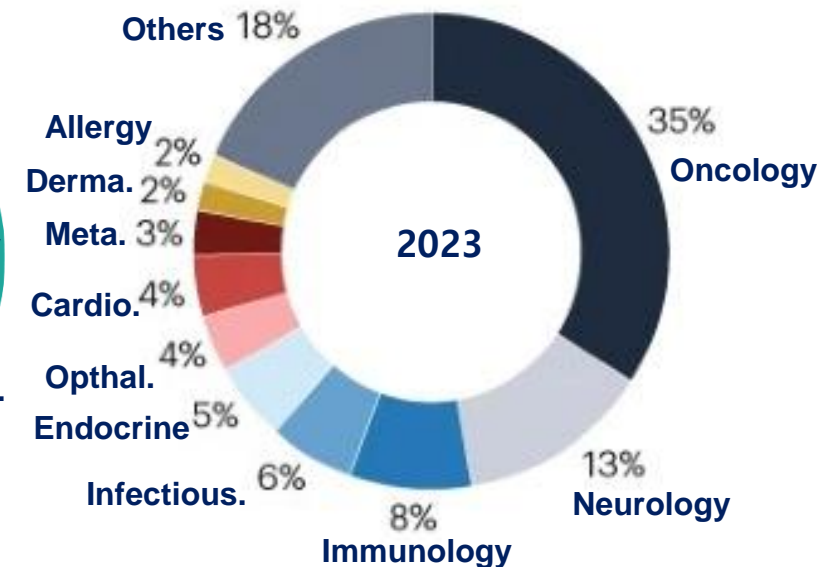
| | Deal Volume | | | Deal Value(disclosed tot.) | | |
|-------------|-------------|------|--------|----------------------------|---------|------------|
| | 2021 | 2022 | 2023 | 2021 | 2022 | 2023 |
| M&A | 196 | 171 | 144(↓) | \$153Bn | \$87Bn | \$160Bn(↑) |
| Partnership | 1,200 | 971 | 741(↓) | \$178Bn | \$179Bn | \$186Bn(↑) |

❖ Breakdown by TA

- M&As(2023) -



- Partnerships(2023) -



Partnerships by TA in 2021, 2022, 2023

| | TA | | | Ratio | | |
|-----------------|-------------|-------------|-------------|-------|------|------|
| | 2021 | 2022 | 2023 | 2021 | 2022 | 2023 |
| 1 st | Oncology | Oncology | Oncology | 34% | 35% | 35% |
| 2 nd | Infectious. | Neurology | Neurology | 13% | 12% | 13% |
| 3 rd | Neurology | Infectious. | Immunology | 12% | 9% | 8% |
| 4 th | Immunology | Immunology | Infectious. | 8% | 8% | 6% |

I-II. Top 10 M&As

Retrieved from Nat Rev Drug Disc(2024), GlobalData

❖ Top 10 M&As of 2023 by tot. deal value

| Top 10 M&As | | | | |
|---------------|------------------------|---|----------------------|-----------------|
| Acquirer | Acquired company | Target focus | Deal value (US\$ Bn) | Announced Month |
| 1 Pfizer | Seagen | Marketed ADC products + ADC pipeline/Technologies | 43 | 2023/03 |
| 2 BMS | Karuna Therapeutics | KarXT submitted for approval in schizophrenia in development for Alzheimer's psychosis | 14 | 2023/12 |
| 3 Merck & Co. | Prometheus Biosciences | TL1A-targeted mAb PRA023 in phase III for ulcerative colitis, Crohn's disease and other autoimmune conditions | 10.8 | 2023/04 |
| 4 AbbVie | ImmunoGen | Approved ADC Elahere pipeline ADC candidates | 10.1 | 2023/11 |
| 5 AbbVie | Cerevel Therapeutics | Neuroscience pipeline led by emraclidine in phase II for schizophrenia | 8.7 | 2023/12 |
| 6 Biogen | Reata Pharmaceuticals | Approved Friedreich's ataxia drug Skyclarys and pipeline focused on rare diseases | 7.3 | 2023/07 |
| 7 Roche | Telavant | TL1A-targeted mAb RVT-3101 in phase II for IBD | 7.25 | 2023/10 |
| 8 Astellas | Iveric Bio | Approved complement C5inhibitor Izervay for geographic atrophy | 5.928 | 2023/04 |
| 9 BMS | Mirati Therapeutics | Approved KRAS inhibitor Krazati plus oncology pipeline including phase I/II MRTX1719 | 5.8 | 2023/10 |
| 10 BMS | RayzeBio | Actinium-based radiopharmaceuticals for solid tumours, led by RYZ101 in phase III | 4.1 | 2023/12 |

I-III. Top 10 Partnerships

Retrieved from Nat Rev Drug Disc(2024), GlobalData

❖ Top 10 Partnerships of 2023 by tot. deal value

| Top 10 M&As | | | | | | |
|---------------------------|------------------------|-----------------------------|---|-------------------------|--------------------|--|
| Company | Partner | TA | Deal focus (Blue: ADC/Antibody conjugates, Green: CGT, Gray: Others) | Deal value (US\$ Bn) | Announced Month | |
| 1 DS | Merck & Co. | Oncology | Three ADC candidates | 22 | 2023/10 | |
| 2 SytImmune | BMS | Oncology | Bispecific Top inhibitor-based ADC | 8.4 | 2023/12 | |
| 3 Voyager Therapeutics | Neurocrine Biosciences | Neurology | Multiple gene therapy Programmes | 4.41 | 2023/01 | |
| 4 Nurix Therapeutics | Seagen | Oncology | DACs | 3.46 | 2023/09 | |
| 5 Monte Rosa Therapeutics | Roche | Neurology Oncology | Molecular glue degraders with option to include an additional target Set | 3.078 | 2023/10 | |
| 6 Alnylam Pharmaceuticals | Roche | Cardiovascular | RNAi candidate | 2.8 | 2023/07 | |
| 7 Nanobiotix | Janssen | Oncology | Investigational radioenhancer | 2.765 | 2023/07 | |
| 8 Valo Health | Novo Nordisk | Cardiovascular Metabolic | AI-driven target discovery and development of novel treatments | 2.76 | 2023/09 | |
| 9 Proxygen | Merck & Co. | Not specified | Molecular glue degraders | 2.55 | 2023/04 | |
| 10 C4 Therapeutics | Merck & Co. | Oncology | DAC candidates directed at an undisclosed Oncology target with option to include three additional Targets | 2.5 | 2023/12 | |

II. R&D Trends in 2023

II-I. Oncology spending(2026), R&D(2022)

II-II. Modality

II-III. New modalities in FIH(2023)

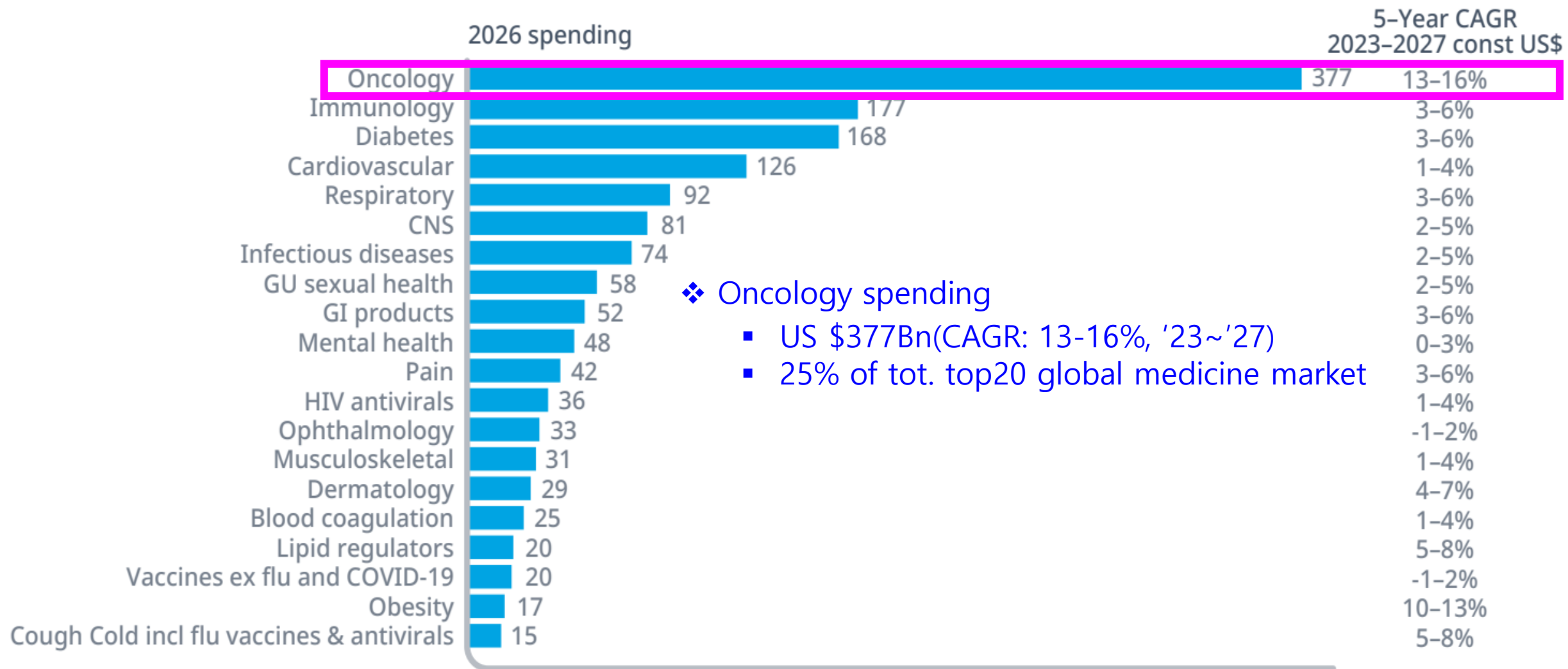
II-IV. New modalities in pharma deals(2023)

* Recent Global ADC Deals

* Increase of ADC Deals

II-V. 2023 FDA Approvals

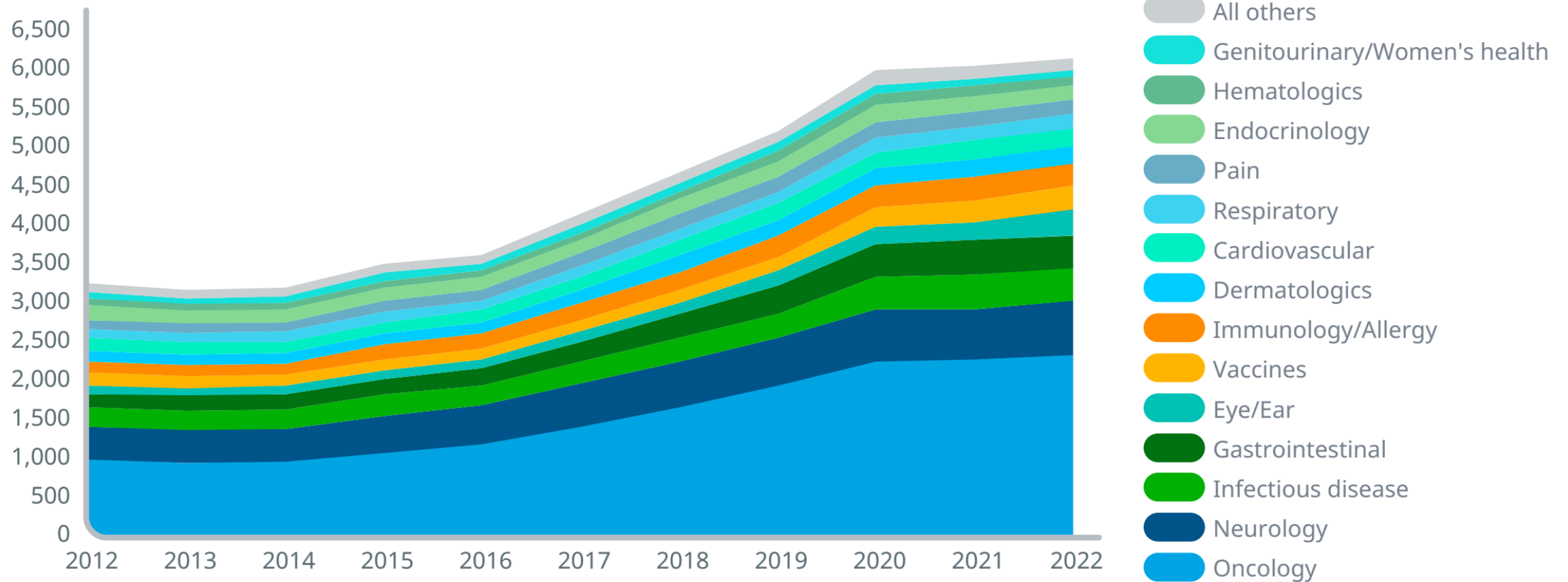
II-I. Oncology spending (forecast for 2026)



II-I. Oncology R&D(2022)

(Phase I ~ Regulatory submission)

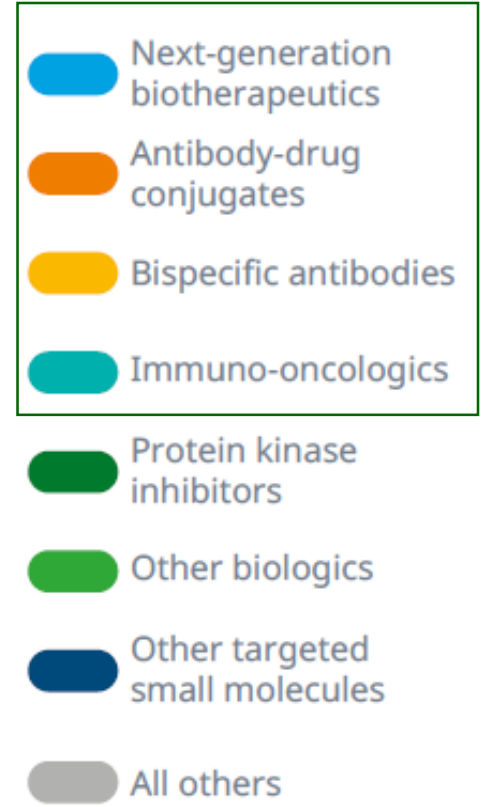
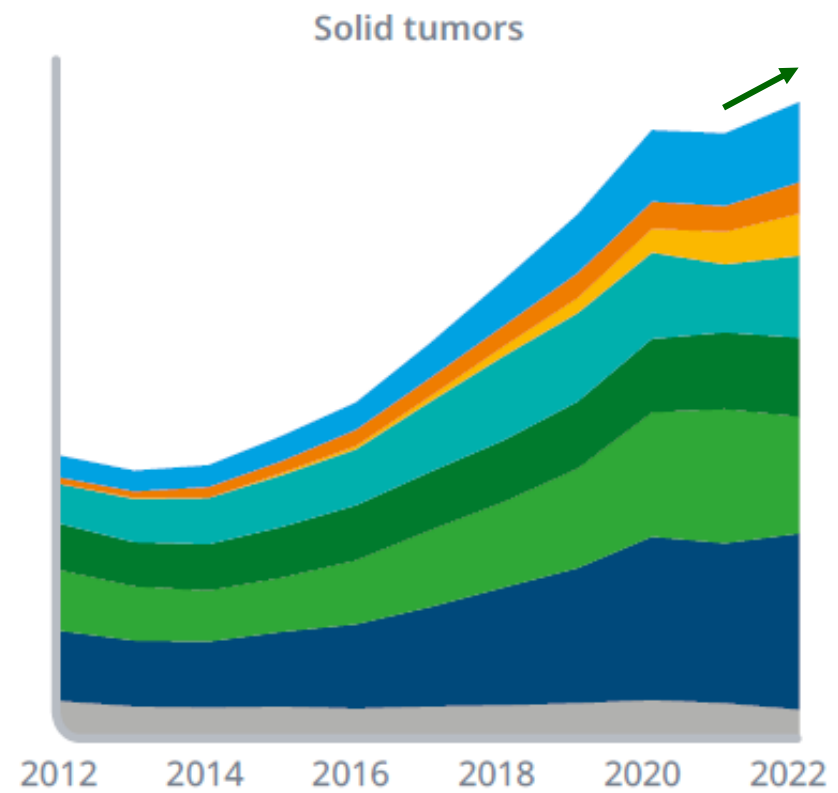
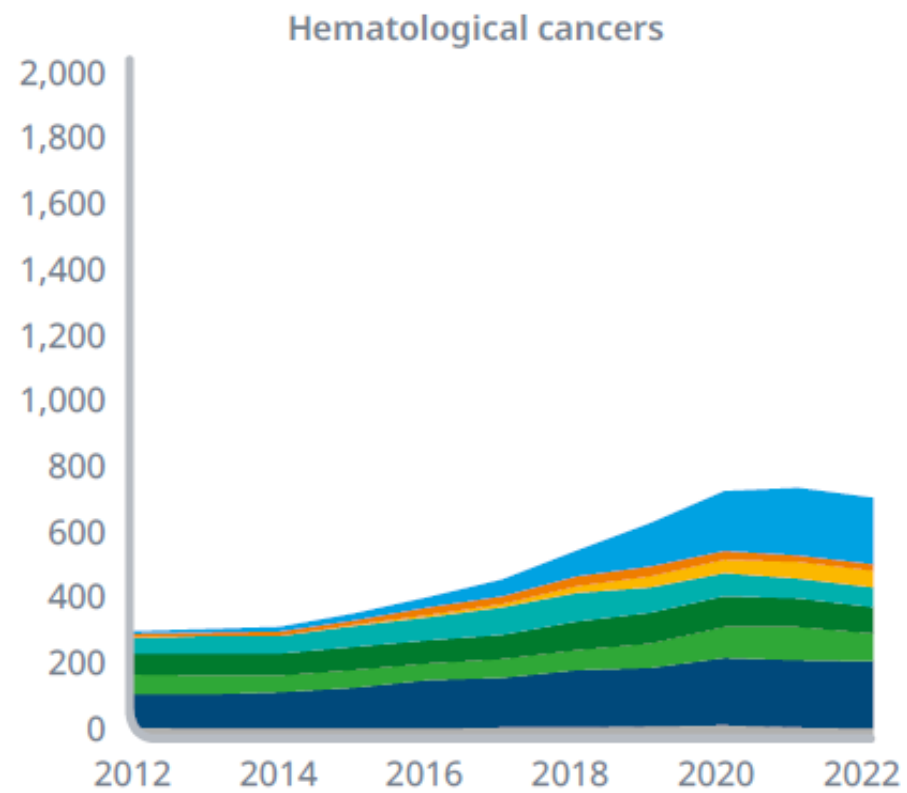
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Source: IQVIA Pipeline Intelligence, Dec 2022; IQVIA Institute, Jan 2023.

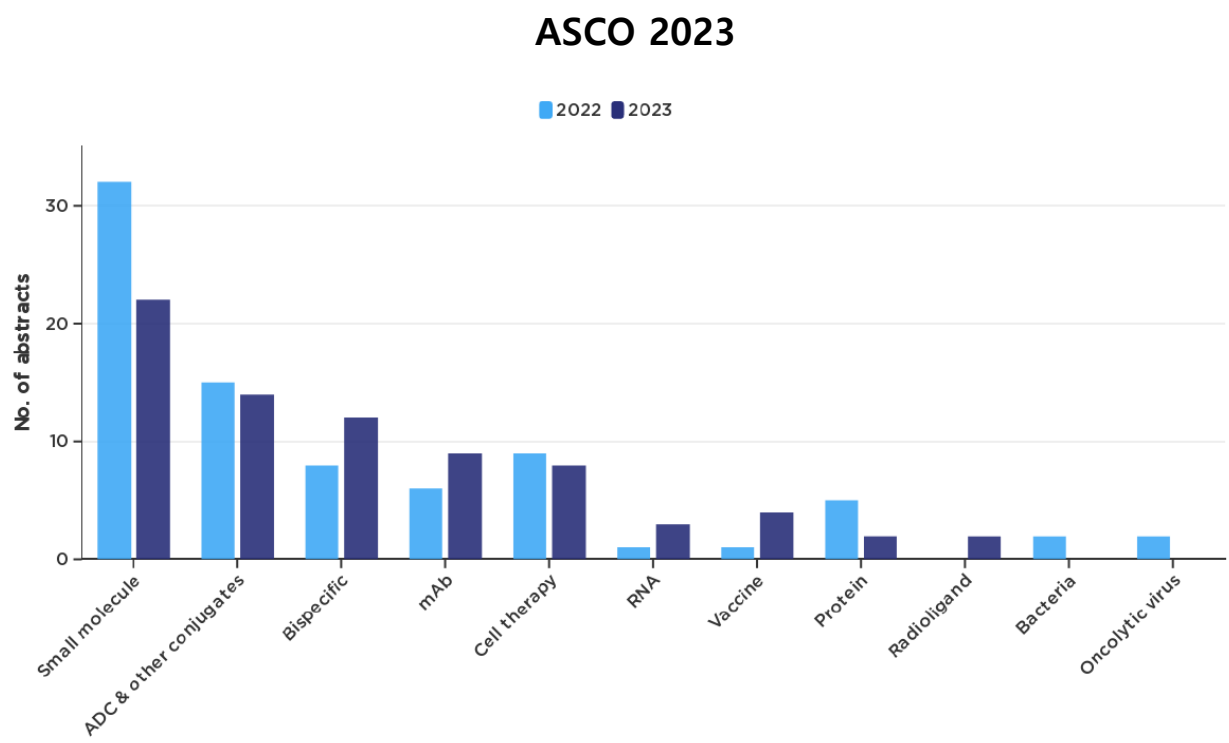
II-II. Modality

(Phase I to regulatory submission)

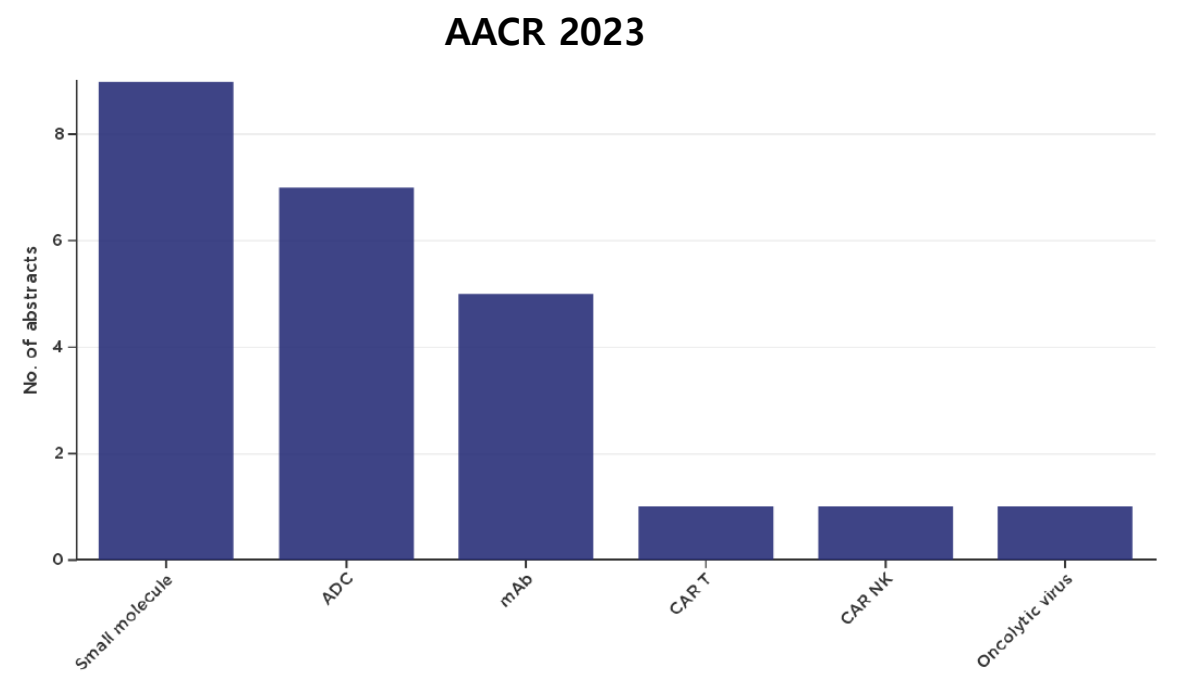


II-III. New modalities in FIH(2023)

New modalities(ADC, Drug conjugates, BsAb, CGT, etc.) ↑ for cancer treatment



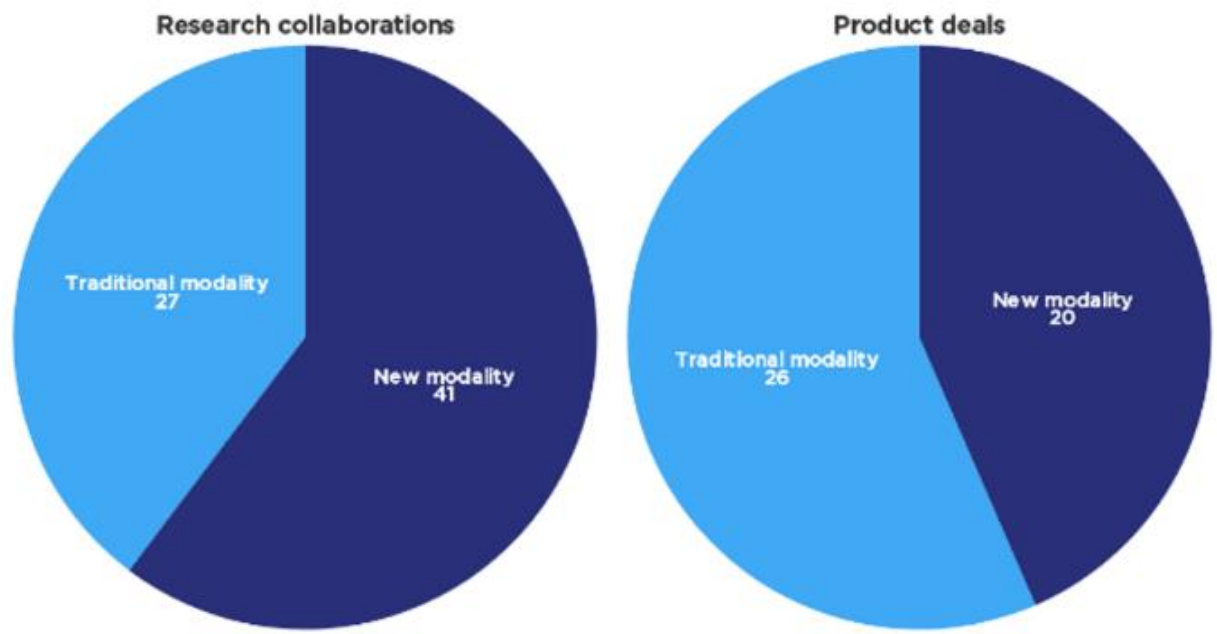
2023 Biocentury



2023 Biocentury

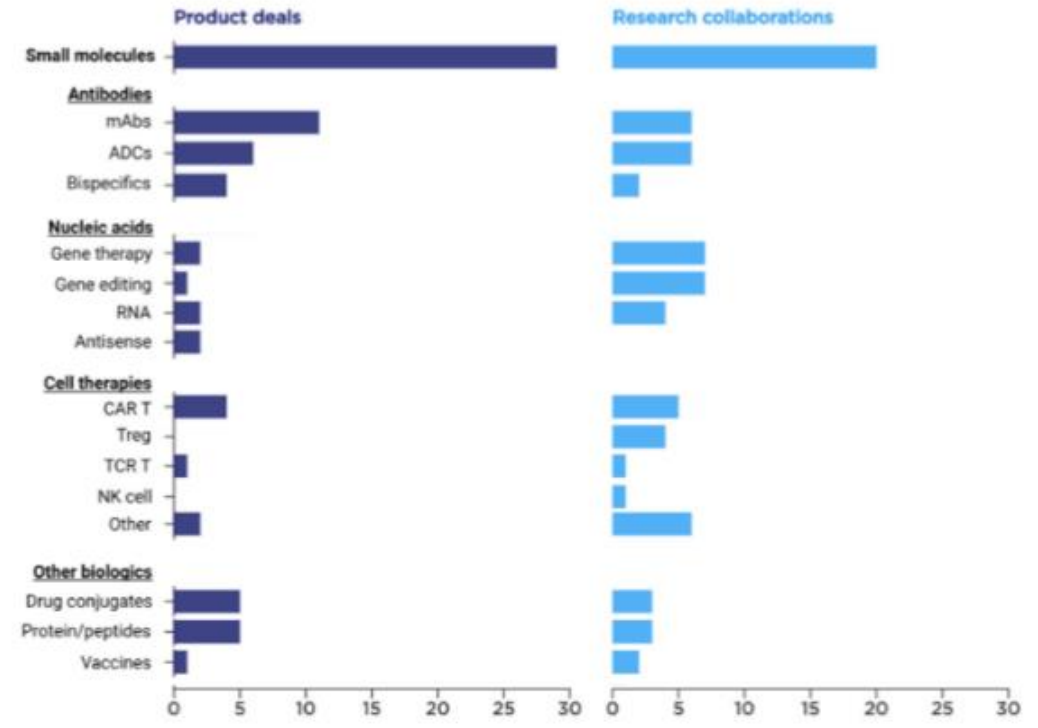
II-IV. New modalities in pharma deals(2023)

Pharmas seek new modalities via collaborations



Source: BCIQ • Research collaborations and product deals by top 21 pharma in 3Q22-2Q23. Excludes acquisitions, non-therapeutics deals without disclosed modalities. New modalities include ADCs and other antibody conjugates, bispecifics, cell and gene therapies, and nucleic acid therapies.

Therapeutic modalities in recent pharma deals



Source: BCIQ • Therapeutic product deals and research collaborations by top 21 pharma in 3Q22-2Q23 with disclosed therapeutic modality; Deals involving multiple modalities counted for each

Recent Global ADC Deals

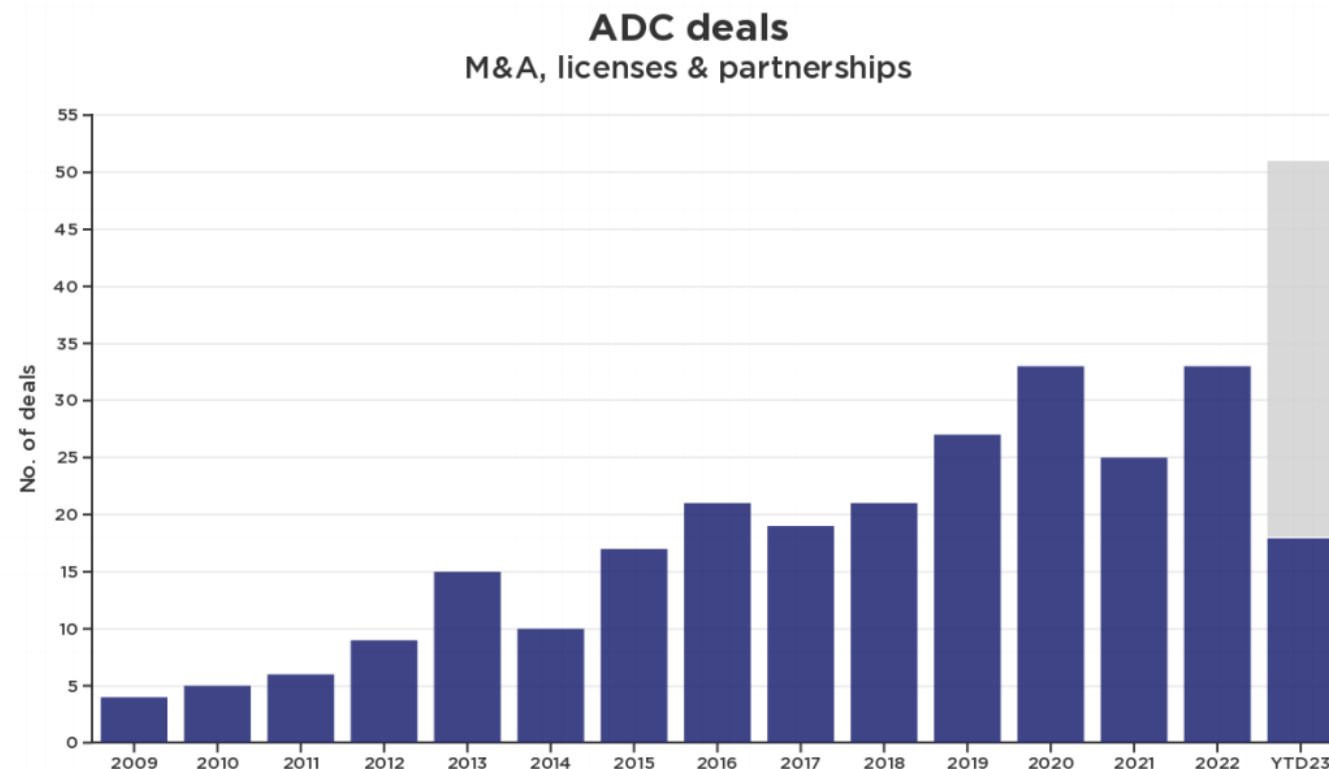
Retrieved from BioCentury, GlobalData

| Deals by tot. deal value (disclosed value only) | | | | | | |
|---|---------------------------|------------------------|-------------|--|----------------------|-----------------|
| No. | Category | Partner | Company | Focus | Deal value (US\$ Mn) | Announced Month |
| 1 | M&A | Seagen | Pfizer | Adcetris(CD30 ADC) Padcev(Nectin4 ADC) Tivdak(TF ADC) | 43,000 | 2023/3 |
| 2 | Licensing/ Partnership | Daiichi Sankyo | MSD | Patritumab deruxtecan(HER3 ADC/Phase 3), Ifinatamab deruxtecan (B7-H3 ADC/Phase 2), Raludotatug deruxtecan(CDH6 ADC/Phase 1) | 22,000 | 2023/10 |
| 3 | M&A | ImmunoGen | AbbVie | Elahere(DM4-FR α ADC/Marketed) IMGN-151(FR α ADC/Phase 1) Pivekimab sunirine(CD123 ADC/Phase 2) | 10,100 | 2023/11 |
| 4 | Licensing/ Partnership | Synaffix | MacroGenics | ADC Platform (GlycoConnect™, HydraSpace™, toxSYN™), 7 assets | 2,200 | 2023/3 |
| 5 | | Synaffix | Amgen | ADC Platform (GlycoConnect™, HydraSpace™, toxSYN™) | 2,000 | 2023/1 |
| 6 | | Bliss Biopharma | Eisai | BB-1701(HER2 ADC/Phase 1) | 2,000 | 2023/5 |
| 7 | | DualityBio | BioNTech | DB-1303(HER2 ADC/Phase 1), DB-1311(TOP1 ADC/Preclinical) | 1,670 | 2023/4 |
| 8 | | Jiangsu Hengrui Pharma | Merck KGaA | SHR-A1904(CLDN18.2 ADC/Phase 1) | 1,669 | 2023/10 |
| 9 | | Hansoh Pharma | GSK | HS-20089(B7-H4 ADC/Phase 1) | 1,570 | 2023/10 |
| 10 | | KYM Biosciences | AstraZeneca | CMG901(CLDN18.2 ADC/Phase 1) | 1,163 | 2023/2 |
| 11 | | SystImmune | BMS | BL-B01D1(EGFRxHER3 ADC/Phase 1) | 840 | 2023/12 |

Increase of ADC deals(2023)

ADCs' recent resurgence is just the beginning

Dealmaking analysis shows antibody-drug conjugates becoming a strategically important modality for many cancer companies



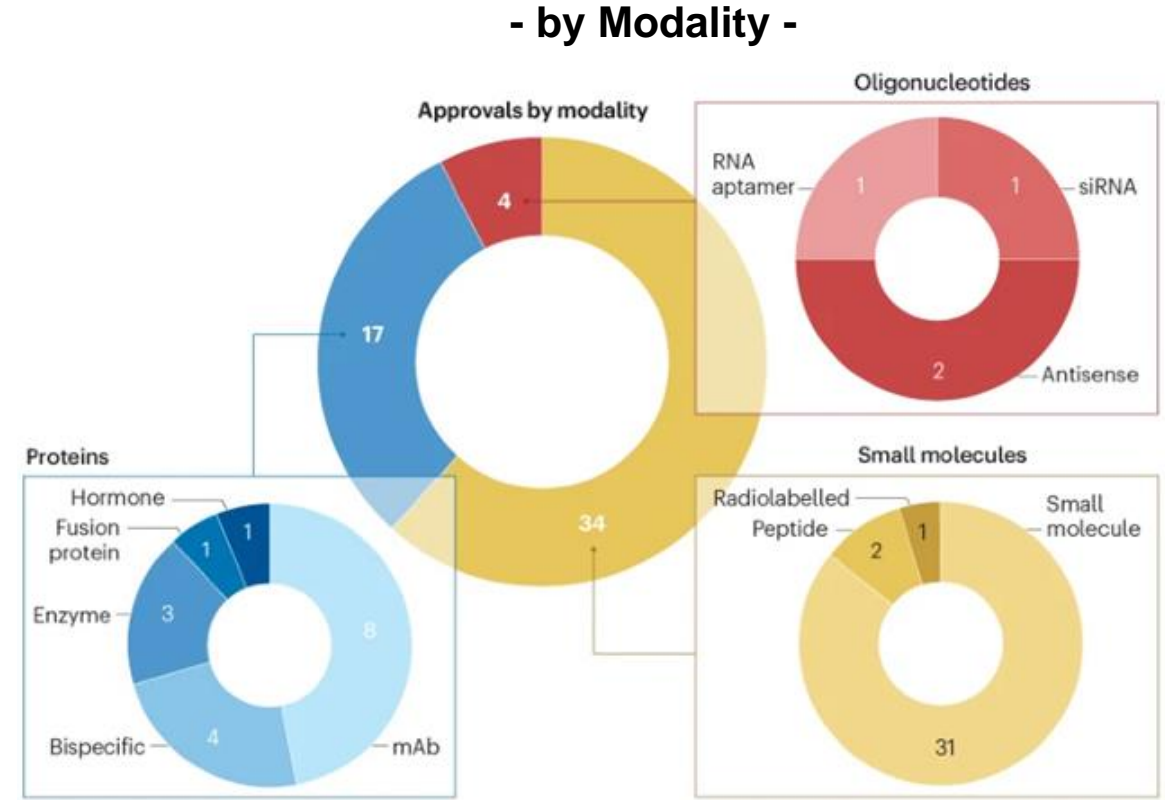
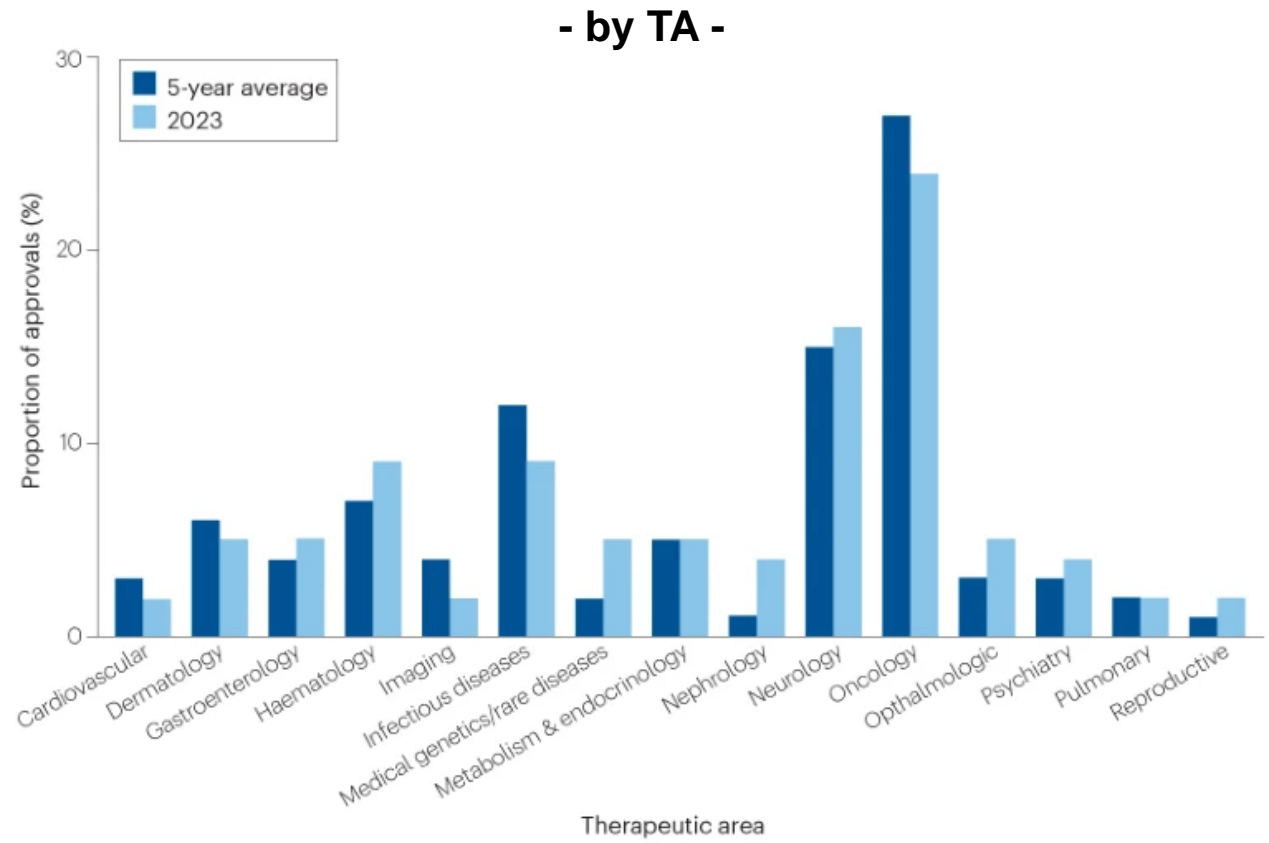
Source: BCIQ • 2023 data as of May 8; gray bar estimates 2023 full-year number if the deal frequency seen so far were to remain steady. Chart excludes collaborations solely to test approved ADCs in combination trials.

II-V. 2023 FDA Approvals

Retrieved from Nat Rev Drug Disc(2024), A Mullard et al.

❖ 55 Approvals(vs 37 in '22)

- TA: Oncology
- Modality: Small molecule > Proteins > Oligonucleotides





국가신약개발사업단
Korea Drug Development Fund

III. Learning & Takeaways

Learning & Key Takeaways

I. Dealmaking trends in 2023

- ❖ **M&A:** volume ↓ & value ↑ (volume: 171(2022) → 144(2023), value: \$87Bn(2022) → \$160Bn(2023))
 - Big Pharma → Inflation, Big Pharma's patent cliff, IRA, etc.
 - Various modalities, Oncology/Immunology/Neurology, Ophthalmology, etc.
- ❖ **Partnership:** volume ↓ & value ↑ (volume: 971(2022) → 741(2023), value: \$179Bn(2022) → \$186Bn(2021))
 - Big Pharma ↔ Smaller company
 - Oncology, various modalities

II. R&D trends in 2023

- ❖ Oncology is a **key driver** in the global medicine market. (\$377Bn, CAGR: 13-16%)
- ❖ **Novel target & Novel modality emerging:** ADC, BsAb, CGT, small molecule with new target/MoA, etc.
 - **ADC**
 - Growing, be a game-changer with significant clinical benefit
 - Global Big Pharma's key interest
- ❖ Needs: **Data-driven evidences**(ex: clinical trials, RWD)