



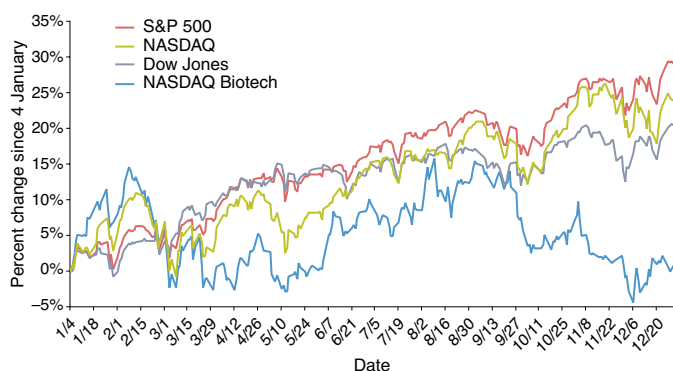
DATA PAGE

2021 — the bubble's hangover

Biotech's overheated asset prices finally came home to roost. The NASDAQ Biotech Index's multi-year ascent turning into a descent from February. But the hangover didn't transfer to initial public offerings (IPOs), with the year witnessing three of the largest ever: SK Bioscience, SD Biosensor and Sana Biotechnology. South Korean companies were prominent in raising eye-popping amounts, and five of the top ten flotations were on Asian exchanges. Follow-on financings were less buoyant, down 34% from the previous year (notwithstanding BeiGene's \$3.5 billion haul, the second largest on record). US and European venture capital (VC) funds had a good year, spurring healthy company formation. ElevateBio, Centessa Pharmaceuticals and Atai Life Sciences signaled the rise of a new type of company: umbrella corporations containing multiple asset-centric ventures. In addition to enterprises developing RNA medicines, developers of adoptive immune cell therapies (Century Therapeutics, CARsgen Therapeutics, Lyell Immunopharma, Sonoma Biotherapeutics and Wugen) and PROTAC (proteolysis-targeting chimera) approaches (Imago Biosciences, Arvinas and Foghorn Therapeutics) were prominent in fundraising and partnering. Financing also rolled in to machine learning ventures, whether from the public markets (Recursion, Insilico Medicine and Exscientia) or from risk capital (EQRx, Insitro, XtalPi and Generate Biomedicines). Mergers were down, as pharma showed a greater interest in partnerships in the face of bloated biotech assets.

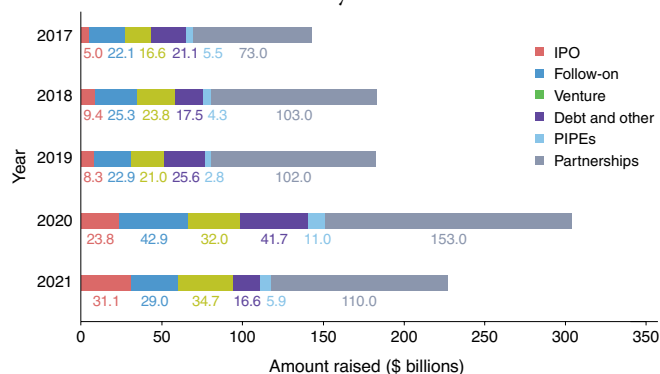
Stock market performance

After hitting February's all-time high, the NASDAQ Biotech Index slid 37%, whereas the NASDAQ rose 18% to new highs.



Global biotech financing

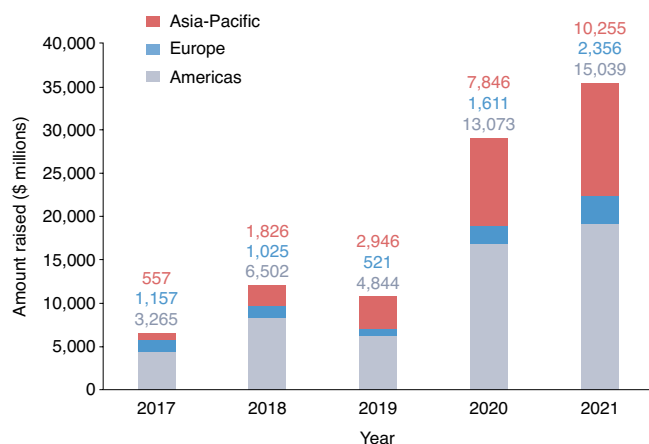
Across the board, financing was steady, although debt in particular was lower than the same time last year.



PIPE, private investment in public equity. Source: BCIQ BioCentury Online Intelligence.

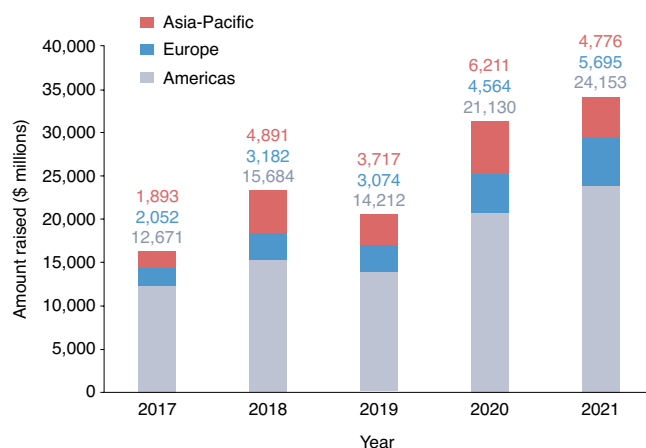
Global biotech initial public offerings

The IPO gravy train rolled on in all regions.



Global biotech venture capital investment

Venture funding trended up in the Americas and Europe, with Asia-Pacific lower than in 2020.



Number of IPOs

	2017	2018	2019	2020	2021
Asia-Pacific	13	25	40	44	44
Europe	26	15	8	14	30
Americas	33	56	47	75	90

Source: BCIQ BioCentury Online Intelligence

Number of rounds

	2017	2018	2019	2020	2021
Asia-Pacific	79	96	100	120	70
Europe	163	153	162	184	146
Americas	437	431	373	413	399

Source: BCIQ BioCentury Online Intelligence.

Top IPOs of 2021

Company (principal underwriters)	Amount raised (\$ millions)	Date completed	Latest stage and focus	Percent change in stock price (as of 1/7/2022)	Exchange
SK Bioscience (NH Investment & Securities)	1,313	18 March	Marketed; vaccines produced in cell culture, protein conjugates, antigen protein design, gene synthesis and cloning, vector manufacturing and protein purification	+18.32%	Korea
SD Biosensor (Korea Investment & Securities)	677	16 July	Marketed; in vitro diagnostics, including nucleic acid amplification and rapid antigen tests, ELISAs and fluorescence immunoassays for infectious and chronic diseases	-7.21%	Korea
Sana Biotechnology (Morgan Stanley, Goldman Sachs, J.P. Morgan, BofA Securities)	677	3 February	Preclinical; 'universal' induced pluripotent stem cells engineered to overexpress 'do-not-eat-me' CD47, PD-L1 and human leukocyte antigen G and containing deletions to genes encoding components of the MHC; 'fusogen' viral particles incorporated into a lipid bilayer for gene delivery to hematopoietic stem cells	-63.45%	NASDAQ
Zymergen (J.P. Morgan, Goldman Sachs, BofA Securities, Cowen, UBS Investment Bank, Lazard)	575	21 April	Marketed; engineered microbes for use across multiple sectors using robotics and ML to automate and scale identification of preferential traits for chemicals and biomaterials	-84.86%	NASDAQ
Recursion (Goldman Sachs, J.P. Morgan, BofA Securities, SVB Leerink, Allen & Co., KeyBanc Capital Markets)	502	16 April	Phase 1; iterative ML-guided drug candidate screening using images from high-throughput cellular assays	-47.28%	NASDAQ
Keymed Biosciences (Morgan Stanley, CICC, Huatai Securities, China Everbright)	460	7 July	Phase 2; bispecific antibodies and antibody-drug conjugates, autoimmune and cancer therapies	-57.5%	Hong Kong
Lyell Immunopharma (Goldman Sachs, BofA Securities, J.P. Morgan, Morgan Stanley)	425	16 June	Preclinical; genetic and epigenetic T cell reprogramming to develop CAR and TCR autologous T cells engineered with 'exhaustion resistance'	-61.81%	NASDAQ
Prestige BioPharma (Samsung Securities)	405	5 February	Registration; humanized antibodies, biosimilars and adenovirus-based vaccines	-60.3%	Korea
CARsgen Therapeutics (Goldman Sachs, UBS, Citic Securities, Credit Suisse)	400	17 June	Phase 2/3; cytokine- and chemokine-loaded autologous CAR-T cells for solid tumors	-19.83%	Hong Kong
Centessa Pharmaceuticals (Morgan Stanley, Goldman Sachs, Jefferies, Evercore)	380	27 May	Phase 3; umbrella organization for 10+ asset-centric companies	-58.67%	NASDAQ

CAR, chimeric antigen receptor; MHC, major histocompatibility complex; ML, machine learning; TCR, T cell receptor. Source: BCIQ BioCentury Online Intelligence.

Top venture financings of 2021

Company (lead investors)	Amount raised (\$ millions)	Round	Date completed	Location	Focus
Suzhou Abogen Biosciences (Temasek, Invesco, Loyal Valley Capital and others)	700	C	19 August	China	mRNA vaccines
ElevateBio (Matrix Capital Management, EDBI, Emerson Collective and others)	525	C	15 March	United States	Gene therapy accelerator for portfolio of asset-centric cell and gene therapy companies; vector manufacturing services
EQRx (Arch Venture Partners, Andreesen Horowitz, GV and others)	500	B	11 January	United States	In-licensed and in-house discovery incorporating ML in analyzing screen hits for drugs against validated targets in oncology and immune inflammatory diseases
Laronde (Flagship Pioneering, T. Rowe Price, Invus and others)	440	B	30 August	United States	Circular RNA for therapeutic protein expression
Insitro (CPP Investment Board, Andreesen Horowitz, SoftBank Vision Fund and others)	440	C	15 March	United States	'Active' ML analysis of image and multiomics data from screens of human induced pluripotent stem cells CRISPR-engineered for lead generation
XtalPi (OrbiMed Advisors, RRJ Capital, Hopu Investment Management and others)	400	D	11 August	United States	ML and computational chemistry in small-molecule discovery
Generate Biomedicines (Flagship Pioneering, Abu Dhabi Investment Authority, Alaska Permanent Fund and others)	370	B	11 November	United States	ML and computational biology to identify de novo target-binding sequences in antibody and protein therapeutics using three-dimensional structural information for oncology, immune inflammatory and infectious diseases
Adagio Therapeutics (RA Capital Management, Redmile Group, Federated Hermes and others)	336	C	19 April	United States	Adimab spinout developing broadly neutralizing mAbs for SARS-CoV-2 variants and zoonotic sarbecoviruses
Cardurion Pharmaceuticals (Bain Capital Life Sciences, Bain Capital Private Equity)	304	Not disclosed	27 October	United States	Takeda spinout developing small-molecule inhibitors of phosphodiesterase 9 and CAMK2 to treat heart failure and rare arrhythmias, respectively
Freenome (Perceptive Advisors, RA Capital Management, a16z Life Sciences Growth Fund and others)	300	D	7 December	United States	Multiomics platform for early colon cancer detection via liquid biopsy

CAMK2, calcium/calmodulin-dependent protein kinase II α ; ML, machine learning; mAb, monoclonal antibody. Source: BCIQ BioCentury Online Intelligence.

Mergers and acquisitions

Target	Acquirer	Deal focus	Value (\$ millions)	Date announced
Grail	Illumina	Liquid biopsy screening to detect tumor in blood for early-stage cancer	3,500	18 August
Dicerna Pharmaceuticals	Novo Nordisk	Dicer substrate small interfering RNAs (DsiRNAs) for intracellular targets in hepatic and extrahepatic cell types and tissues	3,300	18 November
Five Prime Therapeutics	Amgen	Immuno-oncology and targeted cancer therapies, including bemarituzumab (recombinant glycoengineered, afucosylated humanized IgG1 mAb targeting FGFR2b), which has completed a phase 2 trial in gastric cancer	1,900	4 March
Kadmon	Sanofi	First-in-class treatment for graft-versus-host disease Rezurock (belumosudil; small-molecule inhibitor of ROCK2)	1,900	8 September
GenMark Diagnostics	Roche	Multiplex molecular diagnostic panels to detect several respiratory pathogens, including SARS-CoV-2, from a single patient blood sample	1,800	15 March
Vividion Therapeutics	Bayer	Covalent small-molecule discovery and development using chemoproteomic screens that identify cryptic binding pockets in drug targets	1,500	5 August
Kymab	Sanofi	Amlitelimab, a fully human IgG4κ mAb that binds to OX40 ligand	1,100	11 January
Amunix	Sanofi	Unstructured hydrophilic 864-amino acid polypeptide (XTEN) for conjugation to T cell engager mAbs or cytokines to create prodrugs capable of local activation by tumor proteases	1,000	20 December

FGFR2b, fibroblast growth factor receptor 2b; ROCK2, Rho-associated coiled-coil-containing protein kinase-2. Source: BCIQ BioCentury Online Intelligence.

Top licensing and collaborations of 2021

Researcher	Partner	Up-front cash (\$ millions)	Description
Alector	GlaxoSmithKline	700	Global collaboration in immuno-neurology for two clinical-stage first-in-class human IgG1 mAbs targeting sortilin 1 in neurodegenerative disease
BeiGene	Novartis	650, 300	BeiGene grants Novartis rights to develop and commercialize tislelizumab, a humanized anti-PD-1 IgG4 mAb in North America, Europe and Japan
Eisai	Bristol Myers Squibb	650	Global strategic collaboration for Eisai's MORAb-202, antibody-drug conjugate comprising farletuzumab (a humanized IgG1 mAb targeting folate receptor-α) and the microtubule-targeting agent eribulin
Arvinas	Pfizer	650	Co-development and commercialization of ARV-471, a small-molecule PROTAC estrogen receptor degrader
iTeos Therapeutics	GlaxoSmithKline	625	Collaboration to develop and commercialize EOS-448, an anti-TIGIT human IgG1 mAb for treating solid tumors
Foghorn	Lilly	300	Strategic collaboration for novel oncology targets using Foghorn's platform for identifying small-molecule PROTAC degraders that target chromatin remodeling complexes
Debiopharm	Merck	221	Debiopharm grants Merck exclusive, worldwide rights to develop and commercialize xevinapant, an oral small-molecule antagonist of IAPs in cancer
Agenus	Bristol Meyer Squibb	200	Exclusive global license for Agenus's anti-TIGIT program using fully human bispecific antibodies with Fc engineered for high affinity to Fcγ receptor I
Ionis Pharmaceuticals	AstraZeneca	200	Co-development and commercialization of eplontersen, a ligand-conjugated antisense oligonucleotide designed to reduce the production of transthyretin protein
RemeGen	Seagen	200	Exclusive worldwide license and co-development agreement for disitamab vedotin, an antibody-drug conjugate comprising a monoclonal antibody against HER2 conjugated via a cleavable linker to the cytotoxic agent monomethyl auristatin E.

mAb, monoclonal antibody; IgG, immunoglobulin G; TIGIT, T cell immunoreceptor with immunoglobulin and ITIM domains; IAP, inhibitor of apoptosis proteins; HER2, human epidermal growth factor receptor 2. Source: BCIQ BioCentury Online Intelligence.

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