

Supplementary Table 1 Select historical R&D levels, microcap and large cap biotech companies.

Year	Microcap			Large cap		
	Number of companies	R&D spend total (\$ billions)	R&D spend per company (\$ millions)	Number of companies	R&D spend total (\$ billions)	R&D spend per company (\$ millions)
2004	200	3.1	15.5	10	6.3	630
2009	334	4.0	12	13	10.3	792
2014	300	2.9	9.6	23	20.7	900

Supplementary Table 2 Highest-grossing biomedical IPOs

Year	Company	Amount raised (\$ millions)	Status^a
1996	Affymetrix	99	Acquired by ThermoFisher for \$1.3 billion in 2016
1997	Cambridge Antibody Group	66	Acquired for \$1.3 billion by AstraZeneca 2006
1998	Pharming Group	70.8	\$98-million market cap
1999	Tularik	112	Acquired by Amgen in 2004 for \$1.3 billion
2000	Tanox	224	Acquired by Genentech for \$919 million
2001	Third Wave Technologies	82.5	Acquired by Hologic in 2008 for \$580 million
2002	Zymogenetics	120	Acquired by Bristol-Myers Squibb in 2010 for \$885 million
2003	Pharmion	84	Acquired by Celgene in 2007 for \$2.9 billion
2004	Basilea	162	\$886-million market cap
2005	Coley Pharmaceutical	110	Acquired by Pfizer in 2007 for \$164 million
2006	Affymax	106	Dissolved in 2014
2007	WuXi	168	\$3.26-billion market cap
2008	MolMed	85	\$148-million market cap
2009	Talecris	549	Acquired by Grifols in 2011 for \$3.4 billion
2010	Ironwood	215	\$1.3-billion market cap
2011	Clovis	129	\$801-million market cap
2012	Merrimack	100	\$721-million market cap
2013	Acceleron Pharma	96	\$1.2-billion market cap

2014	Circassia Pharmaceuticals	337	\$836-million market cap
2015	Axovant	362	\$1.7-billion market cap

^aAs of February 1, 2016.

Supplementary Table 3 Number of FDA drug approvals by type/year

Year	Number of NMEs approved by FDA ^a	Number of biologic drugs approved by FDA	Number of mAbs	mAbs approved by FDA
		Avonex (interferon beta-1a) Humalog (insulin lispro) Revatase (reteplase)		None
1996	50	3		
		Benefix (nonacog alfa) Infergen (interferon alfacon-1) Neumega (oprelvekin) Rituxan (rituximab) Zenapax (daclizumab) Regranex (becaplermin)		Rituxan Zenapax
1997	41	6	2	
		Refludan (lepirudin) Sucraid (sacrosidase) Simulect (basiliximab) Integrilin (eptifibatide) Synagis (palivizumab) Remicade (infliximab) Herceptin (trastuzumab) Enbrel (etanercept) Thyrogen (thyrotropin alfa)		Simulect Synagis Remicade Herceptin
1998	36	9	4	
		Ontak (denileukin diftitox) NovoSeven (eptacog alfa) Antagon (ganirelix) Rapamune (sirolimus)		
1999	35	4	0	
		Refacto (moroctocog alfa) Lantus (insulin glargine) Mylotarg (gemtuzumab ozogamicin) TNKase (tenecteplase) NovoLog (insulin aspart) Trelstar Depot (triptorelin) Innohep (tinzaparin) Cetrotide (cetorelix) Myobloc (botulinum toxin type B) Angiomax (bivalirudin)		Mylotarg
2000	28	10	1	
		PEGIntron (peginterferon alfa-2b)		Campath
2001	28	Campath (alemtuzumab)	1	

		Natrecor (nesiritide) Aranesp (darbepoetin alfa) Kineret (anakinra) Xigris (drotrecogin alfa) Arixtra (fondaparinux) Elidel (pimecrolimus)		
		8		
		Neulasta (pegfilgrastim) Zevalin (ibritumomab tiuxetan) Rebif (interferon beta 1a) Elitek (rasburicase) Pegasys (peginterferon alfa-2a) Forteo (teriparatide) Extraneal (icodextrin) Humira (adalimumab)		Zevalin Humira
2002	23	8	2	
		Amevive (alefacept) Fuzeon (enfuvirtide) Somavert (pegvisomant) Fabrazyme (agalsidase beta) Aldurazyme (laronidase) Xolair (omalizumab) Bexxar (tositumomab/tositumomab I-131) Advate (r-antihemophilic Factor) Raptiva (efalizumab) Plebaxis (abarelix)		Xolair Bexxar Raptiva
2003	28	10	3	
		Erbitux (cetuximab) Avastin (bevacizumab) Apidra (insulin glulisine) Tysabri (natalizumab) Kepivance (palifermin) Prialt (ziconotide)		Cetuximab Bevacizumab natalizumab
2004	28	7	3	
		Symlin (pramlintide) Byetta (exenatide) Naglazyme (galsulfase) Levemir (insulin detemir) Increlex (mecasermin recombinant) Iplex (mecasermin rinfabate) Orencia (abatacept)		
2005	18	7	0	
		Myozyme (alglucosidase alfa) Lucentis (ranibizumab) Elaprase (idursulfase) Vectibix (panitumumab)		Lucentis Vectibix
2006	22	4	2	
		Soliris (eculizumab) Somatuline Depot (lanreotide) Mircera (methoxy PEG-epoetin beta)		Soliris
2007	17	3	1	

		Recothrom (r-thrombin)	Cimzia
		Xyntha (r-antihemophilic factor)	
		Arcalyst (rilonacept)	
		Cimzia (certolizumab pegol)	
		Peginterferon/Rebetol Combo Pack (peginterferon alfa-2b + ribavirin)	
		Nplate (romiplostim)	
		Firmagon (degarelix)	
2008	23	7	1
		Atryn (r-antithrombin III)	Golimumab
		Simponi (golimumab)	Canakinumab
		Dysport (abobotulinumtoxin A)	Ustekinumab
		Ilaris (canakinumab)	Ofatumumab
		Stelara (ustekinumab)	
		Arzerra (ofatumumab)	
		Kalbitor (ecallantide)	
2009	27	7	4
		Actemra (tocilizumab)	Tocilizumab
		Victoza (liraglutide)	Denosumab
		Xiaflex (collagenase clostridium histolyticum)	
		Vpriv (velaglucerase alfa)	
		Provenge (sipuleucel-T)	
		Lumizyme (alglucosidase alfa)	
		Prolia (denosumab)	
		Xeomin (incobotulinumtoxinA)	
		Krystexxa (pegloticase)	
		Egrifta (tesamorelin)	
2010	22	10	2
		Benlysta (belimumab)	Belimumab
		Yervoy (ipilimumab)	Ipilimumab
		Nulojix (belatacept)	Brentuximab Vedotin
		LaViv (azficel-T)	
		Adcetris (brentuximab vedotin)	
		Firazyr (icatibant)	
		Erwinase (asparaginase erwinia chrysanthemii)	
		Eylea (aflibercept)	
2011	29	8	3
		Voraxaze(glucarpidase)	Pertuzumab
		Surfaxin (lucinactant)	Raxibacumab
		Osmontys (peginesatide)	
		Elelyso (taliglucerase alfa)	
		Perjeta (pertuzumab)	
		Zaltrap (ziv-aflibercept)	
		Linzess (linaclotide)	
		Jetrea (ocriplasmin)	
		Abthrax (raxibacumab)	
		Signifor (pasireotide)	
		Gattex (teduglutide)	
		Fulyzaq (crofelemer)	
2012	37	12	2

2013	28	6	Kynamro (mipomersen) Kadcyła (ado-trastuzumab emtansine) Rixubis (nonacog gamma) NovoEight (turoctocog alfa) Gazyva (obinutuzumab) Tretten (catridecacog)	Ado-trastuzumab emtansine Obinutuzumab
			Vimizim (elosulfase alfa) Myalept (metreleptin) Alprolix (r-coagulation Factor IX) Tanzeum (albiglutide) Cyramza (ramucirumab) Sylvant (siltuximab) Entyvio (vedolizumab) Eloctate (r-antihemophilic factor) Ruconest (conestat alfa) Plegridy (peginterferon beta-1A) Keytruda (pembrolizumab) Trulicity (dulaglutide) Obizur (susoctocog alfa) Blincyto (blinatumomab) Opdivo (nivolumab)	Ramucirumab Siltuximab Vedolizumab Pembrolizumab Blinatumomab Nivolumab
2014	44	15	Cosentyx (secukinumab) Natpara (parathyroid hormone) Unituxin (dinutuximab) Ixinity (r-coagulation factor IX) Praluent (alirocumab) Repatha (evolocumab) Nuwiq (simoctocog alfa) Tresiba (insulin degludec) Praxbind (idarucizumab) Strensiq (asfotase alfa) Imlygic (talimogene laherparepvec) Nucala (mepolizumab) Adynovate (r-pegylated factor VIII) Darzalex (daratumumab) Portrazza (necitumumab) Empliciti (elotuzumab) Vonvendi (r-von Willebrand factor) Kanuma (sebelipase alfa) Bridion (sugammadex)	Secukinumab Dinutuximab Alirocumab Evolocumab Idarucizumab Mepolizumab Daratumumab Necitumumab Elotuzumab
2015	51	19		
				9

NMEs, new medical entities. ^aExcludes sunscreens, diagnostics, preventive vaccines and plasma-derived biologicals; includes therapeutic vaccines and biologicals obtained by means of recombinant technology.

Supplementary Table 4 The three top-selling drugs over the past two decades

Year	Number 1-selling drug, company, global sales (\$ billions)	Number 2-selling drug, company, global sales (\$ billions)	Number 3-selling drug, company, global sales (\$ billions)
1996	Norvasc, Pfizer, 1.8	Zoloft, Pfizer, 1.3	Epogen, Amgen, 1.1
1997	Prozac, Eli Lilly, 2.6	Norvasc, Pfizer, 2.2	Zoloft, Pfizer, 1.5
1998	Prilosec, AstraZeneca, 4.8	Prozac, Eli Lilly, 2.8	Norvasc, Pfizer, 2.5
	Prilosec, AstraZeneca, 5.9	Norvasc, Pfizer, 3.0	Claritin, Merck, 2.67
1999	Prilosec, AstraZeneca, 6.26	Lipitor, Pfizer, 5.0	Norvasc, Pfizer, 3.36
2000	Lipitor, Pfizer, 6.45	Prilosec, AstraZeneca, 5.7	Epogen, Amgen, 5.5
2001	Lipitor, Astellas/Pfizer, 7.97	Epogen, Amgen, 6.5	Zocor, Merck, 5.4
	Lipitor, Astellas/Pfizer, 9.9	Epogen, Amgen, 6.4	Zocor, Merck, 5.0
2002	Lipitor, Almirall/Astellas/Pfizer, 11.7	Epogen, Amgen, 6.2	Plavix, Bristol-Myers Squibb, 5.4
2003	Lipitor, Almirall/Astellas/Pfizer, 13.1	Plavix, Bristol-Myers Squibb, 6.3	Epogen, Amgen, 5.8
	Lipitor, Almirall/Astellas/Pfizer, 13.8	Advair Diskus, Almirall/GlaxoSmithKline, 6.18	Plavix, Bristol-Myers Squibb, 6.1
2004	Lipitor, Almirall/Astellas/Pfizer, 13.6	Plavix, Bristol-Myers Squibb, 8.1	Advair Diskus, Almirall/GlaxoSmithKline, 7.1
2005	Lipitor, Almirall/Astellas/Pfizer, 13.5	Plavix, Bristol-Myers Squibb/Sanofi, 9.5	Advair Diskus, Almirall/GlaxoSmithKline, 7.7
	Lipitor, Almirall/Astellas/Pfizer, 12.65	Plavix, Bristol-Myers Squibb/Sanofi, 9.8	Advair Diskus, Almirall/GlaxoSmithKline, 7.88
2006	Lipitor, Almirall/Astellas/Pfizer, 11.9	Plavix, Bristol-Myers Squibb/Sanofi, 9.4	Advair Diskus, Almirall/GlaxoSmithKline, 8.0
2007	Lipitor, Almirall/Astellas/Pfizer, 10.87	Plavix, Bristol-Myers Squibb/Sanofi, 9.9	Remicade, J&J/Merck/Mitsubishi Tanabe Pharma, 8.9

2012	Humira, Abbott, 9.6	Remicade, J&J/Merck/Mitsubishi Tanabe Pharma, 9.1	Enbrel, Amgen/Pfizer/Takeda, 8.5
2013	Humira, Abbott, 11.0	Remicade, J&J/Merck/Mitsubishi Tanabe Pharma, 9.8	Enbrel, Amgen/Pfizer/Takeda, 8.78
2014	Humira, Abbott, 12.9	Sovaldi, Gilead, 10.3	Remicade, J&J/Merck/Mitsubishi Tanabe Pharma, 9.9
2015 ^a	Harvoni, Gilead, 10.5	Humira, Abbott/AbbVie/Eisai, 10.3	Enbrel, Amgen/Pfizer/Takeda, 6.57

^aData from first three quarters of 2015. Boldface, biologics. J&J, Johnson & Johnson.

Source: BioMedTracker, Medtrack