Credit: PhotoDisc/ Getty Images

Evolution of the landscape for central nervous system disorder therapies

Dealmaking in the central nervous system disorder field has been dynamic in the past year despite COVID-19, and the market for therapies is set to expand in the next 5 years.

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Although global sales of prescription and over-the-counter (OTC) central nervous system (CNS) disease-related products were predicted to grow in 2020, they remained at $86 billion, the same value as in 2019. This was largely down to the COVID-19 pandemic and the limitations it put on patient visits and prescriptions. Evaluate Pharma predicts, however, that the CNS product market will bounce back and bring in sales of $140 billion in 2026 (Fig.1). In this feature, with data provided by Evaluate Pharma, we highlight recent deals made in the field, as well as rank the products and companies forecasted to be successful in the future.

Biogen was a very active dealmaker over the last year, being involved in four of the highest-value deals in Table 1, including the top deal: its $2.7 billion partnership with Sangamo Therapeutics to develop gene therapies using its zinc finger platform. Roche also signed a similar-sized deal, with its $2.1 billion pact with UCB for the development of its anti-tau agent UCB0107 for the treatment of Alzheimer's disease.

Therapies for multiple sclerosis (MS)—as in previous years—brought in the most product sales in 2020, with more than $22 billion in sales (Fig. 1a), and look to continue this lead until 2023. Nootropics—supplements or drugs designed to improve cognitive function—are forecasted to have the largest percentage increase in sales, with a 42% compound annual growth rate up to 2026, although this depends strongly on some

Table 1 | Top 10 CNS licensing deals, based on total deal value from January 2020 to April 2021

Company	Deal partner/ product source	Deal date	Total deal value (upfront payment) ($ million)	Deal summary including product
Biogen	Sangamo Therapeutics	March 2020	2,720 (350)	Biogen partners with Sangamo to develop gene therapies based upon their zinc finger platform, including ST-501 for tauopathies such as Alzheimer's disease and ST-502 for synucleinopathies such as Parkinson's disease.
Biogen	Denali Therapeutics	August 2020	2,150 (560)	Biogen signs licensing deal to develop Denali's DNL151, a leucine-rich repeat kinase 2 (LRRK2) inhibitor for Parkinson's disease.
Roche	UCB	July 2020	2,120 (120)	Roche signs deal with UCB to develop their antibody UCB0107 against a central tau epitope for patients with tauopathies.
Neurocrine Biosciences	Takeda	June 2020	2,015 (120)	Neurocrine partners with Takeda to develop clinical-stage compounds for psychiatric disorders, including the phase 2 candidate TAK-831, a D-amino acid oxidase inhibitor for schizophrenia.
Biogen	Sage Therapeutics	November 2020	1,525 (875)	Biogen partners with Sage to develop zuranolone (SAGE-217) for psychiatric disorders including MDD and PPD.
Eli Lilly	Evox Therapeutics	June 2020	1,220 (20)	Eli Lilly licenses Evox's DeliverEX platform to deliver its RNA interference and antisense oligonucleotide drug candidates into the brain to treat neurological disorders.
Novartis	Cadent Therapeutics	December 2020	770 (210)	Novartis acquires Cadent and its portfolio, including CAD-9303, an NMDA receptor PAM in development for schizophrenia.
Biogen	Pfizer	January 2020	710 (75)	Biogen signs licensing deal with Pfizer to acquire PF-05251749, a modulator of circadian rhythms aiming to improve neurological symptoms in disorders such as Alzheimer's and Parkinson's disease.
Acadia Pharmaceuticals	Vanderbilt University	May 2020	525 (10)	Acadia joins forces with Vanderbilt University to develop therapeutics including muscarinic M1 receptor PAMs to treat CNS disorders.
Ono Pharmaceutical	SK Biopharmaceuticals	October 2020	503 (47)	Ono signs deal with SK Biopharmaceuticals to develop and commercialize Xcopri (cenobate) for partial onset seizures.

CNS, central nervous system; MDD, major depressive disorder; PAM, positive allosteric modulator; PPD, postpartum depression. Source: EvaluatePharma April 2021.

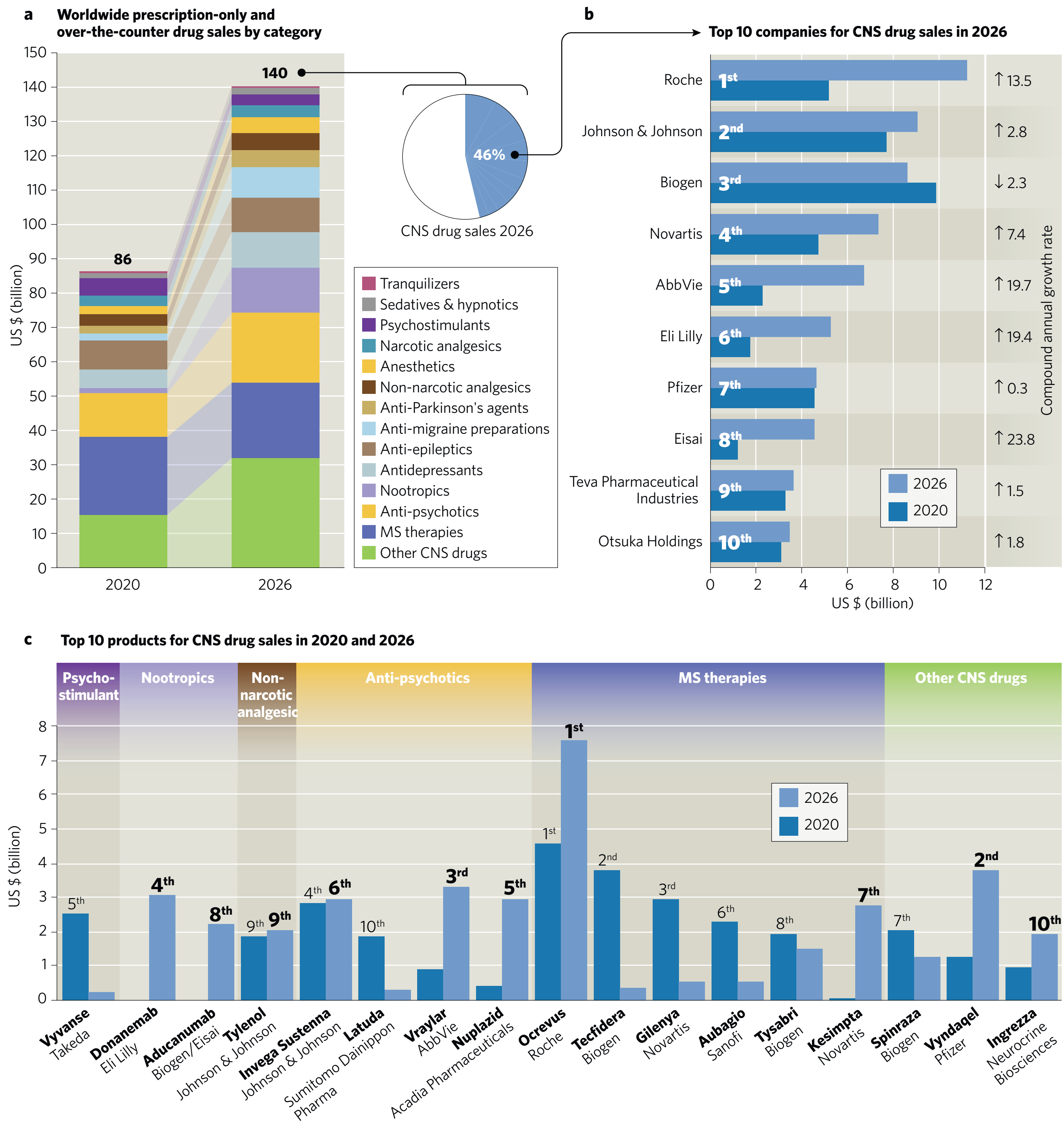

Fig. 1 | Evolution of the market for central nervous system therapies. a | Total global market by therapeutic category in 2020 and 2026. **b** | Top 10 companies based on sales forecasts in 2026, compared with reported sales in 2020. **c** | Top 10 products based on sales forecasts in 2026 and reported sales in 2020. CNS, central nervous system; MS, multiple sclerosis. Source: EvaluatePharma April 2021.

yet-to-be-approved therapies targeting amyloid-β for Alzheimer's disease reaching the market, such as Eli Lilly's donanemab and Biogen and Eisai's aducanumab.

Owing to its portfolio of MS therapies such as Tecfidera (dimethyl fumarate) and Tysabri (natalizumab), it was no surprise that Biogen was number 1 in product sales in 2020 with $9.8 billion overall (Fig. 1b). By 2026 though, it is predicted that Roche will take over the top spot as sales of Ocrevus (ocrelizumab) for MS continue to grow.

Ocrevus is already the top-selling product (Fig. 1c), with more than $4 billion sales in 2020, and it is predicted to hold its lead in 2026 with potential sales of $7.5 billion. Pfizer's Vyndaqel (tafamidis meglumine) for the treatment of the rare disease transthyretin amyloid polyneuropathy is predicted to take the number 2 spot in 2026, followed by AbbVie's anti-psychotic Vraylar (cariprazine) both of which are forecasted to then have sales of more than $3 billion.