Intelligencia AI

July: Juvenile Arthritis Awareness Month

As July marks juvenile arthritis awareness month, we studied our data at Intelligencia AI to better understand the current and potential future state of drug development for this disease.

Juvenile arthritis, most commonly referred to as juvenile idiopathic arthritis (JIA), is a chronic, non-infective, autoimmune disease of childhood that causes inflammation and swelling of affected joints and restricts their movement[1].

According to the International League of Associations for Rheumatology, JIA can be categorized into seven distinct subtypes, based on its presentation over the first six months[2].

There is no single established diagnostic test that can definitively confirm a JIA diagnosis, mainly due to the commonality of the main symptom (joint pain) and the lack of a clear immunological biomarker.

Reported global JIA incidence ranges from 1.6 to 23 per 100,000 person-years, while prevalence ranges from 3.8 to 400 per 100,000 individuals[3].

HOW IS JIA CURRENTLY TREATED?

As there is currently no cure, treatments mainly aim to improve symptoms and ideally lead to long-term remission[4]:

Commonly used types of treatment:

- Disease-modifying antirheumatic drugs (DMARDs)
- Corticosteroids
- Nonsteroidal anti-inflammatory drugs (NSAIDS)
- Biologics

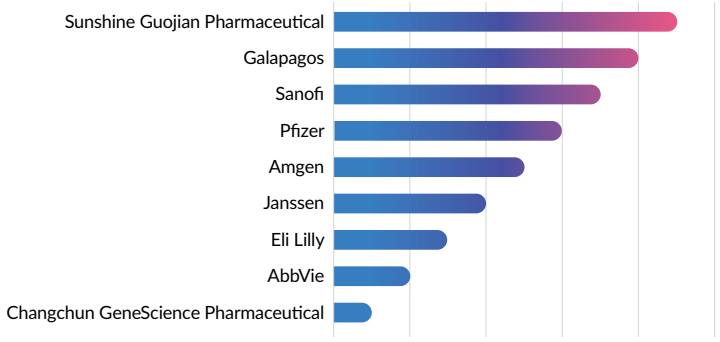
Only four drugs have received FDA approval in the past five years. Three of them are biologics (Upadacitinib, Secukinumab, Tocilizumab) and one of them is a targeted synthetic DMARD (Tofacitinib).

DETAILS IN THE DATA: HERE'S WHAT WE LEARNED ABOUT JIA

Among industry-led, FDA-track clinical development programs* in our data[5] we identified:

- 14 **ongoing** programs, of which:
  - 2 are in Phase 1, 1b, or 1/2
  - 2 are in Phase 2, and
  - 10 are in Phase 3
- The above programs are being conducted by 10 different primary sponsors and correspond to 13 investigational therapies, including mostly small molecules and monoclonal antibodies, as well as an antigen-binding antibody (Fab) fragment.

Top Sponsors in JIA-Ranked by Intelligencia AI Pipeline Performance Score

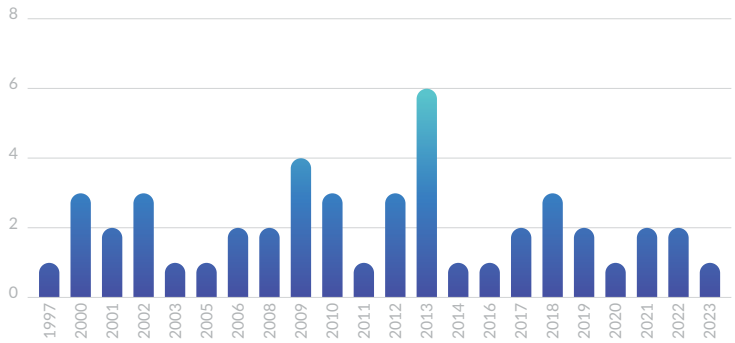


Our pipeline performance score leverages our patented AI-driven probability of technical and regulatory success (PTRS) assessments.

- 1 of the 14 ongoing programs has received orphan drug designation
- The drugs that are currently in Phase 3 trials comprise:
  I. The Janus Kinase (JAK) inhibitors Upadacitinib, Baricitinib and Xeljanz
  II. The Interleukin targeting antibodies Risankizumab, Ixekizumab and Guselkumab
  III. The tumor necrosis factor (TNF) inhibitors Certolizumab pegol and Golimumab
  IV. The phosphodiesterase 4 (PDE4) inhibitor Apremilast

All of these drugs attempt to reduce inflammation.

Distribution of Total JIA Clinical Programs by Year of Initiation Since 1997



For the past almost twenty-five years, there has been a consistently low annual number of initiated clinical programs targeting JIA, excluding the 2013 outlier year.

PERSPECTIVE: WHAT DOES THIS ALL MEAN?

JIA can be considered a success story for the medical community. Even though it has a largely unknown etiology, lacks a single, established diagnostic test, and holds a rather limited industry focus (rarely more than two clinical programs initiated per year, and most sponsors currently running a single clinical program), ten different assets have received FDA regulatory approval since 1997. However, despite approved therapies, a substantial proportion of children fail to achieve inactive disease and maintain clinical remission. Further research is needed to improve understanding of the disease, minimize side effects of available treatments and further improve patients' quality of life[6].

About Intelligencia AI

Intelligencia AI™ leads the way in leveraging proprietary data, biomedical expertise and artificial intelligence (AI) with its patented technology to address significant challenges in the pharmaceutical industry. These challenges include lengthy drug development timelines, excessive costs, and unsustainable return on investment (ROI). Its suite of AI-powered solutions delivers actionable insights crucial in mitigating risks and enhancing decision-making associated with drug development by providing an accurate, unbiased assessment of a drug's probability of success. Founded in 2017, Intelligencia AI is headquartered in New York, NY, with offices in Athens, Greece, and employs 110 individuals globally. Visit intelligencia.ai to discover more.

References

1 Giancane G, Consolaro A, Lanni S, Davì S, Schiappapietra B, Ravelli A. Juvenile Idiopathic Arthritis: Diagnosis and Treatment. Rheumatol Ther. 2016 Dec;3(2):187-207. doi: 10.1007/s40744-016-0040-4. Epub 2016 Aug 12. PMID: 27747582; PMCID: PMC5127964.

2 Petty RE, Southwood TR, Manners P, Baum J, Glass DN, Goldenberg J, He X, Maldonado-Cocco J, Orozco-Alcala J, Prieur AM, Suarez-Almazor ME, Woo P; International League of Associations for Rheumatology. International League of Associations for Rheumatology classification of juvenile idiopathic arthritis: second revision, Edmonton, 2001. J Rheumatol. 2004 Feb;31(2):390-2. PMID: 14760812.

3 Al-Mayouf SM, Al Mutairi M, Bouayed K, Habjoka S, Hadef D, Lotfy HM, Scott C, Sharif EM, Tahoun N. Epidemiology and demographics of juvenile idiopathic arthritis in Africa and Middle East. Pediatr Rheumatol Online J. 2021 Dec 2;19(1):166. doi: 10.1186/s12969-021-00650-x. PMID: 34857004; PMCID: PMC8638433.

4 https://www.arthritis.org/drug-guide/medication-topics/jia-medications-overview accessed 3 July 2024.

5 Data as of June 30, 2024.

6 Brunner HI, Schanberg LE, Kimura Y, Dennos A, Co DO, Colbert RA, Fuhlbrigge RC, Goldmuntz E, Kingsbury DJ, Patty-Resk C, Mintz S, Onel K, Rider LG, Schneider R, Watts A, von Scheven E, Lovell DJ, Beukelman T; PRCSG Advisory Council and the CARRA Registry Investigators. New Medications Are Needed for Children With Juvenile Idiopathic Arthritis. Arthritis Rheumatol. 2020 Nov;72(11):1945-1951. doi: 10.1002/art.41390. Epub 2020 Oct 8. PMID: 32524767; PMCID: PMC7722045.

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**A program (also known as clinical pipeline or drug pipeline) is the clinical development of a drug (or a set of drugs in case of combination therapies) by a pharmaceutical company (alone or in collaboration with other partners) for an indication. A program consists of a set of clinical trials with the ultimate goal of approval for marketing. Each program has unique and specific parameters that can potentially justify a separate regulatory approval. Specifically, the definition of a clinical program is one of unique drug(s), drug dosage, mode of administration, adjuvant state, indication, sponsor, disease severity (e.g. stage of disease), line of treatment and biomarker information used as inclusion criteria.*