# BioMarin Announces Approval of Vimizim® (elosulfase alfa) in China for Treatment of Morquio A Syndrome

**First and Only Treatment in China Approved for Patients with This Ultra-Rare Genetic Condition**
**More than 1,300 Patients Treated with Vimizim in Over 50 Countries**

SAN RAFAEL, Calif., June 4, 2019 /PRNewswire/ -- BioMarin Pharmaceutical Inc. (NASDAQ: BMRN) announced today that Vimizim® (elosulfase alfa) has been approved by the National Medical Products Administration (NMPA) for the treatment of patients with mucopolysaccharidosis type IVA (MPS IVA), also known as Morquio A syndrome. Vimizim is the first treatment in China approved for this condition.

In May 2018, the Chinese government issued the country's first national list of rare diseases, which included MPS. The list also includes phenylketonuria (PKU), Tetrahydrobiopterin Deficiency, and hemophilia—diseases that BioMarin either has an approved therapy for or is developing one. The list gives priority to rare diseases with a relatively high prevalence, that pose a heavy burden and that are highly treatable. Also, in August 2018, the Chinese Drug Evaluation Center posted a list of 48 drugs already approved in the U.S., EU or Japan that could be eligible for Priority Review in China, which included Vimizim.

"Vimizim is the first, and currently only, disease-specific treatment option for this very rare, progressively degenerative, autosomal-recessive lysosomal storage disorder," said Luo Xiaoping, Vice Chairman of the Pediatrics society of the Chinese Medical Association and head of Endocrine Genetic Metabolism Group of Chinese Medical Association.

"Morquio A syndrome is an ultra-rare and difficult condition to treat. Vimizim is the only specific treatment available and offers improved endurance to these patients," said Gu Xuefan, Deputy Director of Shanghai Institute of Pediatrics, Director of Pediatric Endocrinology and Inherited Metabolic Diseases Research Office of Xinhua Hospital, Director of Pediatric Genetic Diseases Diagnosis and Treatment Center, and Director of Pediatric Endocrinology and Inherited Metabolism Group of Shanghai Medical Association.

"Vimizim is approved for patients with mucupolysaccharidosis type IVA. It's used to improve the patients' pulmonary function, and significantly increase their walking distance in six minutes," said Qiu Zhengqing, Member of the Pediatric Endocrinology and Metabolism Group of the Chinese Medical Association, communication reviewer of Chinese Journal of Pediatrics and the Chinese Medical Genetics Journal.

"We are pleased to be able to deliver the first drug therapy for Morquio A to patients in China and to build upon our efforts to serve patients with rare diseases in China," said Jean-Jacques Bienaimé, Chairman and CEO of BioMarin. "We hope to continue to deliver therapies to treat patients who have rare genetic diseases with unmet medical needs."

BioMarin will market Vimizim directly in China, building on its existing presence in the country with a team that has been marketing a BioMarin therapy, Kuvan® (sapropterin dihydrochloride), and that team is well-suited for serving ultra-rare disease populations. In the U.S., Kuvan is approved to reduce blood phenylalanine (Phe) levels in patients with hyperphenylalaninemia (HPA) due to tetrahydrobiopterin- (BH4-) responsive Phenylketonuria (PKU).

Morquio A syndrome is an ultra-rare, severely debilitating disease affecting an estimated 3,000 patients in the developed world. The disease occurs as a result of a deficiency of activity in an enzyme involved in glycosaminoglycan (GAG) metabolism. The pervasive and progressive accumulation of GAGs leads to significant morbidities and multisystemic clinical impairments resulting in diminished functional capacity, impaired quality-of-life and early mortality. The most common features of the disease are progressive skeletal dysplasia, the need for frequent surgical procedures related primarily to musculoskeletal or respiratory dysfunction, and significant limitations in mobility, endurance and breathing.

"The approval of Vimizim in China underscores our commitment to providing this much-needed therapy to patients with Morquio A syndrome across the globe," said Hank Fuchs, M.D., President of Global Research and Development at BioMarin. "We will continue to seek approvals in other countries so that more patients within the MPS community have access to the treatments they deserve."

**About Morquio A Syndrome**

Morquio A syndrome, or Mucopolysaccharidosis IVA (MPS IVA) is a disease in which people are missing an enzyme essential in the breakdown and removal of the glycosaminoglycans (GAGs) called keratan sulfate (KS) and chondroitin-6-sulfate (C6S). The incompletely broken-down GAGs remain stored in cells in the body causing progressive damage. This excessive storage causes systemic skeletal dysplasia, short stature, and joint abnormalities, limiting mobility and endurance. Malformation of the chest impairs respiratory function, and looseness of joints in the neck causing spinal instability and potentially spinal cord compression. Other symptoms may include hearing loss, corneal clouding, and

heart disease. Initial symptoms often become evident in the first five years of life. The disease substantially limits both the quality and length of life of those affected.

The rate of incidence of Morquio A syndrome is as yet unconfirmed and varies among different populations, and estimates vary between 1 in 200,000 live births and 1 in 450,000 live births.

**About VIMIZIM**

VIMIZIM® (elosulfase alfa) is a treatment for patients with Morquio A syndrome, or mucopolysaccharidosis IVA (MPS IVA). VIMIZIM is the first approved enzyme replacement therapy (ERT) designed to target the underlying cause of Morquio A Syndrome—a deficiency in the enzyme N-acetylgalactosamine-6 sulfatase (GALNS). VIMIZIM is intended to provide the exogenous enzyme GALNS that will be taken up into the lysosomes and increase the catabolism of GAGs. Morquio A syndrome is a rare, severely debilitating and progressive disease that previously had no approved, standard-of-care treatment other than supportive care.

**Important Safety Information from U.S. Prescribing Information**

Life-threatening allergic reactions, known as anaphylaxis, can occur during VIMIZIM® (elosulfase alfa) infusions. Due to the potential for anaphylaxis, appropriate medical support should be readily available when VIMIZIM is administered and for an appropriate period of time following administration.

Hypersensitivity reactions have been observed as early as 30 minutes from the start of infusion but as late as six days after infusion. Frequent symptoms of hypersensitivity reactions included anaphylactic reactions, urticaria, peripheral edema, cough, dyspnea, and flushing.

Because of the potential for hypersensitivity reactions, administer antihistamines with or without antipyretics prior to infusion. If severe hypersensitivity reactions occur, immediately stop the infusion of VIMIZIM and initiate appropriate treatment. Patients with acute febrile or respiratory illness at the time of VIMIZIM infusion may be at higher risk of life-threatening complications from hypersensitivity reactions.

Sleep apnea is common in MPS IVA patients. Evaluation of airway patency should be considered prior to initiation of treatment with VIMIZIM. Patients using supplemental oxygen or continuous positive airway pressure (CPAP) during sleep should have these treatments readily available during infusion in the event of an acute reaction, or extreme drowsiness/sleep induced by antihistamine use.

Spinal or cervical cord compression (SCC) is a known and serious complication of MPS IVA and may occur as part of the natural history of the disease. In clinical trials, SCC was observed both in patients receiving VIMIZIM and patients receiving placebo. Patients with MPS IVA should be monitored for signs and symptoms of SCC (including back pain, paralysis of limbs below the level of compression, urinary and fecal incontinence) and given appropriate clinical care.

All patients treated with VIMIZIM 2 mg/kg once per week in the placebo-controlled trial developed anti-drug antibodies.

VIMIZIM should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. It is not known if VIMIZIM is present in human milk.

Safety and effectiveness in pediatric patients below 5 years of age have not been established.

In clinical trials, the most common adverse reactions (≥10%) occurring during infusion included pyrexia, vomiting, headache, nausea, abdominal pain, chills, and fatigue. The acute reactions requiring intervention were managed by either temporarily interrupting or discontinuing infusion, and administering additional antihistamine, antipyretics, or corticosteroids.

Please see full Prescribing Information, including boxed warning, or visit www.VIMIZIM.com.

**About BioMarin**

BioMarin is a global biotechnology company that develops and commercializes innovative therapies for serious and life-threatening rare and ultra-rare genetic diseases. The Company's portfolio consists of seven commercialized products and multiple clinical and pre-clinical product candidates. For additional information, please visit www.biomarin.com. Information on BioMarin's website is not incorporated by reference into this press release.

**Forward Looking Statements**

This press release contains forward-looking statements about the business prospects of BioMarin Pharmaceutical Inc., including, without limitation, statements about: expectations regarding the marketing and commercialization of Vimizim in China. These forward-looking statements are predictions and involve risks and uncertainties such that actual results may differ materially from these statements. These risks and uncertainties include, among others: results and timing of current and planned clinical trials of its product candidates; any further actions by the NMPA; the outcome of pricing and reimbursement negotiations with relevant authorities in China; and those factors detailed in BioMarin's filings with the Securities and Exchange Commission, including, without limitation, the factors contained under the caption "Risk Factors" and elsewhere in BioMarin's Securities and Exchange Commission (SEC) filings, including the

Current Report on Form 10-Q for the quarter ended March 31, 2019, and future filings and reports by BioMarin. BioMarin undertakes no duty or obligation to update any forward-looking statements contained in this press release as a result of new information, future events or changes in its expectations.

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