1. **LIFE SCIENCES AND MEDICAL SECTOR**

Key facts:

* Lithuania is investing in becoming a Northern European Hub for Life Sciences
* We are building the future talent for Life Science innovation
* Our research community is based on collaboration and this community connects with world leading experts every two years at the Life Sciences Baltics conference.

Lithuania has the **fastest growing Life Sciences sector in Europe**. Average annual growth within the biotechnology and pharmaceutical research and production sector is 26%.

Lithuania’s **biotechnology sector is regarded as one of the most developed in the CEE.** Lithuania is active in biotechnology research, the developed techniques and products are applied in the fields of medicine, pharmacy, chemistry, agriculture, environment, etc.

90% of all pharmaceutical and healthcare production is exported to over 100 countries**. Main export markets***:* USA, Poland, Germany, China, United Kingdom (2019, Enterprise Lithuania). There was 21% annual growth in exports of products in 2019.

**Key Event:** “[Life Sciences Baltics](https://lifesciencesbaltics.com)” - a region-leading biennial forum, which brings together global experts in the fields of biotech, pharmaceuticals and medical devices. The event was postponed for a year due to COVID-19 pandemic and will be held on September 22-23, 2021 in Vilnius.

**Lithuania’s main Life Science and Medical products and research specialisations include:**

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| Medical devices | * Main export markets: the UK, France, Russia, Spain, the USA.
* Research areas include biomedical diagnostics and monitoring systems, efficiency research of electronic security systems, analysis and synthesis of electronic devices, quality of electronic systems.
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| Clinical trials | * Over 90 international pharmaceutical and medical companies have conducted clinical trials in Lithuania.
* Clinical trials cover a range of therapeutic areas, such as: Endocrilogy, Gastroenterlogy, Rheumatology, Pulmonology, Infectology, Dermatology, Urology, Pediatric, Surgery, Nephrology, Cardiology, Psychiatry, Hematology, Neurology, Oncology, Ophthalmology.
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| Biotechnology | * Virginijus Šikšnys and his team at the Vilnius University Institute of Biotechnology have received international acclaim and awards for their pioneering research into CRISPR gene editing technology.
* Lithuanian researchers have also delivered ground-breaking results in the fields of pharmaceutical proteins, the biochemistry of enzymes and nucleic acids, and the molecular biology of prokaryotes and eukaryotes.
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| Lasers | * Lithuanian lasers account for 10% of the global scientific lasers market (femtosecond lasers). These lasers are used for a range of medical and scientific research purposes.
* 80% of Lithuanian laser production is exported to nearly 100 countries. Main export markets: Germany, the USA, Japan. Clients and partners of Lithuanian laser manufacturers include: NASA the nuclear Research center in Israel, Rutherford Laboratories in England, Berkeley University in the USA, The Livermore National Laboratory, etc.
* Lithuania delivers 80% of the global production of ultra-fast parametric amplifiers.
* Laser manufacturing sector of Lithuania shows a 15-20% growth per year.
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**What advantages does Lithuania have for Life Science companies?**

**Government committed to R&D growth:** During the last decade (2010-2020) Lithuania invested a lot in creating and strengthening the infrastructure for science research, pharmacy, biomedicine, biotechnology, etc. With 400 million EUR and counting in investment, the Lithuanian government is committed to making the country a Northern European hub for Life Sciences.

Supporting Facts:

* Smart Specialisation program targeting R&D growth and development.
* Lithuania is one of the EU leaders for investment in open R&D infrastructure, with 400 million EUR invested already and 600 million to be invested.
* Expenditures for R&D grew by 24% in 2015-2019 (stat.gov.lt).There are favourable tax incentives for investments into R&D.

**Collaborative R&D community:** Lithuania’s research community is built on collaboration between researchers, businesses and academic institutions. This exchange of expertise helps the country to conduct ground breaking research and nurture new talent.

Supporting facts:

* Lithuania is among the top countries in the CEE region for industry-university collaboration in R&D.
* 5 integrated business and science valleys provide some of the strongest support networks for Life Sciences in Europe.
* There are 26 open R&D centers and 8 of them are for life sciences.

**Talent:** Our talent has the knowledge and know-how to drive innovation. And through close connections between the industry and our education system we are building the right people for the sector to grow. What’s more, with low levels of sector saturation there is plenty of space for that growth.

Supporting facts:

* There were more than 18000 R&D researchers and scientists in various fields in 2019 (stat.gov.lt).
* There are 6 universities and 7 colleges to study life sciences.
* Two leading universities in Lithuania (Kaunas University of Technology and Lithuanian University of Health Sciences) have introduced Health Informatics degree programs aimed at training talent to meet business needs.

**Opportunities for business:** Lithuania has all the reasons and parameters tomature as a strong Life Sciences hub.

Supporting facts:

* Strong international companies are operating in Lithuania, therefore the dissemination of innovations and competencies is continually stimulated and new investments are more easily attracted. International names producing in Lithuania: Thermo Fisher Scientific, Intermedix, Intersurgical, Valeant, Teva/Sicor Biotech, Hollister Incorporated, MOOG, Parexel, etc.
* Life sciences start-ups are flourishing in Lithuania. Start-ups make up about 40 % of the whole sector. Notable examples: Oxipit, Ligence, CasZyme, Droplet Genomics. Start-ups ensure the growth of Lithuania’s R&D potential, generate high added value for economy, increase a potential for attracting foreign investments.

The market is still unsaturated and the gap between small/start-up companies and big industry leaders is unexploited, meaning that there is plenty of room for medium-sized companies.

**COVID-19 and readiness to adapt:** When the COVID-19 pandemic started at the beginning of 2020, Lithuanian biotechnology sector was quick to adjust. More than 60 companies reoriented their production and started developing and manufacturing new and innovative products for protection against the virus.

Supporting facts:  biotech company ”Intersurgical” started producing modern and effective respirators for Lithuanian medics. “Teltonika” launched the production of the prototypes of the lung ventilation machines. “LT Biotech” created and started testing a kit, which allows to identify the virus in real time. “Elegantech” used the 3D technology to manufacture the testing brushes for COVID-19 smears. These are just a few examples of the innovations and the ability to quickly reorient the business.

1. **ECOSYSTEM OF LITHUANIAN LASER SECTOR**

Lithuania, with a population of less than 3 million, remains one of the world’s leaders in laser manufacturing. Strong cohesion between R&D activities in laser companies and academic research centres enable Lithuania to gain and maintain a leading position in the global market.

More than 80% of production is exported world-wide Laser technologies are among the strongest and most intensive value added industrial sectors in Lithuania.

Today Lithuanian laser sector presents 176 M€ industry providing more than 1300 highly skilled jobs at a value-added per employee that is more than three times larger than the national average.

95 out of world’s TOP100 Universities are using Lithuanian laser technologies.

The last decade was marked by intensive penetration into the industrial laser market, where nearly half of the total sales is currently taking place. Today the Lithuanian laser sector is on diversification to other market segments, including biomedical, sensing, optical communication.

The roadmap of the Laser and Photonics industry in Lithuania is in preparation with a goal to reach 5% of GDP in 2030.

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| A picture containing text, electronics, projector  Description automatically generated*Optical parametric amplifier ORPHEUS-MIR by LIGHT CONVERSION honored by Innovators Awards* | A group of men posing for a photo  Description automatically generated with medium confidence*5-axis Module by Direct Machining Control & Neolit Laser by Litilit Finalists of the Prism Award 2021* |

The latest world-wide recognized achievements in lasers & photonics Scientific research started in Lithuanian academia near 60 years ago has resulted important commercial developments, such as OPCPA technology and TW/PW femtosecond lasers. These achievements of scientists and engineers created the conditions for Lithuania to become the Founding Member of ELI ERIC, established in 2021.

**Recognision of researchers working in field of lasers, laser applications and photonics are the Lithuanian Science Prizes:**

2020 winners in the field of technological sciences – Gediminas Račiukaitis, Mindaugas Gedvilas, and Paulius Gečys (FTMC) ‘Interaction of Ultrashort Laser Pulses with Material and its Application in Laser Micromachining’.

2019 winners in the field of technological sciences – Rimantas Gudaitis, Šarūnas Meškinis, Sigitas Tamulevičius, Tomas Tamulevičius (KTU) 'Micro- / Nanostructures and Nanomaterials for Sensors, Photonics, and Power‘ Generation'.

2019 winners in the field of physical sciences – Audrius Dubietis, Mangirdas Malinauskas, Mikas Vengris (VU) ‘Interaction of Intense Laser Radiation with Material: From Fundamental Research to New Technologies’

2018 winners in the field of physical sciences – Vidmantas Gulbinas, Andrius Devižis, Marius Franckevičius (FTMC) ‘Exciton and charge carrier dynamics in organic and perovskite semiconductors and in new-generation solar cells’.