

# Biotechnology and nanotechnology in Poland in 2022

09.11.2023

 **41.4%**

An increase in biotechnology intramural expenditures in firms year-on-year

In 2022, 187 firms conducted biotechnology activities, which constitutes an increase by 8.1% in comparison to the previous year. Biotechnology intramural expenditures incurred by firms amounted to PLN 1952.7 million and increased by 41.4% on an annual basis. In 2022, 4317 persons were employed in biotechnology in firms. Biotechnology research and experimental development was conducted by 234 entities, that

is, by 7.8% more in comparison with the previous year. Biotechnology R&D intramural expenditures amounted to PLN 1432.4 million and increased by 20.9% annually. 8431 persons were involved in biotechnology research and experimental development.

 **7.1%**

An increase in nanotechnology R&D intramural expenditures year-on-year

70 firms, i.e. by 6.7% less than in the previous year, conducted nanotechnology activities. Intramural expenditures on nanotechnology incurred by firms amounted to PLN 485.9 million and were higher by 13.7% in comparison with the previous year. 3687 persons were employed in the field of nanotechnology, of which 1344 persons in firms. Research and experimental development in the field of nanotechnology were carried out by 125

entities, i.e. as many as a year ago. Nanotechnology R&D intramural expenditures amounted to PLN 399.9 million and were by 7.1% higher than in the previous year. 2817 persons were involved in nanotechnology research and experimental development.

## BIOTECHNOLOGY

### Biotechnology in firms

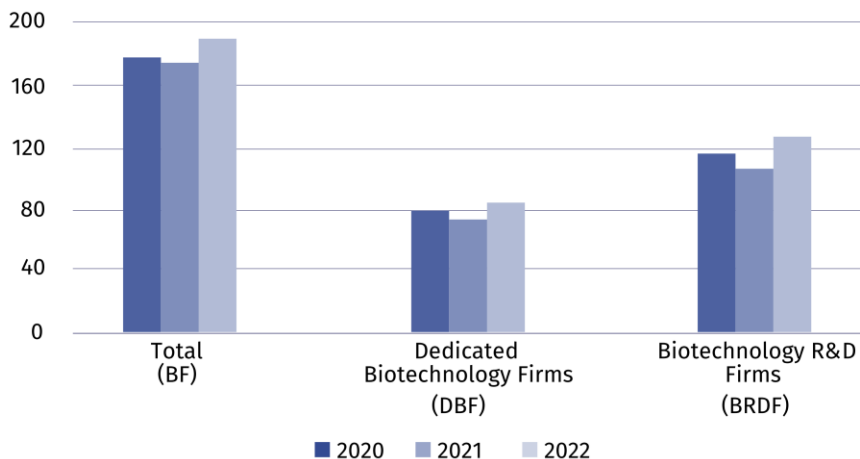
In 2022, biotechnology research and experimental development was conducted in Poland by 187 entities, called biotechnology firms. Among them 44.4% constituted dedicated biotechnology firms (DBF).

Biotechnology research and experimental development (R&D) firms (BRDF) constituted 66.3% of all biotechnology firms, of which 68.5% conducted only R&D in biotechnology. The remaining firms (BRDF) combined R&D with biotechnology manufacturing.

Taking into account size classes, small firms (with the number of persons employed below 50) prevailed constituting 55.6% of the total number of biotechnology firms; the share of medium firms (employing 50–249 persons) and large firms (250 and more persons) amounted to 27.8% and 16.6%, respectively.

Over a half of firms conducting biotechnology activities constituted small firms, that is, with the number of persons employed below 50

**Chart 1. Biotechnology firms conducting biotechnology activities**



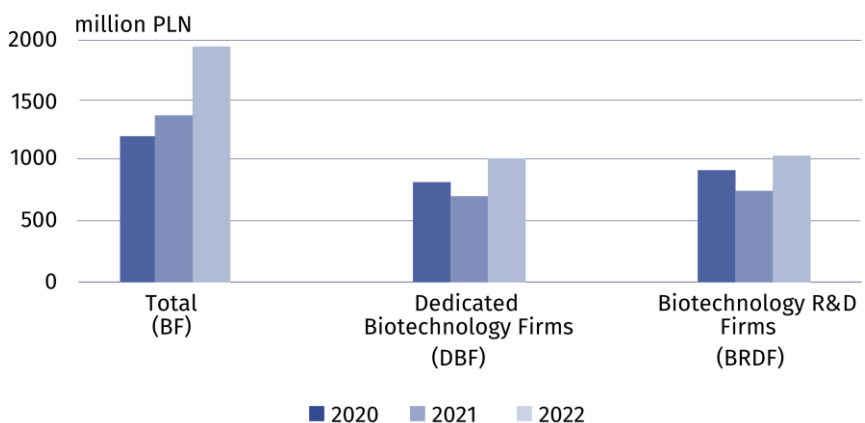
**Biotechnology intramural expenditures of biotechnology firms**

In 2022, intramural expenditures of firms incurred on biotechnology amounted to PLN 1952.7 million, of which internal funds of firms constituted 86.1%.

Analysing size classes of firms, it can be noted that the highest expenditures on biotechnology, like in the previous year, were incurred by entities classified as medium – PLN 864.6 million.

Over 40% of total expenditures on biotechnology was incurred by medium firms

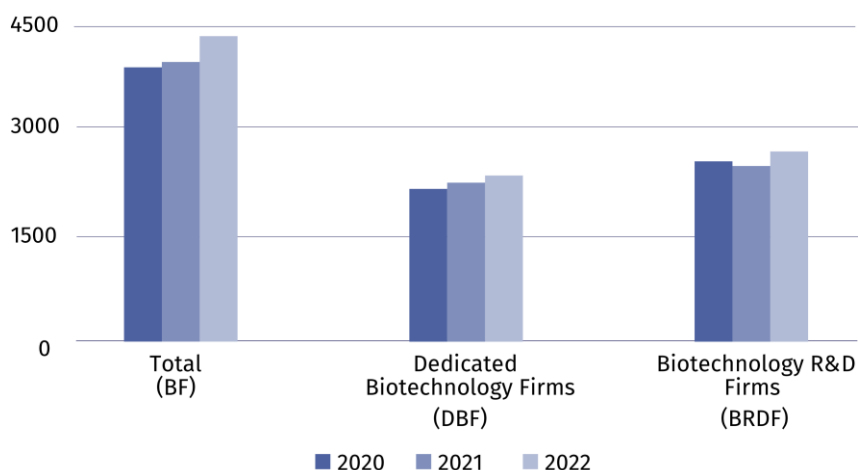
**Chart 2. Biotechnology intramural expenditures of biotechnology firms**



**Biotechnology personnel**

In 2022, 10592 persons were involved in biotechnology (by 5.2% more than in the previous year), of which slightly over 40% worked in firms. Biotechnology research and experimental development in firms was performed by 2144 persons.

In 2022, the number of persons employed in biotechnology R&D firms (BRDF) increased by 9.1%

**Chart 3. Biotechnology personnel in firms****Biotechnology research and experimental development**

In 2022, biotechnology research and experimental development was conducted in Poland by 234 entities, of which over a half belonged to the business enterprise sector. The most numerous group with regard to biotechnology applications was entities dealing with human health – 58.5% of the total number of entities conducting biotechnology R&D.

In 2022, biotechnology R&D intramural expenditures increased by 20.9% on an annual basis amounting to PLN 1432.4 million. Intramural expenditures of entities which belong to the higher education sector and the business enterprise sector constituted each 48.9% of this amount, while of the government and private non-profit sector – 2.2%.

8419 persons were engaged in biotechnology R&D in 2022. The number of persons employed increased by 2.6% in comparison with the previous year. Researchers constituted almost three-fourths of personnel involved in biotechnology R&D.

**Table 1. Biotechnology R&D intramural expenditures by sectors of performance**

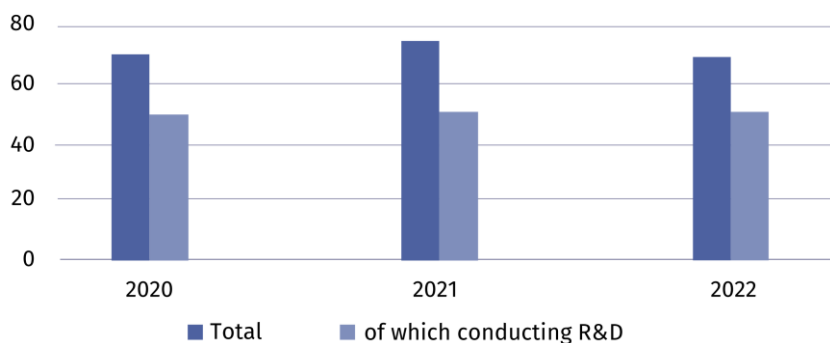
Sectors of performance	2020	2021	2022
	in thousand PLN		
<b>TOTAL</b>	<b>1 090 126.1</b>	<b>1 184 735.1</b>	<b>1 432 365.7</b>
Business enterprise sector	530 043.0	536 196.0	700 258.2
of which enterprises	462 327.9	459 609.0	604 399.1
Government and private non-profit sector	20 044.0	23 055.5	31 492.1
Higher education sector	540 039.1	625 483.6	700 615.4

## NANOTECHNOLOGY

### Nanotechnology in firms

In 2022, the number of firms which indicated conducting nanotechnology activities in the survey, i.e. used nanotechnology for the production of intermediate and final goods and/or conducted research and experimental development in the field of nanotechnology, amounted to 70, which means a decrease of 6.7% compared to the previous year.

**Chart 4. Nanotechnology firms conducting nanotechnology activities**



Nanotechnology activities in firms are related to production in which nanotechnology is used to produce intermediate and final goods. Applying nanotechnology in production also includes indirect involvement of firms, as a user or an integrator. Nanotechnology is also used in research and development, i.e. in scientific research and experimental development.

In the nanotechnology survey firms defined the areas of nanotechnology application in production as well as in research and experimental development as well as indicated the dominant area. In 2022, as in the previous years, nanomaterials constituted the dominant area of nanotechnology application for the majority of firm; the number of such entities decreased annually by 15.3%.

In 2022, nanomaterials constituted the dominant area of nanotechnology application for 71.4% of surveyed firms

**Table 2. Firms according to the dominant area of nanotechnology application**

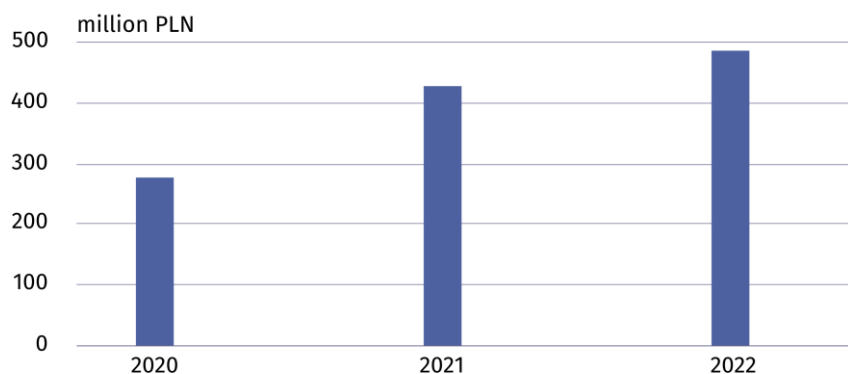
Application areas	2020	2021	2022
<b>Total</b>	<b>71</b>	<b>75</b>	<b>70</b>
Nanomaterials	56	59	50
Nanoelectronics	1	–	1
Nanophotonics	–	1	1
Nanobiotechnology	2	2	4
Nanomedicine	2	2	2
Nanomechanics	–	–	1
Modelling and simulation software	–	1	1
Other	1	1	10

### Nanotechnology intramural expenditures of nanotechnology firms

Nanotechnology intramural expenditures are expenditure incurred for this purpose by firms in the reporting year, regardless of the source of the funds spent.

In 2022, PLN 485.9 million was allocated to nanotechnology activities, of which 88.0% constituted own funds of enterprises. Compared to the previous year, expenditures on nanotechnology increased by 13.7%.

**Chart 5. Nanotechnology intramural expenditures of nanotechnology firms**



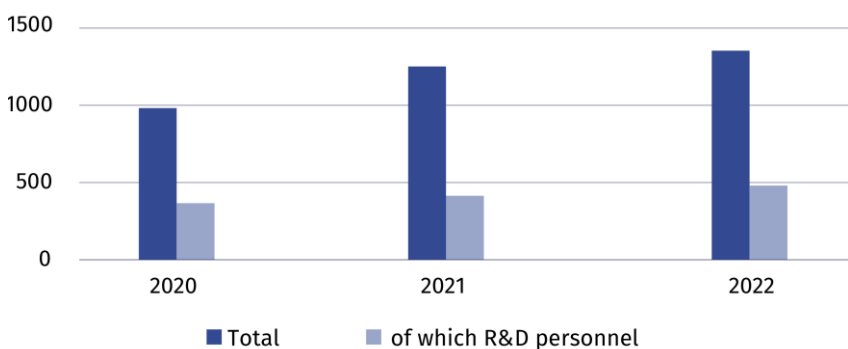
### Nanotechnology personnel

In 2022, 3687 persons were involved in nanotechnology activities (both in scientific units and firms). Firms employed 1344 persons, i.e. by 7.7% more than in the previous year. Research and experimental development in firms was carried out by 474 persons (including 187 women), which constituted 35.3% of the total number of persons employed in the field of nanotechnology.

In 2022, the number of persons employed in nanotechnology firms increased annually by 7.7%

**Chart 6. Nanotechnology personnel in firms**

As of 31 December



### Nanotechnology research and experimental development

The basic classification of research and experimental development is the division of entities into sectors of performance. In 2022, nanotechnology research and experimental development was carried out by 125 entities.

In 2022, nanotechnology R&D intramural expenditures amounted to PLN 399.9 million, i.e. by 7.19% more than in the previous year. The higher education sector had the highest share in nanotechnology R&D intramural expenditures (56.7%).

In 2022, the number of firms conducting research and experimental development in nanotechnology was by 3.8% lower than last year

**Table 3. Nanotechnology R&D intramural expenditures by sectors of performance**

Sectors of performance	2020	2021	2022
	in thousand PLN		
<b>Total</b>	<b>296 736.6</b>	<b>373 386.9</b>	<b>399 929.5</b>
Business enterprise sector	72 099.5	166 965.3	154 476.3
of which enterprises	60 608.7	.	83 639.9
Government and private non-profit sector	6 712.5	.	18 500.9
Higher education sector	217 924.6	199 478.3	226 952.3

In 2022, 2817 persons, including 1119 women, were involved in research and experimental development in the field of nanotechnology. Compared to 2021, there was an increase in the number of R&D personnel in the field of nanotechnology by 7.3%, including women – by 0.4%.

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**Related information**

[Biotechnology and nanotechnology in Poland in 2021](#)

[Science and technology in 2021](#)

**Terms used in official statistics**

[Biotechnology](#)

[The areas of activity in the field of biotechnology](#)

[Enterprise by type of biotechnology activity](#)

[Nanotechnology](#)