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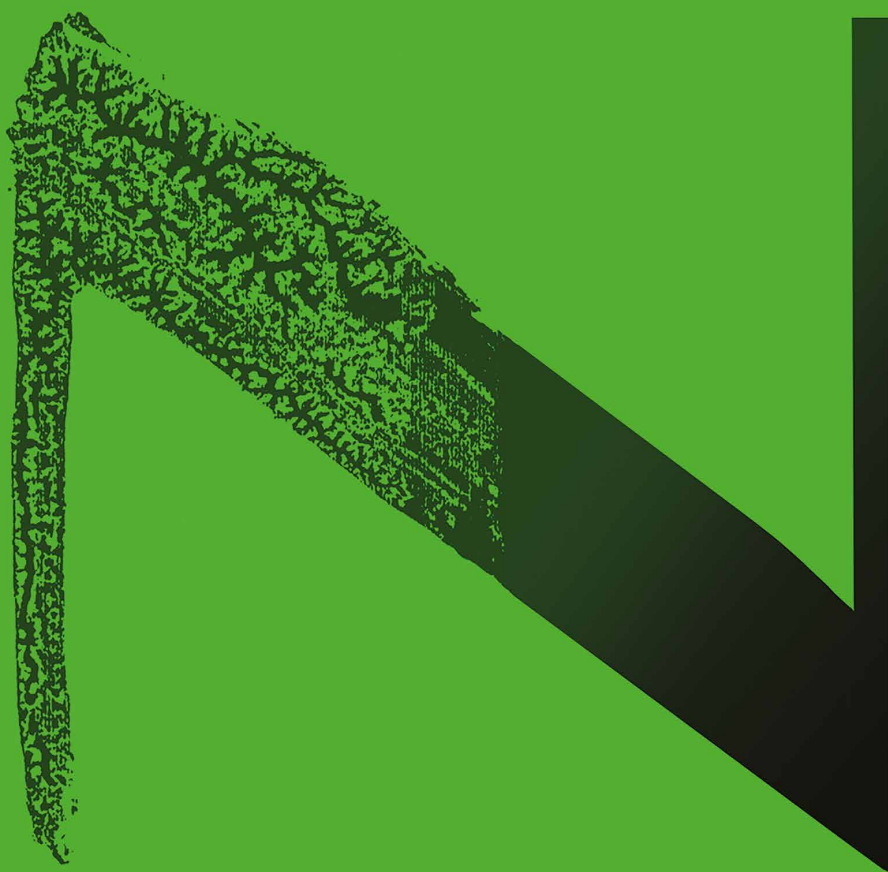


European City of Science
Katowice 2024



UNIVERSITY OF SILESIA
IN KATOWICE

power of nature



power of nature

ISSN
2719-2849

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Better Quality of Life



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Publisher

University of Silesia in Katowice

Editor-in-Chief

Agnieszka Sikora, PhD

Editorial Secretary

Tomasz Płosa

Cooperation

Martyna Fołta

Text Authors

Adam Bała, Weronika Cygan-Adamczyk, Tomek Grząślewicz, Małgorzata Kłoskiewicz, PhD, Olimpia Orządała, Patryk Rurka, Agnieszka Sikora, PhD, Katarzyna Suchańska, Maria Sztuka

Proofreading of the Polish version

Katarzyna Wyrwas, PhD, DLitt, Assoc. Prof.

Translation of the English version

Artur Adamczyk

Proofreading of the English version

Tomek Grząślewicz

Cover

Stefan Lechwar, PhD, DLitt, Assoc. Prof.

Graphic Design, preparation for print

Patrycja Warzeszka

Science and Programme Council

- Agata Daszkowska-Golec, PhD, DSc, Assoc. Prof. (biological sciences)
- Prof. Leszek Drong (literary studies)
- Ryszard Knapiek, PhD (Doctoral School)
- Seweryn Kowalski, PhD, DSc, Assoc. Prof. (physics)
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(10)/2024

UTILISING
Nature's
POTENTIAL



Zinc waste heap in Świętochłowice, Chropaczów district

Greenery cultivated and managed by people tends to dominate in cities. It covers lawns, squares, parks, gardens, and communal gardens, which serve various functions, among others: biological, hydrological, climate, and aesthetic. We are quick to skip over unmanaged greenery. These are plant communities in wastelands, roadsides, post-industrial areas, and post-mining waste heaps. To most people, such areas might seem neglected, abandoned, and in dire need of intervention and proper management. Nothing could be further from the truth!

CITY AS AN ECOSYSTEM

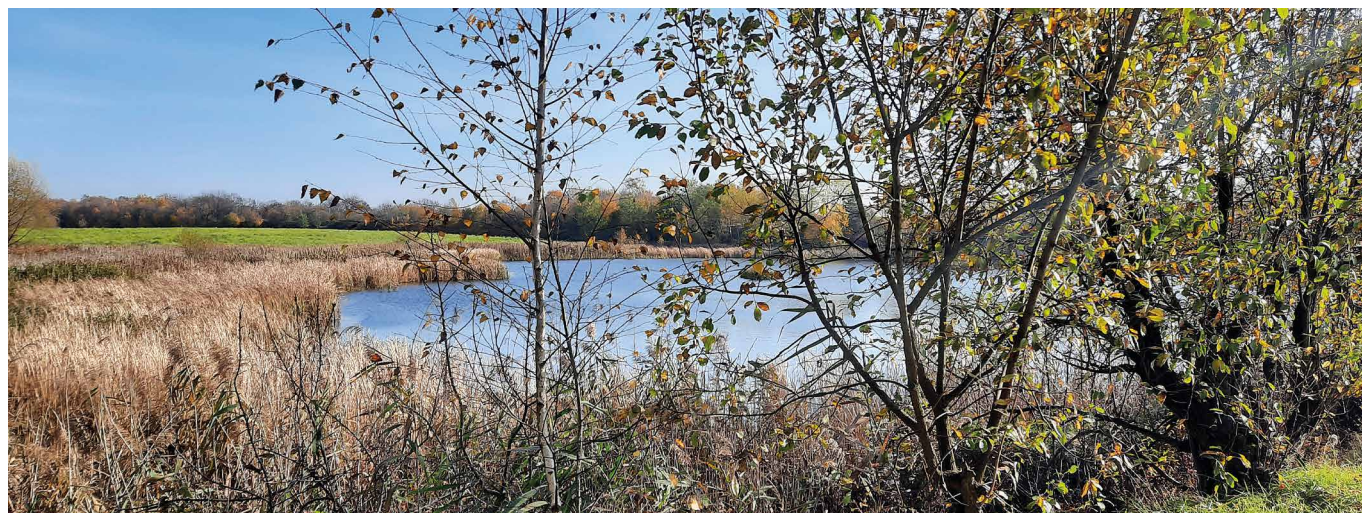
Cities are ecosystems, which means that they are ecological units made up of many different organisms and various elements of inanimate nature found within it. Living organisms and inanimate elements of the environment influence each other. Water, temperature, sunlight, terrain, including roads, bridges, and houses, have a significant impact on the distribution and living conditions of wildlife species in cities. Their ecosystems differ significantly from other ecosystems in terms of the natural processes taking place within them. The fundamental difference results from the fact that cities are constructed to serve only one species – humans, who manage natural environments in such a way as to serve exclusively their own needs.

‘Cities and their ecosystems are a mosaic, a combination of various more or less transformed habitats – from natural and semi-natural to heavily degraded’, says

Agnieszka Kompała-Bąba, PhD, DSc, Associate Professor, a biologist from the Faculty of Natural Sciences of the University of Silesia who conducts research on plants in urban environments. ‘We are used to urban greenery cultivated according to the common guidelines of gardening; we tend to prefer harmonious and symmetrical forms. Meanwhile, nature abides by its own rules. It knows which species will thrive in a given location, and making use of this knowledge can help us effectively shape and contribute to the creation of an urban ecosystem friendly to all species. Contrary to what we might expect, such approach to urban development will result in a significant improvement to the living conditions of humans.

Most people associate unmanaged greenery in urban spaces with weeds that need to be removed. Those plants often grow over transformed habitats,

such as roadsides, surroundings of old buildings, garbage dumps, construction sites, workplaces, factories, and various post-industrial sites. It’s not hard to imagine that these areas are not all that attractive for residents. However, they are very important! Plants affect all places they enter, they influence the environments and bring many benefits, which we do not usually notice at the first glance, and consequently do not appreciate. Firstly, they consolidate the ground and protect against water and wind erosion. Some species can grow in areas with increased concentration of heavy metals, while others in extremely dry locations or places lacking in nutrients. In such spaces, plants create various interesting combinations, often different from those which we know from parks and gardens, and they are better adapted to the conditions they encounter in a given place.



Żabie Dół nature and landscape complex in Bytom

Silesia and Zagłębie are both very specific regions. They mostly consist of industrial, heavily transformed, and degraded areas. The problems do not end just with the aesthetic aspects, even though they can also have a significant impact on the investment value of those areas. Far more serious are the health and safety risks resulting from environmental pollution and climate change, air, soil, and surface water pollution, as well as cities full of concrete that disrupts water management. This becomes apparent when we take into account the increasingly frequent floods after heavy rains. Fortunately, semi-natural habitats, i.e. meadows, grasslands, and forest communities, are also present in some transformed areas, such as quarries and post-mining waste heaps. The plants which enter onto wastelands and post-industrial areas often create picturesque systems. These are ruderal plants growing on terrains transformed by humans, urban spaces in particular, e.g. buildings and their near vicinity, roads and roadsides, railway areas, car parks and squares, landfills post-mining waste heaps, and post-industrial areas. Segetal weeds appear in their vicinity. The seeds that grow into poppies, cornflowers, or the beautifully flowering blueweed are often carried with fertilized materials.

Zielona Park in Dąbrowa Górnicza serves as an interesting example. It was created thanks to the construction of the road to Łagisza in 1931 that connected the area with the city centre. In 2008, an ecological site Uroczysko Zielona was established to protect the mixed oak-hornbeam forest community there. The tree population includes hornbeams, small-leaved limes and pedunculate oaks, maples, and in the undergrowth the wood anemone, yellow anemone, common hepatica, lesser celandine and, a little later in the year, the wild garlic bring about the beautiful colours of spring. There is also a pond that serves as a place for amphibians to reproduce and a habitat for birds and muskrats, as well as many interesting plants growing that grow in it, such as

water soldiers and water lilies. Therefore, not only does the Zielona Park perform recreational functions but it also retains its natural qualities.

Another example of spectacular revitalisation is Silesian Park in Chorzów, one of the largest parks in Europe (spanning nearly 600 ha). It was established on post-industrial areas: post-mining waste heaps, illegal shallow coal mines, sinkholes, landfills, as well as wastelands. The decision to build the park came in 1951. On the one hand, it is now a cultural and recreational space with a football stadium, zoo, amusement park, and a planetarium, but on the other, it is still a wild area with several meadows and a forest. Initially, only fast-growing, pollution-resistant tree species were introduced, but other forest species were later added as well. Currently, the Park is referred to as the green lungs of the Upper Silesia region and serves hikers, families, and those engaged in sporting activities. Unfortunately, the incredibly strong pressure from developers and intensive infrastructure expansion inside the park over the last few years has led to the degradation of green areas within this highly valuable site and development of neighbourhoods in its vicinity. The green oasis in the middle of the Upper Silesian conurbation of several million people in the most industrialised region of the country should be given adequate protection to ensure a better quality of life.

Another example worth mentioning is the Żabie Doły nature and landscape complex in Bytom. It is a green oasis overgrown with ruderal communities and rushes inhabited by numerous birds. Water fills the sinkholes created as a result of zinc-lead ore processing and land subsidence caused by coal mining done at the Barbara-Chorzów mine. There are also tailings pits formed as a result of zinc and lead ore processing at the Orzeł Biały mining and smelting works. Today, there is no longer any industry there, no infrastructure or narrow-gauge railway that once crossed the Żabie Doły area. Nowadays, due to

its wetland character, it is an extremely valuable area waiting to receive the nature reserve status.

Often we do not realise that the tailings pits or waste heaps can be considered an 'ecological bomb'. The material that has accumulated there is washed out and gets into the water and soil – it reacts, and if it were not for the plants that can bind the substrate and extract heavy metals from it, it would certainly pose a great risk to our lives and health. For this reason, colonising wastelands play a crucial role in cleaning up the area. In addition, we mustn't forget that other organisms – birds and amphibians – follow the plants and enter the system, affecting biodiversity.

'Nature researchers call such new systems emerging on post-industrial sites novel ecosystems', the scientist explains. 'Those novel ecosystems show us how to properly develop post-industrial sites. It is a good idea to take a page from nature's playbook on how to use natural processes during land reclamation. We study soils and places covered by spontaneous vegetation to find out how a chain of relationships is formed which then provides us various ecosystem services, such as improved ground and air quality, water retention, aesthetic value, and places to relax – all of which are extremely important.'

Post-industrial areas frequently include bodies of water created by land subsidence, i.e. sinkholes or subsidence basins, some of which have filled with water. For years, the prevailing opinion was that these types of objects should be filled in with waste rock, but nature researchers have shown that with time these places become inhabited by interesting plant and animal species and, as a result, the diversity of the area increases. In addition, those kinds of sinkholes are valuable water reservoirs and can be used during fire-fighting operations. In Silesia, there is a great number of flooded sinkholes, which can be referred to as the Upper Silesian Reservoir district.

Some plants have adapted to the urban heat island. These are often species that originate from warmer Mediterranean zones, such as the wall barley or little lovegrass. It is worth noting that climate change brings along invasive plant species, which pose a threat to the environment over time. They have many important characteristics that distinguish them from native species. First of all, they have no natural enemies in our country and are able to adapt to an extended growing season. Non-native plants often start blooming later than native species, they are taller, and have larger and more colourful flowers. This can make them more attractive to pollinators. In addition, they often secrete oils and pollens that cause allergies and even toxic compounds causing burns, such as Sosnowsky's hogweed. The city modifies the environment. The climate is drier and temperatures are higher than in suburban areas. The

ground contains a great deal of foreign materials sealing the surface, including concrete, elements of reinforcement, and asphalt. The layout of urban development impacts winds and temperatures, and by developing the so-called air corridors we have completely disrupted urban air circulation. Now we are looking for solutions, even in the form of small clumps of trees, pocket parks, or de-retrofitting squares and introducing lawns instead. In such places, the temperature tends to be lower and the humidity higher: this should be the direction of urban development to ensure a better quality of life for all. Nature's potential in regenerating transformed areas should also be explored. Spontaneous or assisted succession makes it possible to restore or create ecosystems in a better way than just incorporating artificial systems created in the reclamation process. Obviously, the conditions are different on post-mining,

post-zinc heaps, sand pits, and quarries, but post-industrial sites offer enormous possibilities for increasing biodiversity. We should let nature take its course, as it is capable of regenerating virtually everything and provides us with wise suggestions on how we can regenerate degraded areas.

 Agnieszka Sikora, PhD

 Agnieszka Kompała-Bąba, PhD, DSc,
Associate Professor
Institute of Biology, Biotechnology and
Environmental Protection
Faculty of Natural Sciences,
University of Silesia
agnieszka.kompala-baba@us.edu.pl

 Agnieszka Kompała-Bąba, PhD, DSc,
Associate Professor



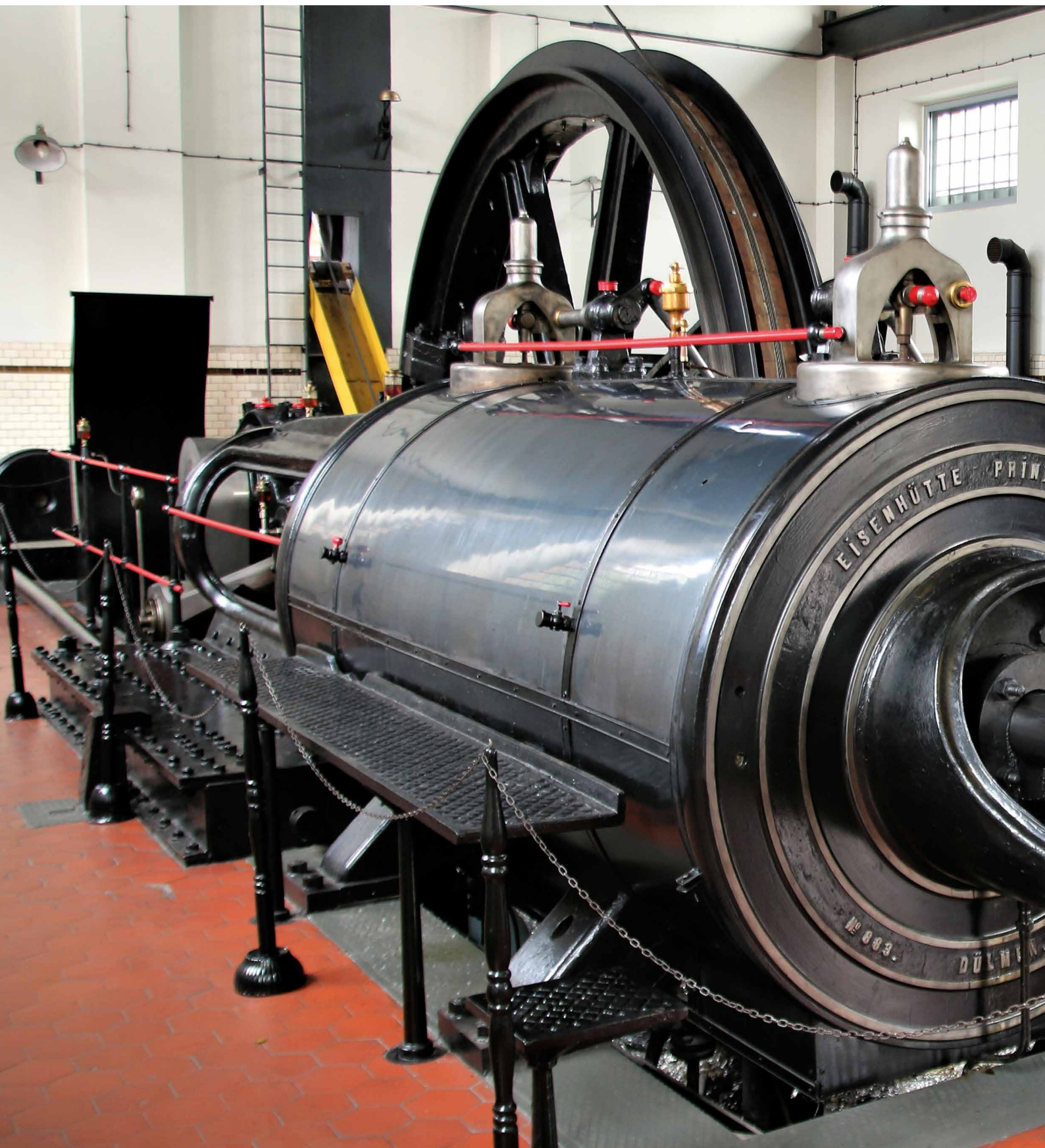
Novel ecosystems on a post-mining waste heap



Wild garlic at the Zielona Park in Dąbrowa Górnicza

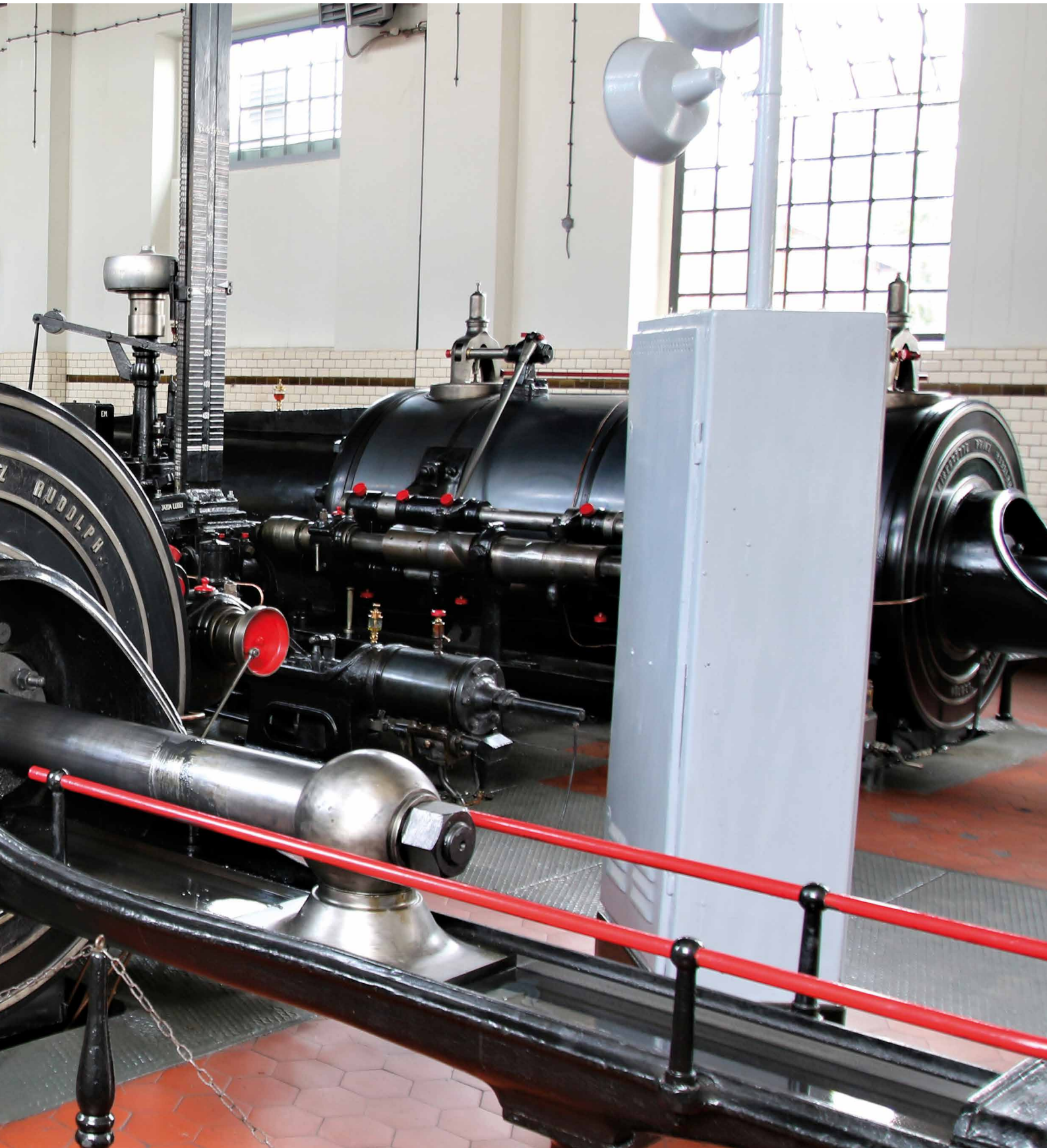
The need for massive scale development of post-industrial areas in Poland is linked to the effects of the post-1989 system transformation. At that time, dozens of obsolete and unprofitable factories were closed down. Then emerged the issue of how to properly develop the areas of former mines and steelworks. In early 21st century, shopping malls were often built on these sites, and over time their historical, educational, tourist, and even environmental potential gained wider recognition.

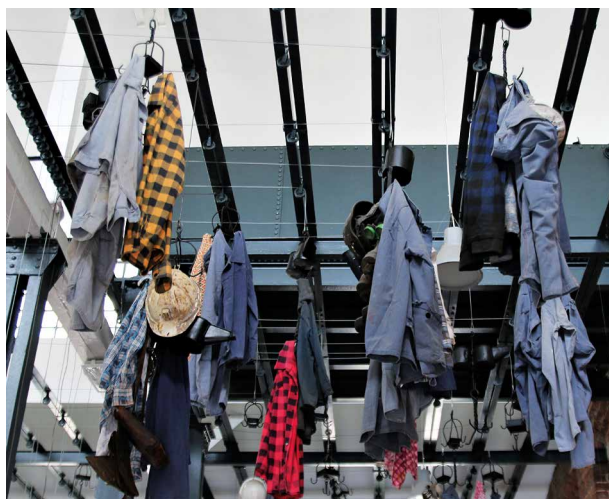
Queen Louise Adit complex in Zabrze



LOUISE'S

SECOND LIFE





Queen Louise Adit complex in Zabrze



Company-sponsored housing estate in Czeladź, Piaski district

‘This is one of the oldest combined heat and power plants in Silesia’, says Marta Chmielewska, PhD from the Faculty of Natural Sciences of the University of Silesia, pointing to a facility located near the Queen Louise Adit complex in Zabrze. ‘It served both the mine and the developing town as a whole. This historic building has been taken over by the city and is meant to be used for tourism and to serve the needs of the local population.

In the 1960s, a part of Queen Louise mine (then known as the Zabrze coal mine) was excluded from mining activities, allowing for school tours to descend 503 metres underground to see how the mine operated. Subsequently, an open-air mining museum was opened there. Several years ago, it underwent a comprehensive revitalisation, understood as the transformation of the degraded part of the city, giving it new functions and taking into account ecological, economic, and social aspects. After two centuries of industrial development in Silesia and the Zagłębie Dąbrowskie region, there is no shortage of places meeting those criteria.

In Western Europe, the problem of how to properly manage areas left behind by former mines and steelworks entered the public discourse in the 1960s.

‘At that time, heavy industry plants began to decline in Great Britain, France, and the Ruhr area’, explains the scientist. ‘This brought the necessity to find a new way to develop these regions and stop the negative trends’. Originally, the site of a decommissioned company was usually cleared

of infrastructure and redeveloped. The breakthrough came with the impending closure of the Zollern mine in Dortmund in the 1960s. The desire to preserve the interesting architecture of the plant forced a change in the mindset regarding the heritage of the industrial age. Today, the Zollern site includes historic buildings, headframes, but also a catering facility and a playground for children. In Poland, a country operating under completely different economic conditions, the issue of revitalisation emerged later than in Western Europe. However, as the researcher from the University of Silesia points out, certain revitalisation measures began to be implemented long before it became trendy.

‘Years ago, in today’s centre of Katowice, there was a settlement called Kuźnica Bogucka, which hosted a small steelworks. Even before the settlement was granted city rights, i.e. before 1865, a park was established on the site of the steelworks. The Silesian Park in Chorzów and Stawiki in Sosnowiec were also created on post-industrial wastelands’, notes M. Chmielewska.

The need for large scale development of post-industrial areas in Poland is linked to the effects of the post-1989 transformation of the political system. Dozens of obsolete and unprofitable factories were closed down. In early 21st century, shopping centres were often built on their sites, e.g. Stary Browar in Poznań and Manufaktura in Łódź. Although they succeeded in giving these places whole new lives, they also had a negative impact on the cities’ commercial

function. No different was the Silesia City Center, which is considered the first comprehensive revitalisation project in the Silesian Voivodeship. Its three-stage implementation process resulted in a multi-directional change to the character of the area. Three former industrial buildings were preserved on the former coal mine site. More relics of the region’s mining past can be found in the Culture Zone, located in the immediate vicinity of Katowice’s city centre.

‘The Katowice coal mine operating there was closed down in 1999. There was much more consideration given to how to make use of the site than in the case of Silesia’, explains the researcher. ‘As a result, the approach was much more well-thought through’.

Unless they receive help through a grassroots initiative, the situation of post-industrial sites located in suburbs and remote districts is much more difficult. This was precisely the case with Walcownia Museum of Zinc Metallurgy in Katowice-Szopienice where, after years of efforts by a dedicated association and organisations supporting it, a tourist facility was created and promoted.

Mining waste heaps are a special kind of legacy of the era of heavy industry. Some of them have grown into the city landscape and are used by the local population: for walks in spring and for sledding in winter. Mount Antonia in Ruda Śląska-Wirek has recently been revitalised and now offers many walking paths, barbecue areas, benches, and a mini playground. However, this is still



Queen Louise Adit complex in Zabrze

 Tomek Grząślewicz

 Marta Chmielewska, PhD
Institute of Earth Sciences
Faculty of Natural Sciences,
University of Silesia
marta.chmielewska@us.edu.pl

 Tomek Grząślewicz

a rare occurrence: as part of our landscape, it is more common to see mining waste heaps, which are often left abandoned. However, sometimes this kind of approach can bring very good results.

‘Nature is never idle. Spontaneous succession takes place when heaps are left alone: new, valuable species tend to appear, and biodiversity increases’, notes Marta Chmielewska.

In the Ruhr Metropolis studied by the scientist, the focus was initially on the planned (and costly) development of heaps. Many areas that once housed mining and production waste are now used for recreation, sport, and tourism. There are also landscape and theme parks. Some of these are further dressed up in such structures as bridges and viewing platforms. Given Poland’s ‘revitalisation lag’ in relation to Western Europe, it is worth asking ourselves the question of whether we should take inspiration from German efforts in this regard.

‘The fact that we are 30 years behind the Ruhr Metropolis means that we can benefit from their experience and avoid making the same mistakes’, claims Marta Chmielewska. ‘They also monitor the solutions introduced in Poland. They already know that sometimes it is worth letting nature take its course’.

The researcher mentions German projects that are worth taking a look at: the adaptation of post-smelting areas in Hörde, a district of Dortmund; the revitalisation of the Em-scher river, which once looked like the Rawa river but now is a beautifully

naturalised watercourse; and finally the Landscape Park Duisburg-Nord on the site of the former steelworks where you can take a walk through the green spaces between post-industrial installations.

Another part of the post-industrial heritage are the company-sponsored housing estates, built for the nearby factory workers and officials. In the Ruhr Metropolis, many of them have been restored; there is even a hiking trail connecting them. Katowice is proud of the Nikiszowiec district, Ruda Śląska of Ficus, and Piaski in Czeladź has considerable revitalisation potential. However, there is no trail connecting them and there are many problems yet to be solved.

‘Some people are not even aware that they live in a former company-sponsored housing estate’, says the researcher. ‘When someone asks me to show them around Nikiszowiec, I always suggest going to Giszowiec as well, and preferably to visit the heavily degraded Szopienice or Borki and compare the differences’.

Then there is the social dimension written into the 2015 Revitalisation Act. Many worrying processes such as unemployment and various types of social pathologies are more common in the districts where heavy industry plants have been closed down. Local initiatives can play a huge role here, such as in the Załęże district in Katowice with its thriving district council and community centre, or in Rybnik where social engagement is built into revitalisation projects – citizens have

the right to express their opinion on whether they like any particular idea or not. Local residents should also have the widest possible free access to the revitalised spaces within their neighbourhood. What does it look like in the case of Queen Louise in Zabrze?

‘Underground tours necessarily have to cost money because maintaining these places requires resources’, comments Marta Chmielewska. ‘However, we should bear in mind that the space we are in now is open and available to visit free of charge. We can take a walk there, visit an exhibition, and take a peek into some of the facilities’.

The growing awareness of the need to develop and manage post-industrial areas, as well as the creativity regarding the directions for revitalisation, is a positive development. The idea of building a gaming hub in Nikiszowiec fits in nicely with Katowice’s function as a creative place, which has been gaining traction for some time now. Another interesting example is the Porcelain Factory in Katowice, a place where new companies are moving in but simultaneously a place where you can also go to enjoy a concert.

‘I hope that we will move towards well-thought-out projects taking into account social, economic, and environmental factors. Sustainable development, which considers both advantages for the people who live in a given place and those who come every now and then to see a quality space to the sound of heavy machinery, is a safe bet to take. As it should be in a post-industrial site’, concludes Marta Chmielewska.





Weronika Cygan-Adamczyk



Prof. Robert Musiol
Institute of Chemistry
Faculty of Science and Technology
University of Silesia
robert.musiol@us.edu.pl

SEARCHING FOR THE MEDICINES OF THE FUTURE

I've been going to doctors for years now and yet I still get sick. Where are the advances in science if we can't combat old diseases and new ones keep popping up? – say many frustrated patients for whom today's medicine seems powerless. Meanwhile, laboratories all over the world are constantly making amazing discoveries, which provide the basis for increasingly effective solutions and treatments. So what is keeping us from this beautiful vision of a future without diseases – is it poor science or inefficient healthcare? Or is the world without cancers, genetic defects, and other ailments just a pipe dream after all?

In 2020, the Nobel Prize for Chemistry went to E. Charpentier and J. Doudna for the development of the CRISPR/Cas9 genome editing method, successfully developed for use in the service of medicine today. Two years later, the prize was awarded to C. Bertozzi, M. Meldal, and B. Sharpless for the development of the so-called 'click' chemistry, which allows chemical reactions to take place in a rapid and efficient manner, thus providing the basis the development of even more effective drugs. Last year's Nobel Prize in Medicine for K. Karikó and D. Weissman for their discoveries allowing for the development of mRNA vaccines that were used against COVID-19 also needs to be mentioned. These are just three Nobel Prizes awarded recently for achievements that improve our chances in the battle against diseases. But before the lucky recipients collect their medals from the Swedish king, they have to spend many years working in laboratories, often suffering failures along the way, and even then, most scientists will never live to enjoy similar recognition and widespread acclaim. But if progress is accelerating and science and technology are advancing faster than ever, why are we still battling cancers, immunological diseases, and new ailments? And why is the pool of the so-called 'civilisational diseases' affecting us constantly expanding?

For every drug that gets approved, five others are rejected in the preliminary stages | Photo: Agata Kurczyk and Robert Musioł



1:5

There are several reasons, and none of them will be satisfactory to someone who expects that a great treatment or cure is within arm's reach.

Prof. Robert Musioł, Director of the Institute of Chemistry of the University of Silesia and Head of the Drug Design and Nanopharmacology Team, explains that one of the main challenges to overcome is to go beyond the next stage of complexity when testing new substances.

'Together with the Pharmaceutical Biophysics Team, we are conducting research on cell spheroids, which develop in the form of micro-tumours. In this way, we are simulating the behaviour of tumours, so we are dealing with an assemblage of cells. Even at this stage, the activity of the drugs looks completely different from the response of a single cell. There is a problem with diffusion into the inside, and the fact that the cells inside have a different environment from those outside is also an issue. This includes less oxygen and more CO₂, which significantly affects their metabolism. All of this may impact the drug's chances to pass this stage and get into the next phase of testing, this time conducted on a living organism', explains the expert.

The team of specialists from the University of Silesia is also implementing a project that is now entering the stage of testing on mice, and is encountering certain obstacles as well. The chemist stresses that the compound, which has previously been characterised by good solubility and activity (even much better than the other agents previously mentioned in the professional literature), performs much worse in contact with blood. And even though the biochemists' toolbox has been expanded to include artificial intelligence and computer simulations that have accelerated certain processes, these tools are not a sufficient substitute for tests performed on living organisms. Meanwhile, it all still looks the same in practice, i.e. there are tests carried out on living tissues, animals, and finally humans. A quick glance at the statistics tells the story: for every drug that gets approved, five others are rejected in the preliminary stages. According to some statistics, as much as 90% of potential drugs fail at some stage of development. This, in turn, contributes to high costs, which consequently increase the price of various treatment options, especially when dealing with rare diseases. For example, one injection to improve the condition of people suffering from amyotrophic lateral sclerosis (ALS) – due to which many children die before the age of 2-3 – can cost more than \$2 million. Last year, a similar treatment method was approved in the European Union to treat haemophilia B. It comes with a price tag of up to \$3.5 million. Given that we want to create a society with equal access to treatment, this is an aspect that absolutely must be taken into consideration.

RACE FOR A BETTER DRUG

But what does the search for specific drugs look like 'behind the scenes'? What do contemporary researchers have at their disposal in the race for better pharmaceuticals?

There has been a lot of talk recently about advances in gene therapy based, among other things, on the previously-mentioned CRISPR/Cas9 solution. In theory, we just have to cut out a fragment of the damaged gene which makes the body produce the wrong protein or block processes necessary for it to function properly. In practice, things are much more complicated – we first need to find a proper carrier to allow for such an intervention in the patient's body. It is most often a virus, possibly nanoparticles, or even... an electric field. In addition, the vast majority of genetic diseases are caused by damage not to a single gene but to several, which often interact with one another and their environment in ways that are unclear and difficult to explain. So far, gene therapy has been used successfully in treatment of, among others, certain types of cancer and sickle cell anaemia.

Nanotechnology has also been enjoying considerable interest for a long time, although with certain reservations.

'Even though several drugs have emerged that have "nano" in their names, it does not really translate into an actual mechanism of action in any of them. Most are drugs that were known much earlier and developed as normal small-molecule chemical compounds with a specific mechanism of action. However, they could have had some undesirable pharmacokinetic parameters, i.e. connected with how the compound behaves in the human body', explains Prof. Robert Musioł.

Therefore, nanotechnology would be more of a way to improve certain parameters of an already known drug than a revolutionary new treatment option. Drugs designed using nanotechnology could thus have better solubility, would be more efficient in crossing certain barriers in the human body, or wouldn't lose their properties in contact with gastric acid.



PERSONALISED TREATMENT

The road to a healthy society will lead not only to the production of new and better substances, even though this is obviously also the case, but to a personalised treatment strategy for specific types of diseases as well. This may involve collecting material from the patient, modifying it, and inserting it into the body to carry out the right treatment. A totally separate problem may be the selection of a set of different molecules with complementary mechanism of action. This is how treatment for certain cancers and HIV is currently carried out.

The specialist from the University of Silesia provides an example of solutions that are increasingly often used in the treatment of various cancers based on small-molecule drugs:

'Nowadays, we might also encounter the term "polypharmacology", because each drug causes more than one reaction in the body and each of them will always have some side effects. However, we aim to correlate them in one direction with the goal to improve the wellbeing of the patient. We know that tumours are way less genetically stable than healthy tissue, therefore, mutations can occur much more quickly and easily. In such a case, administering a single-target drug risks the absurd situation where the drug can accelerate the progression of the disease. Hence, this is why a double hit is supposed to be better than a single hit', concludes the researcher.

What is the answer to the question presented in the article's title, then? Robert Musioł leaves no doubt – it certainly won't be possible to create a universal cure for everything and there will still be diseases that we are unable to avoid. However, this conclusion does not necessarily have to leave us feeling hopeless.

A lot depends on how we define the disease itself. Be it AIDS, COVID-19, or cancer, for which we are already finding better and better treatments. It can also be anything else that involves the harmful effects of broadly defined bodily lesions and causes discomfort, suffering, and a negative perception of the patient.

The fact is that we live longer and our standard of living is steadily rising thanks to advances in knowledge. However, science alone will not solve every problem. Whether access to treatment is equal for all citizens also depends on many other factors, including the politicians we elect. It is also important to try to lead a healthy lifestyle, and thus reduce the risk of contracting certain diseases. If we all base our actions and decisions on sound science, we will be well on our way to a better and healthier society.



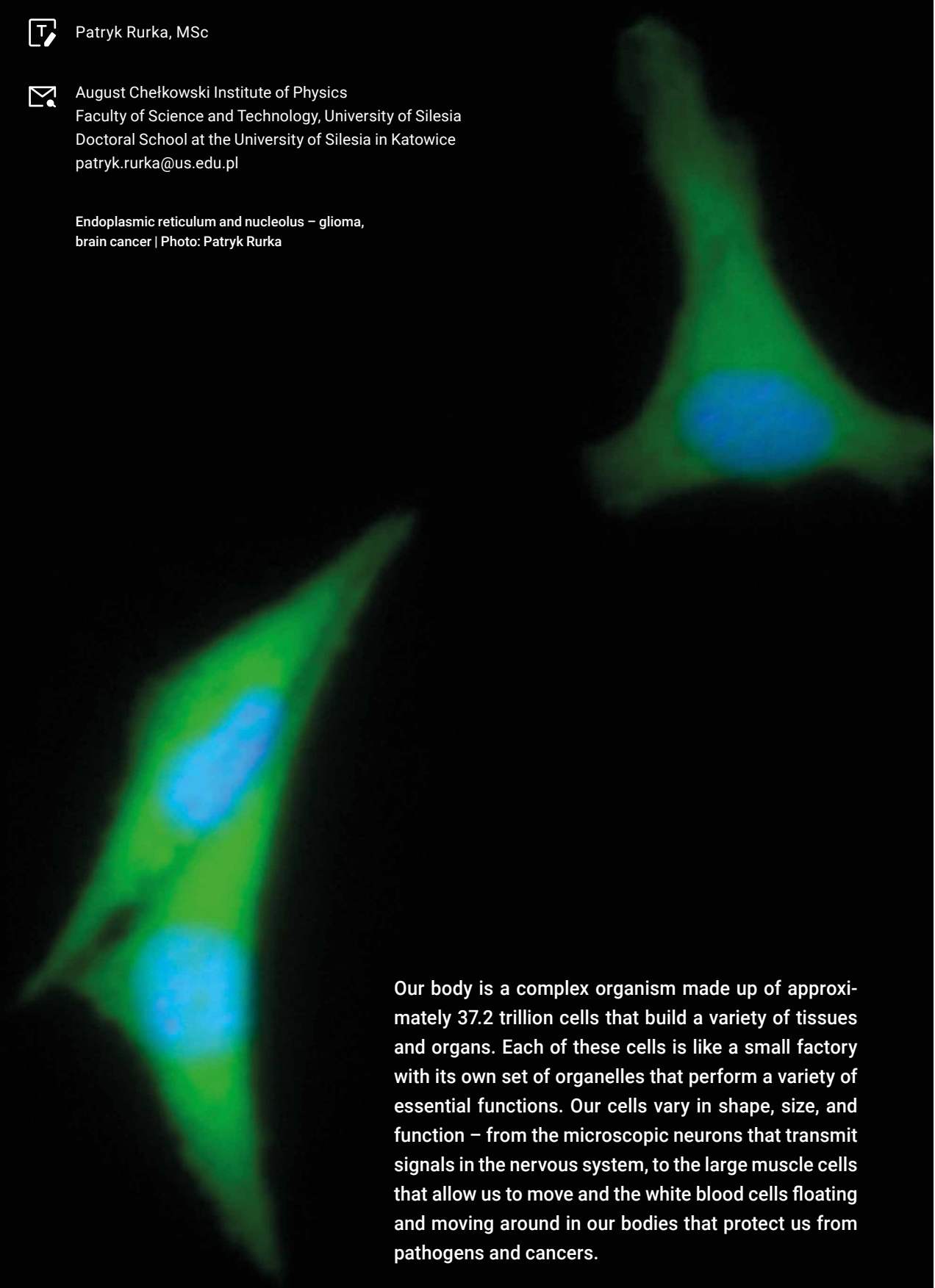


Patryk Rurka, MSc



August Chełkowski Institute of Physics
Faculty of Science and Technology, University of Silesia
Doctoral School at the University of Silesia in Katowice
patryk.rurka@us.edu.pl

Endoplasmic reticulum and nucleolus – glioma,
brain cancer | Photo: Patryk Rurka



Our body is a complex organism made up of approximately 37.2 trillion cells that build a variety of tissues and organs. Each of these cells is like a small factory with its own set of organelles that perform a variety of essential functions. Our cells vary in shape, size, and function – from the microscopic neurons that transmit signals in the nervous system, to the large muscle cells that allow us to move and the white blood cells floating and moving around in our bodies that protect us from pathogens and cancers.

FROM GENES TO DRUGS

A NEW APPROACH IN TREATING GLIOMA

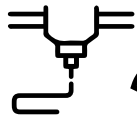
So what are cancers? They are diseases caused by uncontrolled growth and division of cells in the body. These mutated cells not only grow without limitations, but can also escape the natural defence mechanisms of our bodies, thus becoming a difficult opponent in the struggle for our health. Cancer's ability to adapt and constantly change makes the fight against it extremely difficult and requires a multifaceted approach combining genetic research and new treatment methods. It is worth noting that at any point in life, some proportion of our cells develop into cancer cells, but our immune system detects and neutralises them. It is only when the immune system itself is unable to deal with them that we can speak of a disease.

We must bear in mind that human body is extremely complex and yet beautiful, and there is one organ within our bodies that continuously tries to gain a proper understanding of itself – the brain. Unfortunately, there are many diseases that try to attack it. In our laboratory at the Institute of Physics of the University of Silesia, we primarily study one of them – glioblastoma multiforme, a cancer arising from astrocytes, i.e. stellate glial cells. Glioblastoma multiforme is one of the most aggressive forms of glioma, capable of growing rapidly, mutating, and spreading throughout the brain. Gliomas can have different grades. Grade 1 gliomas are benign and grow slowly; their mere presence is worrying, but they leave enough time for a proper response. Grade 2 gliomas are more malignant and may return after successful treatment on their own, waiting patiently for their chance to continue wreaking havoc. Grade 3 is a more serious opponent, growing rapidly and threatening the patient's health, while grade 4, the glioblastoma multiforme, is the true embodiment of evil – fast-growing, invasive, mutating and difficult to stop. Statistics show the scale of the challenge – the 5-year survival rate for patients with grade 4 glioma is only about 5%, putting it among the most-deadly cancers. What makes glioblastoma so scary? Firstly, the invasive nature, i.e. rapid spread to neighbouring brain tissues, which makes

complete surgical removal difficult. Secondly, its resistance to standard form of treatment such as radiation therapy and chemotherapy. Lastly, the blood-brain barrier, which protects the brain from toxins and our own immune system and, at the same time, makes the delivery of drugs difficult. The symptoms of glioma are like alarm signals sent out by our body. Fortunately, we are not alone in the fight against this opponent. Surgery, radiation therapy, and chemotherapy are the brave heroes that enter the battlefield in the fight against glioma. While they are essential, they are often not enough to completely defeat this insidious opponent. However, thanks to modern treatment methods and continuous research, more and more new approaches are emerging as new weapons.

Personalised medicine, based on genetic testing, is emerging as a clever strategist that adapts the battle plan to the patient's individual genetic characteristics. Genetic testing identifies specific mutations in glioma cells and makes it possible to target the enemy's weak spots with precision. Best in this regard are the multifaceted drugs we are working on, which can affect multiple targets so that, despite the opponent's diversification, they can no longer recover.

Nanotechnology is another hero of the future that has entered the war. Like tiny warriors, nanoparticles are designed to carry drugs directly to cancer cells, minimising side effects. Nanoparticles can also be used as diagnostic tools to help detect gliomas earlier and monitor the progress of treatment. In our Pharmaceutical Biophysics Team, we are also working on the possibility of using lipid and albumin nanoparticles, which are intended to aid the transport of substances across the blood-brain barrier, allowing us to destroy cancer cells. Although the fight is challenging, the future of glioma treatment looks more and more promising and patients can look forward to increasingly effective treatment. Glioma still remains a difficult opponent, but each new discovery and each innovative treatment brings hope for a better tomorrow.



3D PRINTING

REVOLUTION IN ORTHOPAEDICS

Implants, like clothes, are produced in only a few sizes and usually correspond to the most common shapes. It is our body, i.e. the broken bone or damaged joint, that, with the help of surgeons, has to 'adapt' to them. Personalised implants made with the use of 3D printing are an enticing alternative. They are created as a result of close cooperation between doctors, engineers, technicians, and physicists. The process allows the bone structure and joint geometry to be perfectly reproduced. Although today such solutions are primarily used for young patients and people with severe bone deformities, in the near future they could become a hospital standard.



Photo: moystock140886 – Freepik.com

'As recently as two hundred years ago, a broken bone in an upper or lower limb meant, if not death, then certainly amputation of the damaged limb. As far as we are aware, the first fracture fixations were performed around one hundred and twenty years ago. At that time, they were made using wood, metal, or bone', says Ryszard Tomaszewski, PhD, DSc, Associate Professor at the University of Silesia, Head of the Department of Paediatric Orthopaedics and Traumatology of the Medical University of Silesia and an employee of the Faculty of Science and Technology of the University of Silesia in Katowice, who treats patients with personalised implants.

According to the scientist, there has been enormous progress in the field of medicine.

On the one hand, the materials have changed. Wood and bones were replaced by metal and then by biodegradable materials. Then they also became bioactive, i.e. they could carry, for example, pharmaceutical substances to speed up tissue regeneration after surgery. Nowadays, there are already rumours about the fourth generation of such materials, which are supposed to be biomimetic and simulate human bones.

On the other hand, progress has been made in the techniques used as well. In traditional implants, the surgeon orders a finished piece and then cuts the patient's bone during surgery to fit the shape of the implant.

The use of 3D printing and cooperation with engineers, technicians, and phy-

sicists allows for the implant to be adjusted for the particular body.

'Currently, the most common solutions are joint endoprotheses, spinal implants, and materials used in traumatology for internal fracture fixation', says the orthopaedic surgeon.

To prepare such an implant, first a CT scan of the damaged bone is taken, while in the case of a soft tissue tumour an MRI scan is also taken. Then, the image is converted to a format that allows for the final step, which is the printing of bone and implant models.

'We present these to patients in preparation for surgery. This is an important step allowing patients to understand the next steps we need to take and so that they know what the benefits of this modern method are', says Ryszard Tomaszewski.

The printing of surgical trials and implants makes it possible, first and foremost, to reduce the duration of surgery and the number of intra- and postoperative complications.

Currently, those implants are produced from natural and synthetic polymers, ceramics, metal (mainly titanium in this case), and composites of two or more materials. They are biodegradable and bioactive, can be sterilised, should not cause inflammation, and must have strictly defined mechanical properties. Is it a perfect method? Not yet. Scientists and doctors are still facing several challenges.

As Ryszard Tomaszewski explains, mainly one type of tissue is printed. Meanwhile, the human body is a complex system of many different tissues wor-

king together. Another problem is the lack of implant growth, which is particularly troublesome in young patients. 'Today, special motors are used in implants to imitate tissue growth. However, I hope that in the near future, such technological solutions will be used as to make the implant grow with the patient', says the orthopaedist.

Another issue is the toxicity of certain metal ions, which can be released, for example, when the implant reacts with tissue and cause metallosis.

The cost of such a treatment is also worth mentioning. As with clothing, tailor-made implants are simply more expensive because they require more specialists to be involved in the process and more investment to be spent on research to develop the materials used. However, from a healthcare perspective, it is a good investment. We are facing the consequences of an ageing population. More and more people are struggling with bone-related cancers, osteoporosis, and age-related bone and joint damage. Modern implants not only translate into improved patient well-being and comfort but also fewer post-operative complications and associated costs.

'We have no complexes. We have been working with engineers in preparing precisely such implants for our patients for a long time. I am convinced that over time they will become cheaper and thus more accessible to everyone for whom they simply translate into a better quality of life', concludes Ryszard Tomaszewski.

 Małgorzata Kłoskiewicz, PhD

 Ryszard Tomaszewski, PhD, DSc, Associate Professor
Institute of Biomedical Engineering
Faculty of Science and Technology, University of Silesia
Department of Orthopedics and Traumatology, Medical University of Silesia
rysard.tomaszewski@us.edu.pl





Adam Bała



Natalia Ruman, PhD
Institute of Pedagogy
Faculty of Arts and Educational Science
University of Silesia
natalia.ruman@us.edu.pl

A photograph of a person sitting at a desk, viewed from the side. They are wearing a dark blue jacket and a blue and white patterned shirt. A black laptop is open in front of them. To the left, a glass bowl containing yellow food, possibly pasta or salad, is visible. The background is a light-colored wall with vertical lines.

OVERWEIGHT AND OBESE STUDENTS IN POLISH SCHOOLS – HAVE WE FAILED THE TEST?

Estimates suggest that by 2025, the number of overweight 5-17 year olds will reach **177 million**, whereas the number of obese 5-17 year olds will increase to **91 million** worldwide.

Currently, this issue affects as many as 10% of children and youth.

How are Polish schools handling it?

This article uses data from:

www.gov.pl · www.mazovia.pl · www.wkatowicach.eu · www.szkolazklasa.org.pl

At the beginning of 2024, the Medical University of Warsaw surveyed 1,642 primary (the last two grades) and secondary school students. As it turns out, one in five students in the Masovian Voivodeship is already overweight or obese. A similar study was carried out in the same year by the Katowice Municipal Sports and Recreation Centre (MOSiR) together with the city of Katowice. Thanks to FMS (Functional Movement Screen) tests involving 722 school students, we found out that as many as 30% of Katowice's schoolchildren are overweight. Only 204 boys and 250 girls were within the norm, 67 boys and 59 girls were overweight, and as many as 49 boys and 40 girls were significantly overweight. The culprits include poor diet and lack of exercise. Experts estimate that young people eat too few meals and the food that ends up on their plates is not varied or nutritious enough.

ON PAPER VS. IN REALITY

The statistics are alarming, and Polish schools are far from perfect when it comes to working with overweight and obese students. Natalia Ruman, PhD, from the Institute of Pedagogy of the University of Silesia, is researching the issue.

'It is true that there are school lesson plans on the subject, but they will not be of any use individually. The pro-

grammes themselves are not conducted in a reliable manner', says the pedagogue. 'The evaluation of prevention and education initiatives conducted using questionnaires also seems to be unreliable. On paper, the results are positive, but in practice they do not contribute much and are generally of little help.

So what measures can a school take to promote acceptance and body diversity among students? Natalia Ruman proposes solutions that might seem quite obvious and yet prove difficult to implement. Schools need more classes on topics that aim to improve students' self-esteem and help them discover their strengths, the introduction of diversity days, the publication of relevant texts in the school newspaper, and topic-related happenings. There is no doubt that this is an issue that must be included in the prevention and education programme.

'24 October, i.e. the Anti-Obesity Day, and 4 March, i.e. the World Obesity Day, should be included in every school calendar and celebrated accordingly. Schools could invite special guests who managed to achieve significant weight loss and who would be willing to answer questions asked by children', suggests Natalia Ruman. 'We could also organise challenges that are so popular around the world nowadays, such as "one day without sugary drinks". The point, however, is that these challenges should be realistic and not rivaling the 12 Labours of Heracles. A week without sweets is

too much, it would just discourage children from working on themselves', she adds.

The important thing is rules. One basic rule should be to exclude sweets and fast food from such class events as birthdays and school dance parties. Instead, the teacher could encourage students to bring fruit and healthy snacks. Similarly, during trips – instead of storming McDonald's, why not go out for a nutritious and healthy lunch? School trips should involve physical activity and walking, during which there should be no shortage of reminders to drink water regularly.

I SEE MYSELF THE WAY YOU SEE ME

There are many stereotypes, negative opinions, and prejudices about people who are obese or struggling with their weight. They are often perceived as unattractive not only in terms of physical characteristics but also in terms of their personality. The perception of what's on the outside influences the evaluation of that what is inside. This leads to discrimination and even psychological and physical abuse (bullying) not only on school premises but also beyond them. Name-calling, hurtful jokes, and teasing are the grim reality for many students affected by weight-related issues. To make matters worse, they tend to see themselves through the

lens of others' opinions and judgements. When the lack of acceptance and dislike expressed by peers is combined with a lack of self-acceptance, the young person withdraws and often begins to react with aggression towards those around them and towards themselves. Those individuals tend to exhibit their emotional problems as well as social difficulties also further in their adulthood.

Therefore, the teacher's role is, first and foremost, to limit the negative attitudes of classmates and to effectively combat discrimination against those who do not conform to the generally accepted standards of appearance.

TEACHERS AND PARENTS

Teachers must help overweight students feel more comfortable not only in P.E. classes but in all school activities – involve them in various activities, praise them publicly for the mini-successes of everyday life. Most of all, inappropriate behaviour towards such kids should not be downplayed in the first place – every sign of bullying (which might even lead to a suicide attempt) must be addressed. In doing so, the teacher should avoid empty platitudes such as 'just don't pay it any mind', 'if you try hard, you'll look the way you want', etc. Overweight students must be treated normally, like an-

yone else, without exclusion, labelling, or comparison to others. It is essential to conduct awareness-raising conversations with the class, during which young people will gain knowledge about weight-related issues and their causes, which can change their attitudes towards their peers. In P.E. classes, an informed teacher should always choose exercises that will not put the student at risk of being mocked by their classmates. A meeting with the student's parents may be helpful as well, as it could result in the family deciding to take up physical activity and review their eating habits. It is important to ensure that the young person does not feel alone in dealing with their problem.

Natalia Ruman also draws attention to the competencies teachers need to develop in order to be able to effectively support students with those particular needs.

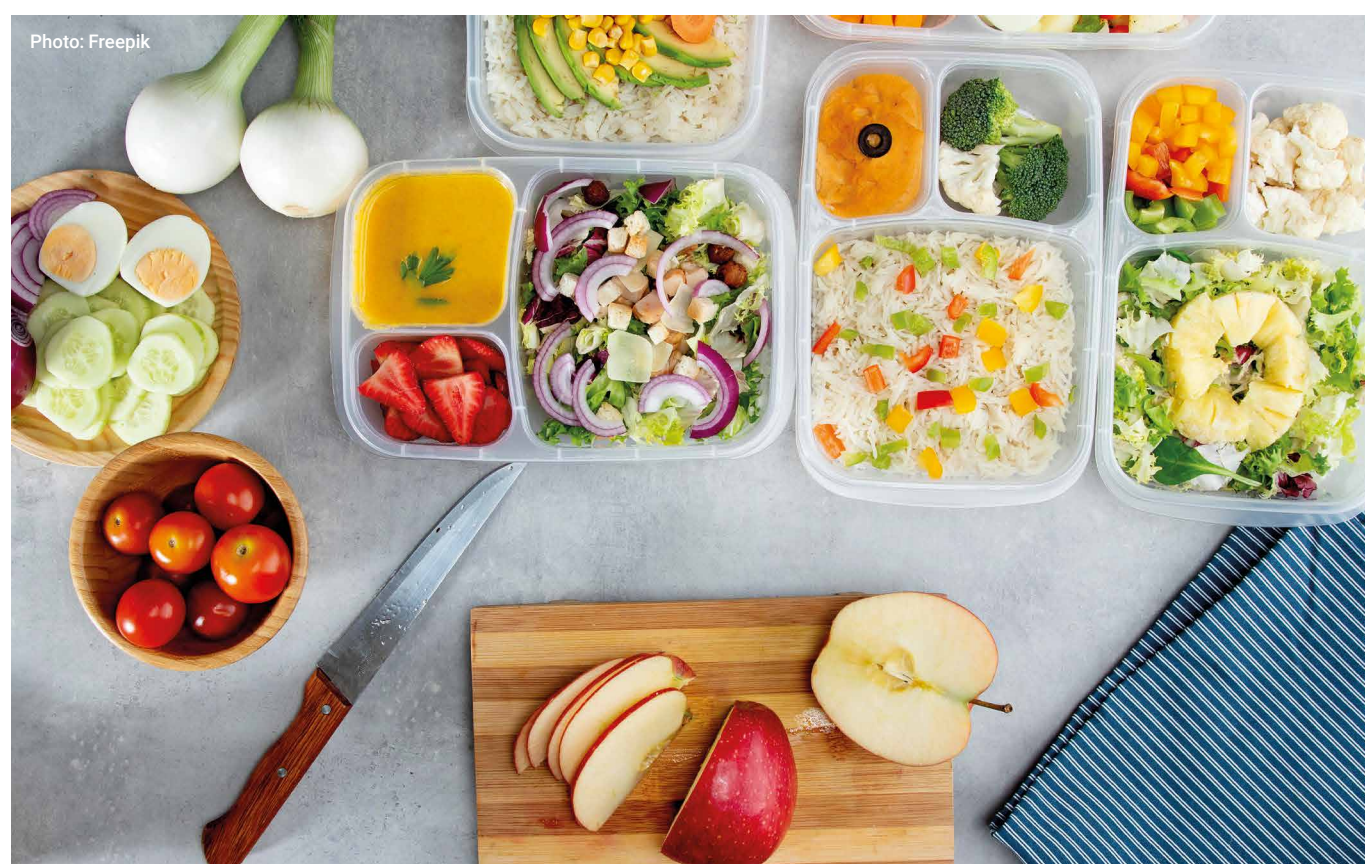
It is crucial to be able to recognise emotional states, also related to hunger and fullness levels, or more specialised ones, such as those relating to eating habits. The teacher should know how to talk to a student in crisis and how to help a child who has withdrawn', explains the pedagogist.

The teacher could try to explain to their students that in today's world we often perceive our own appearance through

the standards of human body image promoted by media (especially social media) that are extremely difficult, and often impossible to achieve,. It would also be useful to explain the tricks that influencers use to ensure that the camera does not show the imperfections of their bodies (there are tons of articles and videos online exposing such practices).

It is also important to be mindful of the words we use. Strong, often radical terms, such as *obesity*, *overweight*, *fattening*, *calorie-dense*, *low-calorie products*, *bad habits*, etc., can be replaced at school with softer-sounding words, e.g. *higher-than-average body weight*, *unhealthy food*, *healthy products*, *unhealthy habits*. This may not seem important, but it produces completely different images in young people's minds.

Of course, the parents' support is essential. The family must take care of the young person, encourage them, and be there for them, even if they fail in their efforts to lose weight. Sometimes silence is more important than words. It is better to simply be there for them than to repeat the platitudes about how the next time will be different. But most of all, they should not be allowed exceptions like 'OK, you got an A in maths today, so we'll order a pizza or go to the shop for crisps'.



WE ARE ALL EQUAL

The World Health Organisation estimates that there are 1.3 billion people with disabilities worldwide, representing 16% of the total population. According to Eurostat, people with disabilities account for 27% of EU population over the age of 16, and 24% in Poland. These figures are continuously rising, which is why it is so important to support people with disabilities, improve their quality of life, and educate the society, including future teachers.



Olimpia Orządala



Dorota Prysak, PhD
Institute of Pedagogy
Faculty of Arts and Educational
Science
University of Silesia
dorota.prysak@us.edu.pl

Participation of uniformed services in the Day of Dignity for People with Disabilities at the University of Silesia has become quite a tradition | Photo: Konrad Matyniarz



People with disabilities form a diverse group. Some of them experience intellectual disabilities. Dorota Prysak, PhD from the Faculty of Arts and Educational Science of the University of Silesia in Katowice, successfully combines her work in academia with teaching in a school for students with special educational needs.

Nowadays, social inclusion becomes an increasingly frequent topic of discussion. The world, including Poland, is becoming more open to people with disabilities and tries to include them in social life. Much has changed in terms of architectural accessibility over the past decade or so: the installation of wheelchair ramps and suitably wide lifts could serve as examples. It is the mental barriers in society that prove to be the most difficult.

‘Maria Grzegorzewska, the pioneer of special education in Poland, emphasised the potential of people with disabilities. Her most often quoted words are: “There is no cripple, there is a human being”. I was taught, and so I also teach this to others, that in order to support people with disabilities we must first get to know them, understand their

perspective, find out what challenges they face, and learn about the environment in which they function on a daily basis. Only then can we make suggestions tailored to their individual needs’, says the USil scientist. ‘Nowadays, we are increasingly often talking not about disabilities but about people with different developmental and educational needs. This view is particularly close to my heart, as I believe that every single person has needs, we just have to create a space where we can meet, get to know each other, and feel safe.

Teachers who work with people with disabilities, as well as academics training future special education teachers, social workers, and residential home staff, play an important role in social inclusion. They often work not only in kindergartens and schools but also in the local communities of people with disabilities. It’s safe to say that some of us probably don’t know how to behave around people with intellectual disabilities. Often such people may seem too upfront to us, causing us to avoid them. Meanwhile, as the researcher believes, we can learn a lot from them. Their world is simple, and a zero-sum approach can help us organise our thinking a little better. In turn, their honesty opens the way for us to become more authentic as well.

‘A lot depends on ourselves and what kind of people we are and what kind of value system we have. Nothing is impossible. Barriers resulting from intellectual disabilities do not prevent us from establishing relationships with people with disabilities’, emphasises Dorota Prysak.

Our language, especially specialist language, is very complex for people with intellectual disabilities. Therefore, it is important that we use short and simple phrases.

‘The simpler, the better. Sentences should be straightforward and refer to their knowledge of the world and knowledge in general, because then it is easier for them to understand our message’, says the researcher.

Non-verbal communication also turns

out to be particularly important. People with intellectual disabilities speak to us with their bodies, e.g. by using facial expressions to communicate whether they understand or agree with something. An educator working with people with disabilities needs to be particularly attentive in order to acquire knowledge of how the person communicates. The ability to be a careful observer is incredibly helpful.

‘Sometimes we forget that being a teacher does not mean we cannot learn from the people we interact with, including people with intellectual disabilities. We all learn from one another. Working with people with disabilities can be really fascinating and inspiring. I think that it helps us live and overcome various crises’, admits the scientist. Dorota Prysak is involved in a variety of projects related to people with disabilities. During a research stay in Spain, she exchanged experiences with teachers working with people with intellectual disabilities there and learned about new suggestions for support solutions. Recently, she has also established cooperation with the King Jan III Sobieski School Complex no. 6 in Jastrzębie-Zdrój. Under the supervision of the school’s teachers, the future IT specialists are developing an application to prepare teachers for working with a diverse group. The researcher also organises the Day of Dignity for People with Disabilities held on the campus of the University of Silesia in Cieszyn. Teachers and students are not the only people attending the event; there are also, among others, members of uniformed services (police officers, firefighters, prison officers, military personnel, foresters, and healthcare professionals) who prepare workshops and learn how to communicate with people with disabilities.

‘Working with people with intellectual disabilities has shown me that we all have similar problems and experiences. They have the same needs as we do. They want to work, they want to be loved and have children. We are all equal’, concludes Dorota Prysak.





Maria Sztuka



Prof. Ewa Syrek
Institute of Pedagogy
Faculty of Social Sciences, University of Silesia
ewa.syrek@us.edu.pl

Drawing: LineDraw_Pix – Freepik.com



WHEN BOOZE RULES THE FAMILY

The latest report from the Organisation for Economic Co-operation and Development (OECD) shows that an average resident of an EU country consumes 11.3 litres of pure alcohol per year. The average Pole (over 15 years of age) consumes even more – as much as 11.7 litres of pure alcohol per year. Nearly one million Polish people are struggling with alcohol addiction. This number, however, is only the tip of the iceberg because alcoholism affects all family members, sometimes causing irreversible damage.

Although, from time to time, the shock and the tragedy of victims of drunk drivers, children beaten up by intoxicated parents, and the drastic descriptions of murders committed under the influence reverberate through the society, the stereotype of how to have a good time does not change. Strong alcoholic drinks still remain an indispensable part of any successful party because tradition and cultural habits demand it. Announcements by the WHO confirming that no level of alcohol consumption is safe for our health, high fines, confiscating cars from drunk drivers, and huge resources allocated to treating alcoholism and its consequences do not deter people as there is still a lack of knowledge and education.

The monograph entitled *Codziennosc w perspektywie doświadczeń dorosłych dzieci alkoholików. Zarządzanie rozwojem osobistym* (lit. Everyday life from the perspective of the experiences of adult children of alcoholics. Managing personal development) by Prof. Ewa Syrek (Institute of Pedagogy, Faculty of Social Sciences, University of Silesia) and Rev. Grzegorz Polok, PhD, DLitt (Department of Market and Marketing Research, University of Economics in Katowice) has been circulating in Katowice's universities for a year now. Both scholars have a wealth of experience and knowledge on the topic. Prof. Ewa Syrek's research interests are related to social pedagogy, health pedagogy, and the sociology of health and illness, while Reverend Polok, in addition to being an active lecturer since 2001, has also been providing spiritual care to a therapy group at the 'Zawodzie' Academic Chaplaincy in Katowice, which includes ACDF (adult children from dysfunctional families) and ACA (adult children of alcoholics) students.

Many years of research by the scholars resulted in a compendium of knowledge on how to overcome the traumas from growing up in homes affected by alcoholism. The monograph, a significant part of which consists of anonymous confessions by students, provides encouragement and assistance in overcoming fears, unjustified feelings of inferiority, inadequacy, and similar emotions. The voice of adult children of alcoholics leaves a stronger impression than mere statistics, it also helps to overcome the fear of asking for help, and the unwarranted shame.

Alcoholism disrupts family life, resulting in, among other things, family dysfunction, co-dependency, violence, financial problems, and a misunderstanding of social and professional roles.

I experienced a lot of fear as a child. On the one hand, I was afraid of my father and him returning home, on the other for my sick mother's life and for our future. Sometimes I am afraid that I'll always be afraid – the ACA syndrome comes through in this statement as clear as day.

The effects of childhood experiences vary greatly. The scope of the ACA syndrome is extensive, and it can manifest as low self-esteem, fear of making decisions, fear of new situations, inability to manage free time, difficulty in recognising feelings, fear of rejection, difficulties socialising, and denial of one's own needs.

As Prof. Ewa Syrek explains, 'Co-dependency is a concept analysed in scientific literature. It has undergone many changes and its definition depends on the theoretical and methodological approach in a given scientific discipline (e.g. psychology, medicine, education, social policy, etc.). Various models of co-dependency can be found in the literature. Worth noting is the fact that a

co-dependent person is characterised, among other things, by the presence of various disorders (e.g. anxiety disorder, mental disorders, weak sense of self, emotional problems, and others). Co-dependency disrupts psychosocial well-being', emphasises the pedagogist. Addicts and their co-dependents can benefit from various forms of help and support, including self-help groups, e.g. AA (alcoholics anonymous), Al-Anon (for co-dependents), Alateen (for co-dependent children), professional therapy centres.

'In scientific literature and social practice, there are different therapies according to the person they are aimed at and the needs of the individuals and social groups, as well as to the type of therapy the therapist specialises in (psychological therapy, educational therapy). In general, young adults have great career ambitions and aspirations to achieve professional and social success, which is why self-reflection, future-oriented competencies and strategies, as well as motivation and openness to personal development, effective decision-making, emotional intelligence, and personal and collective relationship-building skills are so important in this process. Undertaking personal development activities allows them to satisfy many important needs, including the need for meaning in their lives, self-development, recognition, success, and many others. Undergoing psychotherapy is a conscious choice and, according to research, has the intended effect of changing the quality of life of an ACA person', concludes Ewa Syrek.

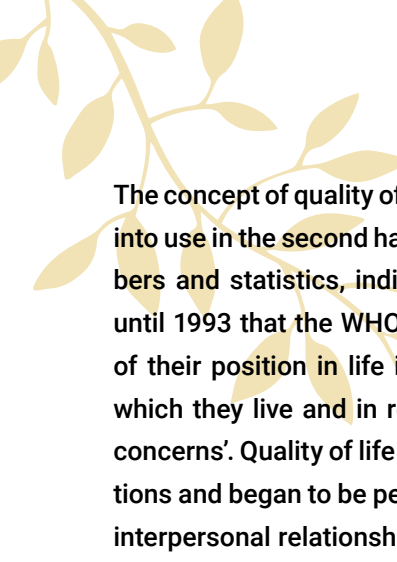
Therapy will not make all life's problems disappear, but as one survey participant states: *therapy helps to look at problems from a different angle – a healthy one! To live consciously and fully.*





QUALITY OF
HUMAN KIND

QUALITY
OF LIFE



The concept of quality of life understood as a certain standard of living came into use in the second half of the 20th century. It encompassed various numbers and statistics, indicating a person's economic well-being. It was not until 1993 that the WHO defined the concept as 'an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns'. Quality of life ceased to be defined on the basis of material conditions and began to be perceived based on values, well-being, and positive interpersonal relationships. It has become the equivalent of happiness and life satisfaction.



Katarzyna Suchańska



Rev. Antoni Bartoszek, PhD, DLitt,
Associate Professor
Institute of Theology
Faculty of Theology, University of Silesia
antoni.bartoszek@us.edu.pl

So, what is happiness to be found in? 'There is no single answer to this question', says Father Antoni Bartoszek, PhD, Associate Professor at the Faculty of Theology of the University of Silesia, a moral theologian and a chaplain at a Catholic centre for people with disabilities. 'The concept of quality can have multiple meanings. Some people understand it literally, one could say: empirically. After all, there are psychological tests to determine how satisfied we are with our lives and the degree of quality we have achieved. Others will look for a more philosophical approach. The question is: what factors should be taken into account in order to judge whether someone is happy and what is their quality of life? Is it health, income, frequent travel or a loving family?'

'Nowadays, the emphasis is on the quality of life, but we must never forget the about the sanctity of life', the priest continues. 'The quality of life is built on its sanctity. Australian ethicist Peter Singer said that the era of the sanctity of life has come to an end and the era of the quality of life has begun. This quotation draws on the opposition between the quality and sanctity of life, the reductive treatment of life, and the dangerous degradation of life to the material sphere only. As a result, the decisions to commit suicide and end the life of another through

abortion or euthanasia become easier. Quality of life is a positive category when it mobilises us to secure our needs in all dimensions of human life. It begins to produce negative effects when, through poverty, illness, or disability, we judge our life as one of low quality, and therefore, of low value. Nowadays, few people are able to discover the meaning of failure and suffering. In a time of affluence and lavish consumerism, ever younger and younger people suffer from depression, have serious problems dealing with failures, pain, harm, setbacks, and maintaining mental resilience in the face of stress and various other unpleasant events. Moreover, the awareness of the fact that pain and setbacks are a part of life and it is impossible to avoid them completely is being rejected. Today, people are geared towards the ideal, idealised beauty, and all-encompassing affluence, and this, counter-intuitively, can lead to low self-esteem. Dissatisfaction with our own life grows because when compared to others, we will always feel that we have achieved too little and that we are inadequate for this world'. And to feel this way is a real human tragedy. When a person says: I have such a low quality of life that my life is not worth living. They do not realise that life itself is of great value, and a gift of God, in the theological sense,

notes the lecturer from the Faculty of Theology.

Father Antoni Bartoszek owes much of his pastoral experience to twenty-three years of working with people with intellectual disabilities. He says that generally these people are perceived as disadvantaged, leading unhappy lives, and being deprived of a lot of joy and good experiences, which for many is tantamount to a poor quality of their lives. In reality, the world of these people looks substantially different and many people with Down's syndrome can be happier than any rich businessman. Why? One factor that sometimes has a decisive impact on the joy and satisfaction in a person's life is the richness of their spiritual (inner) life.

'The modern world is starting to discover spirituality. In 1948, the World Health Organization defined health as 'complete physical, mental, and social well-being'. 50 years later, the same organisation, in developing a definition of palliative care, described it as one that seeks to secure the physical, mental, social, as well as the spiritual needs of the patient', points out Father Antoni Bartoszek who has been researching the spiritual and moral aspects of palliative care for years.

So why has spirituality become this important?

‘Spirituality often only becomes particularly significant when facing the terminal phase in a person’s life’, explains the chaplain. ‘The pain felt by the patient isn’t always the result of the illness, but can sometimes have an existential basis that translates strongly into bodily afflictions. This proves that care for the spiritual life influences the condition and quality of life. Particularly important is the fact that thanks to palliative care, spirituality has attracted the interest of medicine’.

We can understand spirituality in many different ways. Nowadays, spirituality is not always associated with faith in God; it has taken on a more humanist, artistic meaning, giving people peace and tranquillity, allowing them a better understanding of themselves and their talents, as well as their needs and the possibility to discover the best way to fulfil them. In a way, spirituality is about aesthetics, sensitivity, and cultural experience. Some people fulfil themselves through painting, art, music, acting, photography, or hiking in the mountains. Spirituality also includes a concern for others, a desire to experience beauty, and good deeds done for other people and oneself. All these things can have a truly unique meaning for a person. Spirituality understood in this way can be discovered by everyone, including non-believers.

‘Spirituality is like a well’, says the priest. ‘Its outermost layers are accessible to every person, but the deeper we go, the darker it gets, and the more light is needed to be able to see something. In theology, this is called the light of Christian revelation that flows from the word of God. The deepest dimensions of spirituality can only be discovered through faith. The depths are thus reached through faith in God, while the outer layers are grasped by reason. It is in these deepest spaces of spirituality that we discover the truth about life being a gift from God, and that a happy eternal life is destined to us’.

A holistic approach to the patient, especially those terminally ill, also includes spiritual care and covers both purely humanistic and theological dimensions. It consists of being continuously there for them, talking about the meaning of life, transience, and passing away, supporting them in the last moments of their lives, and helping them face what they find difficult to come to terms with: the mistakes they made and the feelings of guilt, or even helping them to reconcile with those with whom they have lived in conflict. Some experiences can live in a person’s mind for decades. They lead to an inner struggle and refusal to accept what has happened. Faith very often comes into focus for people experiencing illness and suffering: sometimes it awakens and intensifies.

‘Being with a terminally ill person, including the presence of a priest, often leads to an inner reconciliation with God, with themselves, and with their close ones. Sometimes a person needs a little help to open up, to throw off the discord that they have carried inside them for so many years, and to achieve inner peace. This is the moment when the quality of life improves considerably because the burden that has been carried for a long time finally gets lifted away’, says Father Antoni Bartoszek. ‘And to return for a moment to people with disabilities, I would say that we also try to take a holistic approach to the people we care for at our centre. We take care of physical rehabilitation and social integration. Special Olympics are very important to us. We try to develop our patients’ spirituality, especially through various forms of art therapy, as well as in a theological sense – by caring for their religious life’.

Today’s efforts to have the best possible quality of life are commendable. Concern for health is fundamental. However, we should also keep in mind the deeper dimensions of humanity. By discovering – through faith – the most profound areas of spirituality, it is possible to find the most fundamental meaning of life, even in the face of illness, suffering, and disability.



Spirituality often only becomes particularly significant when facing the terminal phase in a person’s life

The concept of quality can have multiple meanings (...)
The question is: what factors should be taken into account in order to judge whether someone is happy and what is their quality of life? Is it health, income, frequent travel or a loving family’?

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