



Ukrainian science in the context of its anticolonial struggle

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ABSTRACT

The current Special Issue entitled “Highlights of Ukrainian Molecular Biosciences” is dedicated to presenting recent contributions in the areas of biochemistry and biophysics, molecular biology and genetics, molecular and cellular physiology, and physical chemistry of biological macromolecules made by researchers either currently working in Ukraine or those who have obtained their training in Ukrainian institutions. Obviously, such a collection can present only a small sample of relevant studies, making the editorial task a particular challenge, as inevitably many deserving research groups were missed. In addition, we are greatly sorrowed that some of the invitees were unable to contribute due to the continued bombardments and military attacks perpetrated by Russia in Ukraine since 2014, and especially in 2022. This Introduction is also intended to provide a broader context for understanding of Ukraine’s decolonization struggle, both in science and on the battlefield, and outlines suggestions for the global scientific community.

This Special Issue of BBA Advances, entitled “Highlights of Ukrainian Molecular Biosciences”, contains 7 original experimental reports, 12 topical reviews and two commentaries [1,2], representing research groups from Ukraine (with several authors making their submissions from Poland and Denmark, as refugees), Germany, the UK, and the US. The authors represent several generations of scientists, with former students and mentors presenting their independent studies. Included among the authors are recipients of various prestigious international awards, including the Gregorio Weber Award in Biological Fluorescence and the Hans Neurath Award in Protein Science. The submissions cover a wide area of subjects, ranging from regulation of translation [3,4] and gene activation [5] to protein-membrane interactions [6,7] and cellular signaling [2,8-11]; from biotechnology [12,13] to structure-function studies of proteins [14-16], nucleic acids [17] carbohydrates [18] and phosphoglycolipids [19]. The contributions to this issue also cover a broad spectrum of experimental and theoretical approaches, including photochemistry and biochemistry of proton transfer reactions [20,21], quantum chemical modeling [17] and theoretical and experimental exploration of complex spectroscopic responses of amyloids [6]. The presented works clearly demonstrate high level of technical rigor and scientific excellence of Ukrainian researchers in many areas of basic and translational Biosciences.

We are particularly grateful to the Editors of the BBA family of journals for this opportunity to feature the scientific contributions of Ukraine and its people, and we hope this collection will play a role in both a scientific and larger social context. The excellent manuscripts

collected here will speak for the former aspect, and the task addressed in this introduction is to provide some social and historical context to Ukrainian science as an enterprise. (A more personal account, from the author’s three decades of an academic career in the US, can be found here: *Ladokhin A.S., Tragedy and Triumph of Ukraine, Biophysical Society Bulletin*, May 2022 <https://biophysics.cld.bz/Biophysical-Society-Bulletin-May-2022/9/> and here: *Ladokhin A.S., Ukrainian Science in the Context of Decolonization: A personal perspective for the benefit of the international science community* <https://shevchenko.org/research-publications/op-ed-pieces/ukrainian-science-in-the-context-of-decolonization/>).

I hope that the following writing will convince the readership of BBA that the continuing anti-colonial struggle of Ukrainian scientists goes far beyond resistance to the general hardship that oppressive regimes impose on the scientific enterprise. Instead, the thriving scientific and cultural scenery in Ukraine is an effective way of defeating the Kremlin’s genocidal policies that are specifically aimed at undermining Ukrainian identity.

1. Hijacking of Ukrainian science by imperial powers

Do you know any Ukrainian scientists from the late 19th to early 20th centuries? Chances are you do, yet you probably do not know they were from Ukraine, were educated in Ukraine and/or made their career in Ukraine (hint—think of the Voronoi or Jablonski diagrams, periodic table of elements, invention of helicopters, and design of the first man-

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carrying space rocket). This is not surprising, given that many imperial powers regularly took credit for Ukrainian achievements, and, in the case of Russia, denied the very existence of Ukrainian identity, banning the use of the Ukrainian language at all levels of education. The Soviet Union largely continued this tradition of tight colonial control in all spheres of cultural life using the tools of selective executions of Ukrainian intelligentsia (tens of thousands of victims), mass deportations of people from all classes to Siberia (several hundred thousand households moved from Ukraine), and genocide via man-created starvation known as *Holodomor* (four million victims died in Ukraine between 1932 and 1934). Another means of wiping out cultural identity was the Russification campaign, which was particularly severe in Ukraine from a period after World War II through the early 1980s. While these are all well-established, historical facts, audiences in the West and Global South may not be aware of them nor appreciate the significance of the 2014 Russian occupation of Crimean and parts of the Donetsk and Luhansk regions, which amounted to the beginning of colonial war of aggression by Russia.

The two historical perspectives, written by prominent Ukrainian scientists for this Special Issue, present a clear view of the double jeopardy imposed upon the biological sciences in Ukraine under the Soviet imperial rule [1,2]. First, all sciences that had no clear and immediate application to warfare had a third-tier funding across the Soviet Union. Second, the situation in Ukraine was particularly dire, given its remoteness to the site of political power, Moscow, where policy and financial decisions were made.

2. Western acquiescence to Russian colonial aggression in Ukraine

Over the past century, both Western journalism at large, and scientific journalism in particular, have enabled Russian imperial actions in Ukraine.

2.1. Russian genocide in Ukraine in 1930s

The genocide of Ukrainian people by Stalin's enforcers, known as *Holodomor*, took the lives of 4–6 million people in 1932–33. This was the time when the US recognized the USSR and, along with other Western powers, profited from collaboration with Stalin. To ensure that the Western public knew nothing of these crimes, Walter Duranty, the Moscow bureau chief of *The New York Times*, engaged in a cover-up, suppressing the eyewitness testimonies of a few honest journalists, like Gareth Jones. While Duranty was rewarded for his betrayal of journalistic integrity with a Pulitzer Prize, Gareth Jones "disappeared on assignment" to Inner Mongolia in 1935. Remarkably, even after Duranty's actions were fully exposed in the 1990s, the Pulitzer Prize committee refused to withdraw the award. (For more on Stalin's genocide in Ukraine, listen to the lectures of Prof. Timothy Snyder freely available on YouTube channel of Yale University and read his books "**Bloodlands: Europe Between Hitler and Stalin**")

2.2. Russian invasion of Ukraine of 2014: how western academia fell for Russian propaganda

The decade that followed the 2014 annexation of Crimea and continuous aggression in Eastern Ukraine by Russia was largely ignored by the West, reminiscent of the non-reporting on Stalin's genocide in Ukraine in the 1930s (see Section 2.1). As a result, the West's relationship with Putin was "re-set", just in time to coincide with sky-rocketing oil- and gas-generated revenues. As a result, instead of exporting democracy to Russia, the West imported corruption, with Russian funds going to the pockets of political heavyweight EU and US lobbyists, providing electoral funds for both extreme left-wing and extreme right-wing political parties and movements inside Western democracies, and supporting the creation of a network of "research" institutions,

specializing in what is now referred to as "toxic Russian propaganda" (For details see <https://antac.org.ua/en/news/ban-kremlin-agents-and-toxic-russian-propaganda/>).

The best-known example was an Orwellian misrepresentation of the Russian occupation of Ukrainian lands by the scientific community, illustrated by the news feature entitled "Out in the cold" in the journal *Science* (2016 April 8, p 140–141). Not only did the editors of *Science* send a correspondent to enter Ukraine illegally via the Russian Federation, but they inexplicably placed the resulting news article on Crimea under their "Science in Russia" collection. We have presented our analysis of this article in the context of the Kremlin's propaganda machinery in a Letter to the Editor, signed by nearly 150 scientists worldwide, "Crimea report leaves readers in the cold" [22]. This had a modest impact, successfully coaxing a single-line apology from the Editor of *Science*. It is a point of fact that the "Out in the cold" feature published by *Science* basically reiterated the main points of Kremlin's propaganda "justifying" Russian invasion of Ukraine. Moreover, the *Science* article implied a phantasmagorical claim to justify removal of Western sanctions on Russia-occupied Crimea: allowing scientists to monitor "dangerous near-Earth asteroids" threatening the world. Of course, the reality is that the Russian military threatens the world, and Crimea served as a military staging ground for attacking Ukraine in 2022. We have published our detailed analysis of the Putin's policy of weaponization of science and culture in the E-letter, accompanying our 2016 publication [22]: entitled, "'Out in the cold' and Kremlin's weaponization of culture" now available at https://ukrainet.eu/wp-content/uploads/2023/03/2016_Kremlin_and_Weaponization_of_Culture.pdf.

2.3. The international scientific community must not buy into the Russian propaganda

The next goal of Russian propaganda appears to be directed at undermining the resolve of the West by speculating on the needs of regular members of society. This can be clearly seen in the attempts to reframe this aggression as "Putin's war", not as a military assault carried out on his orders by hundreds of thousands of Russian soldiers with most of Russian society showing either enthusiastic support or silent acquiescence. The natural assumption in the West is to treat scientists in Russia as a default opposition to the Kremlin regime. This is a mistake! Not only is a large part of Russia's research community directly involved in the military effort, but the overwhelming majority of Russian society at large, including academia, shares the imperial delusions that led to the invasion of Ukraine (for more see *Ladokhin A.S., Ukrainian Science in the Context of Decolonization: A personal perspective for the benefit of the international science community* <https://shevchenko.org/research-publications/op-ed-pieces/ukrainian-science-in-the-context-of-decolonization/>; and Bazality et al., **Ukraine: don't relax scientific sanctions against Russia**, [23]; and the Open Letter "**Ban Kremlin agents and toxic Russian propaganda**" https://antac.org.ua/en/news/ban-kremlin-agents-and-toxic-russian-propaganda). Future historians will be dissecting this phenomenon, which probably originates from a failure to provide a real de-Stalinization of Russian society, in a manner similar to the de-Nazification of the German society after World War II. This goal is still obtainable but would require winning the war on the battlefields of Ukraine, the devastation of the aggressor's economy, and holding war criminals and their enablers accountable in international criminal courts.

3. What should the scientists in the democracies of the West and the Global South do?

My first suggestion for the international scientific community is: take a long look in the mirror. What will you see? A corruption of Putin's friends in the EU and the US? A self-serving betrayal of democracy by authoritarians in India and Latin America? An arrogant ignorance of the journalistic failures of preeminent scientific publications? I hope that



Fig. 1. Ukrainian academia and the ongoing colonial war. (A) Firefighters work to extinguish a fire at the Kharkiv National University, Kharkiv, Ukraine after Russian shelling. March 2, 2022. REUTERS/Oleksandr Lapshyn. (B) Ukrainian professor Dr. Fedir Sandor is teaching an undergraduate class for Uzhhorod National University (Uzhhorod, Ukraine) over zoom from the trenches during the break from fending off Russian invasion of Ukraine. May or June 2022.

instead, the readers will see themselves as brave and steadfast colleagues and supporters of the contributors to this Special Issue. I fear that, as Tolkien's characters, the readers might also see the reflections of their own possible future in the current reality of Ukrainian scientists, which is illustrated in Fig. 1. To prevent such a terrible possibility, the international scientific community must realize that now is the time to take sides and abandon the delusions that the Kremlin is not attacking YOU (and the entire civilized world), both in the cyberspace and on the battlefields of Ukraine.

To help Ukraine resist Russian imperial aggression, we call upon the academic and research institutions of the democratic world to join the economic and financial sanctions against the aggressors. No more business as usual, no more invitations to international conferences and programs for the aggressors. We call upon the scientific journals to enforce the compliance of all their Contributors, Reviewers and Editorial Board members with the stated ethical code of conduct common to all publishers. Obviously, we are not asking to ban all scientific publications by Russian scientists. Instead, we request that their submissions be accompanied by a clear and explicit public statement condemning imperial aggression against Ukraine, and that failure to provide such a statement disqualifies the submission on the grounds of violating the publisher's code of ethical conduct. We call upon every democratic institution and individual scientist to make a calculated decision to help Ukraine, engaged with their conscience and with the knowledge that the liberty of individuals and nations depends upon the choice they make.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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