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Analytical chemistry and bioanalytical chemistry – an unshaped social relationship

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The title Analytical and Bioanalytical Chemistry (ABC) represents a trend that has been observed in several important analytical chemistry journals: more and more papers on research in bioanalytical chemistry are being published in traditional analytical chemistry journals. For an outsider this might be seen as evidence of the attraction of more and more analytical chemists to bioanalytical topics. However, a more thorough investigation does not fully support this observation. Many authors of bioanalytical papers in the traditional analytical journals come from outside of the traditional analytical chemistry community. This has led the Division of Analytical Chemistry (DAC) within the European Association for Chemical and Molecular Sciences (EuCheMS) to set up a study group to investigate the reasons for this phenomenon.

The first thing to clarify is a broad definition of bioanalytical chemistry. This is far from easy because the term has been used for a variety of fields. Analytical chemists tend to think that bioanalytical chemistry is a science devoted partly to the chemical analysis of biological systems/analytes and partly to the application of tools derived from biology to other branches of analytical chemistry. A different, much narrower definition has been used for some time in the pharmaceutical industry, where bioanalysis is the name for the biological testing of pharmaceuticals, *e.g.*, in bioequivalence studies. Then there is a huge field, clinical chemistry, which might be considered as a subdivision of bioanalytical chemistry, but has developed in its own way and remains a distinct field.

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The uncertainty surrounding the definition of bioanalytical chemistry is reflected in the social aspects of this science, which appears to be very fragmented and geographically unevenly distributed. A survey of some prominent bioanalytical chemists showed that researchers in this area are not so well organised socially as analytical chemists have traditionally been. They have societies and meetings devoted to sub-fields of bioanalysis, *e.g.*, proteomics analysis or, specifically, mass spectrometry in proteomics, but a broader community does not seem to have formed. The geographical distribution of authors of bioanalytical papers published in analytical chemistry journals appears to be biased towards a few countries. For example, in two recent issues of the Analyst (10 and 11 in 2010), twenty-two bioanalytical papers were published (this number having been established by a somewhat subjective classification) and only two of them were authored from Europe. While this is a single example, the impression has been obtained that there is a preponderance of US compared with European contributors in this field. A good service to the community has been, *e.g.*, to profile many European authors in recent bioanalytical thematic issues of ABC 391(5) and 398(6).

Who are the scientists doing bioanalytical research? When browsing the affiliations the authors of bioanalytical papers published in analytical journals, familiar sounding names of departments and industries that have been strongholds of analytical chemistry are rarely found. There are naturally many authors coming from institutions devoted to biology and biochemistry, and pharmaceutical chemists appear to play an important role. This might be due to their training, which is a suitable mix of biology and chemistry.

The observations made above quite naturally raise the question: should the two, apparently only slightly overlapping communities of analytical and bioanalytical chemists, who are now sharing the pages of many analytical journals, be brought closer together in a more personal way? Can these communities understand each other and offer something that is mutually beneficial? At this moment, the answers are unknown. The DAC of EuCheMS has been promoting the social mixing of these scientists by encouraging the organizers of its meetings, particularly traditional Euroanalysis meetings, to organize bioanalytical sessions. The last Euroanalysis meeting in Innsbruck, Austria,[1] attracted many bioanalytical presentations and it is hoped this will also be the case in Belgrade, Serbia, in 2011.[2]

What can the two communities offer each other? Biology has undergone a revolution in the last two decades. It has been transformed from a phenomena-descriptive science to a much more measurement result-based science. Biological studies have enriched science with many new ideas, which are potentially very useful within the analytical chemistry community. It should not be forgotten that some of the most important tools of analytical chemistry of today came from

biological laboratories, *e.g.*, chromatography, immunoassays and enzymatic methods. Analytical chemists can offer from their side basic concepts and approaches for qualitative and quantitative analysis, including vast experience in metrology and quality assurance. These include the establishment of more universal and sustainable reference systems, approaches to calibration and estimation of measurement uncertainty. In this respect, one should mention the important role of metrological institutes (such as NIST in the US, LGC in the UK, and IRMM for the EU) that have also embraced with great enthusiasm the issue of quality assurance in bioanalytical assays. It is useful to note here that the science of analytical chemistry developed into a distinct discipline within chemistry when – following the explosive development of chemistry at the turn of the 19th and the 20th century – many chemists devoted their research efforts to the realisation of precise and reliable chemical quantification. A similar development may be needed in the wake of the biological revolution.

If the two communities are to meet for their mutual benefit, there is a clear obstacle to be overcome: analytical chemists need to be better trained in biology and biochemistry while those already in the profession should pay more attention to the rapid progress of biological sciences. In some sub-fields of analytical chemistry, this was not a problem, *e.g.*, in food analysis, where such an education has always been a necessity. The education of biochemists would also certainly benefit from courses given by traditional analytical chemists.

When underlining the importance of bringing analytical chemists and biochemists closer together, it should not be forgotten that bioanalysis is not restricted to these two communities. Physicists are making important contributions, *e.g.*, by providing novel optical tools for biosensors. Engineers and medical doctors play a crucial role in, *e.g.*, developing point of care devices. Fellow chemists should also be mentioned, *e.g.*, for the creation of various nanoparticles and biomimetic systems. The long experience of analytical chemists as team players will help us to integrate the efforts of all these groups of scientists.

The annual reports of the Bioanalytics study group of the EuCheMS-DAC can be found at the DAC website.[3] The 2010 report includes a non-exhaustive list of bioanalytical scientists from Europe to help with the identification of this community. Comments about this list and the DAC reports are welcome and should be addressed to George Horvai (george.horvai@mail.bme.hu).

Information from the EuCheMS Division of Analytical Chemistry

Euroanalysis 16 is the main DAC event of 2011. Slavica Ražić is the Chairman of Euroanalysis 16,[2] to be held in Belgrade, Serbia, 11–15 September 2011. The international year of chemistry will be celebrated at Euroanalysis 16, thus promoting chemistry to young students.

Euroanalysis 17 is planned for Warsaw, Poland, in 2013.

The Robert Kellner Lecture (RKL), generously sponsored by Springer Publishers, was awarded to Jonas Bergquist of Uppsala University who will give his lecture at Euroanalysis 16.

The Chairman of the DAC retired from office at the end of 2010 and Paul Worsfold was elected as the new Chairman by the Delegates at the Annual Meeting in Nuremberg on Sunday, August 29, 2010. The EuCheMS-DAC congratulates Paul Worsfold and supports his plans for inviting Delegates to participate in making the DAC more visible by contributing to newsletters, supporting Study Groups and Task Forces, establishing scientific and social networks and maintaining Euroanalysis as the number one DAC event. Bo Karlberg and George Horvai retired from the Steering Committee (StC) but will continue to participate as Delegates. Jiri Barek and Slavica Ražić were appointed as new Members of the StC. The Members Wolfgang Buchberger, Paul Worsfold (Chairman) and Jens Andersen (Secretary) complete the StC for 2011.

The DAC has appointed liaison persons to other EuCheMS Divisions: Education (Reiner Salzer), Food (Bo Karlberg), Environment (Gemma Rauret), Electrochemistry (Luigia Sabbatini), Computational Chemistry (Maria Filomena Camoes and Bo Karlberg) and Life Sciences (George Horvai), while Jan Labuda is the liaison person to the IUPAC. Nominations for liaison representatives at other EuCheMS Divisions are welcome.

The Delegates of the DAC are also organized in Task Forces and Study Groups. A single Task Force entitled “Opportunities for Analytical Chemistry” is currently initiated while other matters of importance to the DAC remain in the custody of the five Study Groups Education, History, Quality Assurance, Bioanalytics and European Analytical Chemistry on the Web.

The Study Group on Quality Assurance also considers the development of Metrology where Hendrik Emons reported that a large EU programme in Metrology has commenced, with a budget of 400 M Euros over 7 years.

Additional matters arising: the journal Analytical and Bioanalytical Chemistry is considering publishing a special issue on GMO analysis. It was proposed a separate list be prepared with the names of potential conferences in the field of Bioanalysis.

The DAC is looking forward to seeing you in Belgrade!

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REFERENCES

1. www.euroanalysis2009.at/
2. www.euroanalysis2011.rs/
3. www.dac-euchems.org/reports/bioanalytics