



International Society on Aptamers

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EDITORIAL



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Keep in touch

<http://aptamersociety.org>
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Welcome to the second newsletter of 2019. I hope you all had a good few months since the last newsletter, and if you travelled to the conference in Oxford in April, that you arrived home safely. You will find more on our symposium on page 2, but I can tell you that Nebojsa Janjic will be our symposium chair for 2020, which I am really excited about. Enter 1st and 2nd April 2020 into your diaries and keep up to date at <http://libpubmedia.co.uk/aptamers-2020>.

You also see on page 3, an update from the AGM and I would like to hear some of your views on where we go in the future as a Society and how we all keep in touch to help one another. You'll see on page 4 an article from a new contributor and I'm sure you've all been in this position. I've added my thoughts and additional comments on page 5. If you'd like to contribute an article, please get in touch. We also have our recently published aptamers section on page 6 – if we've missed one, let us know.

As a final note, have you liked our Facebook page? We are currently providing links to new aptamer research papers on a daily basis. Don't have time to keep up to date on current literature? Get our daily updates in your morning newsfeed at <https://www.facebook.com/AptaSoc>. Please don't forget to also follow us on twitter (@Aptamer Society, @Japtamers).

May you all have a great few months and enjoy reading the rest of this newsletter!

Dr Sarah Shigdar
President





From the Editor

If you have anything you would like to see in the next issue of the INSOAP newsletter, send it directly to sarah.shigdar@deakin.edu.au.

Aptamers Journal

We announced the official journal of INSOAP at Aptamers 2017. Please email us at aptasoc@gmail.com or JAptamers@gmail.com to express your interest in joining the editorial or reviewer team. Please see <http://www.JAptamers.co.uk> to submit your article.

Aptamers 2019 Symposium

Web: <http://libpubmedia.co.uk/aptamers-2019>

Twitter: @AptamerSociety; @JAptamers; #AptaOx19

Email: AptamersOxford@gmail.com



We would like to thank our Symposium Chair, Gunter Mayer, for putting together a fantastic program for this year. We had a great representation of researchers from around the world, with presenters from Australia, Belgium, Canada, China, Cyprus, France, Germany, India, Italy, Japan, Qatar, Russia, South Africa, Spain, Switzerland, Turkey, UK, Uruguay, and USA (~40% PIs/postdocs, 25% students, and 35% from the industry)! A wide range of topics were covered in 25+ oral presentations, 15+ flash-talks and 45+ posters. You can see the full conference proceedings at <http://japtamers.co.uk/aptamers-2019-a-conference-update>. As you can imagine, it was a difficult job for the judges to choose the best posters and flash talks out of a stellar line up, but congratulations to our flash talk winners Nico Dreymann (Germany), Benat Olave (Spain), and Sladjana Slavkovic (Canada), and our poster award winners Kevin M Cheung (UCLA), Robert Hale (GlaxoSmithKline) and Wiebke Sabrowski (Fraunhofer Institute for Cell Therapy and Immunology).



Our flask talk (left) and poster (right) award winners with Dr Maureen McKeague, Dr Sarah Shigdar, and Professor Dr Gunter Mayer.

As well as the scientific program, we also held our Annual General Meeting and a discussion on the Consortium before breaking for the conference dinner. We would like to thank our sponsors for their generous support, making this meeting possible.





Update from the Annual General Meeting of INSOAP

Sarah Shigdar

We held the AGM directly after the scientific agenda and poster session finished on the first day of the conference, prior to the conference dinner. We had a good turn-out, with about a third of conference attendees joining the discussion. One of the first topics we discussed was how to bring members of the Society closer together. Social media is obviously the answer but which modality works best for people? The Facebook page has been active for several years now and we have over 250 followers, though there is very limited interaction on the page. There is a core group of people who 'like' the abstracts released daily though we know a good number of people see the posts. Quite a number of people suggested more discussion would occur on LinkedIn – we have 142 members in our LinkedIn group at the moment. Would you be more likely to comment or add to the discussion there? For us to build the Society, we really do need input and involvement from more people. We need to start encouraging our PhD students and ECRs to participate and ask questions. We can also use this forum to add new sessions or new formats to the conference. This is a good segue to the next topic we discussed. The short poster presentations have been held for two years now and are definitely a hit with both the presenters and the audience. Next year we are hoping to add a panel discussion on where the field is advancing to, and I think this will be a really good addition. How to fit this into the program was also discussed and the two options were to either have a welcome session the night prior to the conference, or to extend the conference. Both options are viable and we will have further discussions leading up to the release of the final conference program. We will also be likely moving the poster session to a different location to provide more manoeuvring room.

We also discussed the Aptamer Consortium, that we announced in the first newsletter of the year (and that I've kept in this newsletter). We know that one of the issues in research is reproducibility and this is not helped by information lacking in publications, which then leads to the inability to replicate data. Between that and a lack of suitable protocols and/or knowledge in the larger scientific community, there are many researchers that may want to use aptamers but don't know how to, or have tried and failed. Therefore, the first thing we, as a Consortium, are going to work on is aptamer validation and the requirements for publication which we hope will become the gold standard for authors and reviewers.

As we are a fairly small society at the moment, all input is welcome and the only way we will grow is to spend time to engage with our colleagues on social media platforms in between conferences. We welcome your comments on any of the platforms that we can be contacted on.

We all know about aptamer research, how about them?

Ka Lok Hong, Nesbitt School of Pharmacy, Wilkes University

To begin this article, I would first like to thank Dr Shigdar, who has given me this opportunity to express my opinion on aptamer research. As a young researcher myself, securing research funding early is often very crucial for career development. I would like to share some of my personal opinion and experience in pursuing funding for aptamer research in academia, particularly as a young faculty member in the United States.

Almost three decades of aptamer research has happened since the first two aptamer papers published independently by the Gold group and the Szostak group. Since then, many more aptamer research groups have emerged in academia worldwide, and a number of research groups have been very successful and impactful to the field. When I look at aptamer researchers' university department affiliations, I observe a wide variety of disciplines. It includes basic life sciences, engineering, and health sciences. This suggests aptamer researchers have the flexibility to conduct their research in a wide variety of subject areas. In fact, the aptamer community generally agrees that the screening of aptamer itself can be directed to virtually any molecules, cells, or substances. The application of aptamer itself determines the actual field of research. Therefore, it appears that aptamer researchers can have a wide range of opportunity



to peruse research funding in multiple disciplines. This is a huge “upper-hand” almost all aptamer researchers can share.

When I take a quick glance of the recently published aptamer listed prepared by Dr McKeague in the last INSOAP newsletter. The targets can generally be broken down into two categories, 1) therapeutics/ human health-related, and 2) environmental related. Health sciences or therapeutic application of aptamer remains to be the major area of aptamer research. I recently had a quick conversation with Dr Maria DeRosa from Carleton University (Canada) at the American Chemical Society national meeting in March. Dr DeRosa shared her past experience in how difficult it was to get research funding in health-related aptamer research as a young faculty. This message quickly resonated in my mind. “Yes, it is so true!”

As I mentioned previously, even though we are moving into the third decade of aptamer research, the term “aptamer” is still relatively unheard by many scientific minds. In my most recent starter grant submission to a pharmacy school-related organization, where all reviewers are scientists affiliated with U.S. pharmacy schools. I received both very favorable and very critical comments from the grant reviewers. One of the most disheartening comments I received was related to the reviewer underappreciation on the concept of nucleic acids aptamers. I have to admit that I need to do a better job in explaining what aptamer is on my next grant submission. On the other hand, it also appears only very few pharmaceutical scientists know about aptamer, even though Macugen for macular degeneration has been on the market for 14 years. This lack of understanding in aptamer phenomenon is more often encountered during research manuscript submissions. However, unlike being requested for a “major revision” in a manuscript submission, there are often little to no chances for a rebuttal in a grant submission, at least not until the next funding cycle. I am unsure if aptamer is more widely known in other fields of research. However, I am not entirely optimistic when aptamer is still not well appreciated in the health sciences field where aptamer is mostly heavily investigated.

I believe as the aptamer research field is moving into its third decade, some of us or our students need to walk out of our laboratory more often than in the past. At the professional level, PIs and students can participate in more conferences hosted by a diverse group of organizations. At a more non-professional level, I personally have plans to reach out to my local high schools to give non-technical talks on what aptamer is. I have found that explaining aptamer and aptamer selection is not exactly difficult to the audiences with a very basic understanding of biology. It is only some forms of DNA and RNA. It is not rocket science. As my former graduate advisor, Dr. Letha Sooter often said, “To identify an aptamer is just like winning a lottery by buying all possible combinations!” With that in mind, I am sure a lot more people can understand and enjoy the concepts of aptamer in the near future.

Reply from the Editor

This is quite a timely article as I have had a similar experience though within the last month, I’ve had a couple of positive experiences with researchers outside the aptamer field. I attended the 10th Nanomedicine conference held in Sydney (with views of the Sydney Opera House and the Bridge) and there was a presentation from another researcher who has just started working with aptamers and is aware of other researchers in Australia starting to use aptamers as tools for various applications. Another encounter I had at the conference was from someone who had ordered aptamers a couple of years ago from a commercial company that provided some limited information but being new to aptamers, the researchers didn’t understand all the complexities or even the starting concentration or incubation time/temperature. Stay tuned to the Aptamers Journal for a technical article appearing soon. Though following our conversation they are now trying again after having shelved the research for two years. The final encounter I had was with a colleague who had worked in the US 10 years ago and asked if aptamers were still useful as they had appeared to lose their way. After I’d spent the next ten minutes talking about all the updates, he was impressed. So how do we continue to tackle the lack of knowledge in the wider scientific



community? I'd love to offer a 12 step plan. I had comments on a grant two years ago that aptamers were too novel and untested. I hope that the tide is changing and we will slowly start to see acceptance, especially when the results published speak for themselves. Until then, all we can do is continue to promote our research at conferences and in papers, and talk to other researchers.

INSOAP updated list of recently published aptamers

Maureen McKeague

Here are newly reported aptamers since our last issue (March 2019). We only report aptamers that have been characterized with a dissociation constant (Table 1). Typically, we make use of Pubmed to identify newly published aptamers with the keywords "aptamer" and "SELEX". If we have missed any newly reported aptamers, please let us know (maureen.mckeague@mcgill.ca). Readers should consult the literature (link provided) for verification and further information.

Table 1: Newly-reported aptamers published since our last issue (March 2019).

Link	Target	Nucleic acid type
https://www.ncbi.nlm.nih.gov/pubmed/30859598	<i>Vibrio alginolyticus</i>	DNA
https://www.ncbi.nlm.nih.gov/pubmed/30925703	poly(C)-binding protein 2	DNA & RNA
https://www.ncbi.nlm.nih.gov/pubmed/30952308	gastric Cancer cell line BGC-823	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31020784	glutamate dehydrogenase from <i>C. difficile</i>	DNA (circ)
https://www.ncbi.nlm.nih.gov/pubmed/31027736	ephedrine	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31036860	dexamethasone	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31040350	influenza virus subtypes H1N1 and H3N2	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31042376	histamine	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31080213	thrombin	Somamer
https://www.ncbi.nlm.nih.gov/pubmed/31083763	thrombin	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31089250	immature laminin receptor protein (OFA/iLRP)	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31103164	thrombin	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31099939	cyclic adenosine monophosphate	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31099246	dead cells	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31111537	$\alpha 4$ integrin	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31196711	MCF-7 human breast cancer cells	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31153018	salicylic acid	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31179688	glioma stem cells	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31179220	alkaline phosphatase heterodimers	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31141341	papillary thyroid carcinoma	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31215436	neutrophil gelatinase-associated lipocalin	DNA
https://www.ncbi.nlm.nih.gov/pubmed/31226519	integrin $\alpha 5\beta 1$	RNA
https://www.ncbi.nlm.nih.gov/pubmed/31289496	matrix metalloproteinase 14 (MMP14)	DNA

Nominations for INSOAP committee

We are currently asking for expressions of interest for membership of the management committee of INSOAP. If you would like to be an integral part of our Society as it moves forward, please contact me at sarah.shigdar@deakin.edu.au.



Updates to the website

We have been working on updating the website for INSOAP and you will now see that we have a listing of all aptamer companies throughout the world, as well as a listing of all the aptamer laboratories to date. If we haven't got you listed, please get in touch and we will add you to our growing list. We are also providing a careers page so please get in touch with any vacancies you wish to be listed. Finally, if there are any suggestions for improvements to the website, please contact us and we will make the changes.

Aptamer Consortium

Sarah Shigdar

One of issues that we've watched develop over the last few years is the reproducibility crisis that we first discussed in the June 2017 newsletter. At the time we suggested that aptamers could fix some of the issues of reproducibility by providing a more reliable tool for applications. The next step in this process is to develop best practice guidelines for the publication of research articles describing the generation of aptamers and their use in specific applications. To that end, within the Society, we have been discussing the need for a small group of researchers to come together from both Academia and Industry to work on these guidelines. Our Mission Statement, while still a work in progress, states:

'The Aptamer Consortium supports researchers, academic institutions, and partners, to promote best practice for aptamer techniques in both diagnostics and therapeutics, to provide guidance for basic and applied research as well as development and commercialisation, and facilitate discussion and interchange of ideas.'

If you are interested in sharing your views on the Consortium, please email me (sarah.shigdar@deakin.edu.au).

Aptamers 2020 Keynote Speaker



We are delighted and honoured that Dr Larry Gold - the inventor of SELEX process in 1989 - will deliver a keynote address at Aptamers 2020 at Oxford. He will also receive a Lifetime Achievement Award at the symposium. Dr Gold is an eminent, internationally recognised scientist whose research at the University of Colorado Boulder (USA) has resulted in numerous discoveries, commercially successful biotechnology patents and companies.

Dr Larry Gold is the Founder and Chairman of the Board, and former CEO of SomaLogic. Prior to SomaLogic, he also founded and was the Chairman of NeXagen, Inc., which later became NeXstar Pharmaceuticals, Inc. In 1999, NeXstar merged with Gilead Sciences, Inc. to form a global organization committed to the discovery, development and commercialization of novel products that treat infectious diseases.

During his nearly 10 years at NeXstar, Dr Gold held numerous executive positions including Chairman of the Board, Executive Vice President of R&D, and Chief Science Officer. Before forming NeXagen, he also co-founded and served as Co-Director of Research at Synergen, Inc., a biotechnology company later acquired by Amgen, Inc. Dr Gold recently became the CEO of Lab79, a new biotech company in Boulder, Colorado.

Since 1970, Dr Gold has been a professor at the University of Colorado at Boulder. While at the University, he served as the Chairman of the Molecular, Cellular and Developmental Biology



Department from 1988 to 1992. Between 1995 and 2013, Dr Gold received the CU Distinguished Lectureship Award, the National Institutes of Health Merit Award, the Career Development Award, the Lifetime Achievement Award from the Colorado Biosciences Association, and the Chiron Prize for Biotechnology. Dr Gold was also awarded the 8th International Steven Hoogendijk Prize by the Dutch Batavian Society of Experimental Philosophy in 2018.

In addition, Dr Gold has been a member of the American Academy of Arts and Sciences since 1993 and the National Academy of Sciences since 1995. He is a fellow of the National Academy of Inventors. Dr Gold also serves on the Board of Directors for CompleGen, Plato BioPharma, Lab79, Keck Graduate Institute, and the Biological Sciences Curriculum Study.

Dr Gold established the Gold Lab at the University of Colorado Boulder in 1971. Starting with basic research on bacteria and bacteriophage, the lab shifted its focus to human disease following the invention of the SELEX process in 1989. The Gold Lab today focuses on the utilization of biological and information technology to improve healthcare. Dr Gold also began holding the GoldLab Symposia in 2010, an annual event that tackles big questions in healthcare (www.goldlabfoundation.org). He is determined to change healthcare for the better through teaching, research, and debate among scientists and citizens throughout the world.