



**International Maillard Reaction Society**

**IMARS**

***HIGHLIGHTS***

**Research Commentaries for the Members of  
The International Maillard Reaction Society**

*A Non-profit Research and Education Organization in Biomedicine and Food Science*

**Special edition:**

**Worldwide impact of the coronavirus on  
glycation research**

Preface by Prof Atta-ur-Rahman FRS.

**Volume 15**

**Number 4**

**July 2020**

## Worldwide impact of the coronavirus on glycation research



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### PREFACE

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## PREFACE

### Prof Atta-ur-Rahman FRS

The advent of the COVID-19 pandemic has had a profound impact on the world. The global disruption of life has no precedence of this magnitude. However, it has opened up new avenues of research into the behavior of the virus and triggered new drug development initiatives. I was appointed as the Chairman of the Prime Ministers Task Force on Science and Technology, and, over the last 3 months, we have initiated a number of interesting projects. The genome of the strain of COVID-19 found in Pakistan was sequenced (at the Jamilur Rahman Center for Genomics Research established by me in my father's name at University of Karachi) and it was found that mutations had occurred at 8 points in its structure. A "100 Genome" project has now been launched to determine the structure of various COVID-19 strains found in Pakistan.

We have also initiated a major program for clinical trials of various drugs in Pakistan. Over a dozen national institutions are involved. We have magnified national testing levels from 400 tests per day in March this year now to 32,000 tests per day. In this connection a major laboratory with BSL-3 facilities has been established within the Virology Research Center in our institute where about 2,000 tests are being carried out daily. We have also started a program for the local manufacture of ventilators in Pakistan. In addition, an agreement has been signed with a major international company by our Center to carry out clinical trials of a vaccine in Pakistan. The fact that all this has been accomplished within about 3 months indicates what can be achieved through an intensive focused effort of a group of committed scientists.

A feature of special scientific interest is the role of glycoproteins in its mechanism of action of COVID 19. An important first step is the attachment of the virus to the host human cell. This involves the binding of the transmembrane (S)-glycoprotein on the virus surface to the ACE2 receptor on the human cell. This virus-receptor binding affinity is under intensive study for development of ACE2 inhibitors as potential drugs. Vaccine development efforts are also focusing on the coronavirus transmembrane spike (S)-glycoprotein. Both the S-glycoprotein and ACE2 receptor are known to be extensively glycosylated, i.e. they contain covalently linked complex oligosaccharides called glycans. It is important to understand the role and mechanisms of glycosylation for the development of potential new treatments, including the development of new vaccines.

I am confident that with the intense pace of research, several exciting new drugs will soon become available to fight this global menace. What is more important is that the world should prepare itself for the next pandemic, so that our health systems are not caught unprepared, as happened on this occasion.

### Atta-ur-Rahman FRS

Professor Emeritus (International Centre for Chemical and Biological Sciences, University of Karachi, Karachi 75270, Pakistan; Chair, Pakistan Higher Education Commission, 2002 - 2008).

July 2020.

### Prof Paul J Thornalley - IMARS President

The pandemic of infection by SARS-CoV2 coronavirus and related COVID-19 disease developed from January 2020 whilst research in glycation research groups was progressing well with most unaware of the emerging global public health emergency. I travelled to Kanazawa, Japan, to speak at the International Symposium on Diabetes and Glycation Biology, 14<sup>th</sup> January 2020, organized by Professor Yasuhiko Yamamoto, Kanazawa University. There, I met many IMARS members, friends and colleagues. In 16<sup>th</sup> February, I made the short trip from Doha, Qatar, to Muscat, Oman, to speak at an international conference on Artificial Intelligence in Medicine on the application of algorithms with glycation adduct features for clinical diagnosis. The first case of COVID-19 in Qatar was confirmed on 27<sup>th</sup> February 2020. There were initially very few cases of COVID-19 in Qatar with a later increase to a peak of about 1,700 cases per day by late May. As I write, we appear to be on the downslope of incidence. We have had *ca.* 103,000 cases of COVID-19 in Qatar with, fortunately, very low mortality; 146 deaths in total. Clinical testing for COVID-19 is high – over 144,000 tests per million population. The low mortality may be linked to the age demographics – a high proportion of relatively young guest workers, early detection through clinical testing with tracking and tracing of contacts, and good clinical care. A further factor may be that elderly relatives are cared for in extended families in Qatar where decline in health is recognized early and clinical support sought promptly. Obesity and type 2 diabetes have emerged as risk factors for progression of COVID-19 to severe symptoms and are of high prevalence in Qatar. So, maintained public health measures to decrease coronavirus infection and transmission are important as we exit the national lockdown and return to the laboratory and office.

In Qatar Biomedical Research Institute (QBRI), we closed the laboratories on 12<sup>th</sup> March and switched to remote working. I have since had weekly remote meetings with my research team: PhD student, Maryam; and post-doctoral researchers – Patrick, Alberto and Ming. My research team have been working on data analysis for manuscripts and bioinformatics projects. I organize weekly meetings with the 7 research team leaders of QBRI Diabetes Research Center and attend meetings of QBRI Senior Management overseeing the contribution of QBRI to the national COVID-19 research and preparations for the return to laboratory working. In QBRI, we maintained laboratory activity on COVID-19 related diagnostics; as have the national leading virology research laboratories in Qatar University. QBRI researchers are working in clinical diagnostics laboratories and contributing to new efforts in COVID-19 related research. We plan for the return to full laboratory working in stages from July, with social distancing and safety measures to minimize coronavirus infection and transmission. I and my team are keen to return to laboratory working.

The COVID-19 pandemic is a generational challenge – the like of which we have never experienced before. I am heartened by the way the biomedical research community has come together and supported clinical diagnostic efforts and quickly re-focused to initiate projects to develop vaccines, treatments and preventive measures to counter the pandemic. There is a long way to go to control and eradicate SARS-CoV-2 but I am optimistic key advances will be made later this year. We look forward to the lifting of travel restrictions soon and, along with Professor Naila Rabbani (Qatar University), I expect to be able to welcome you to the 14<sup>th</sup> International Symposium on the Maillard Reaction, ISMR14, Doha, Qatar, in September 2021.



**View in lockdown:** flowers on the plumeria tree in our garden, Education City, Doha, Qatar.  
Paul J Thornalley, July 2020.

### **Dr Kim Maasen – Young AGERS**

In the Netherlands, the first case of the SARS-CoV2 virus was reported on 27<sup>th</sup> of February, although it was later reported that the virus was likely already present in the Netherlands before that. One of the Southern provinces was hit the most, probably catalyzed by the yearly celebration of the Dutch Carnival in February. Also, the Southern province of Limburg, where Maastricht is located, was one of the most affected areas of The Netherlands. In total, as I write, we have had close to 50,000 positive tested cases in The Netherlands, and 6,000 reported deaths. Testing facilities have been expanded, and from June 1<sup>st</sup>, everybody can request a test, also non-healthcare professionals.

On March 16<sup>th</sup>, we were all requested to work from home. At that time, we had just submitted our abstracts for the Young AGERS symposium that was planned to be held this year in Dresden. We were looking forward to meet up again after the edition we had hosted ourselves in Maastricht last year, and to head to the founding fathers of the symposium for the 5<sup>th</sup> edition. Unfortunately, this of course had to be postponed.

At our Department, chaired by Prof. Dr. Casper G. Schalkwijk, we soon started to miss the contact with the department and resumed our weekly meetings, but now via Zoom. This proved to be a good way to keep updated on what everybody was working on but, even more importantly, also a way of checking in and seeing how everybody was doing at home. With being the department of Internal Medicine, most of my fellow PhDs have a medical background, and they paused their research to work at the University Medical Centre for the time being. A conference center next to the university was transformed into an emergency hospital, in anticipation of a higher influx of patients. Luckily, this facility has never been used.

Restrictions are now being lifted slowly, and since a few weeks they resumed their research, albeit from home. The lab is slowly opening for limited numbers of people and new safety guidelines, and some aspects of patient work is scheduled to start off again in July. Interestingly, Maastricht University is running a large observational prospective population-based cohort study of 10,000 individuals, focusing on the etiology and complications of Type 2 Diabetes. New research proposals are currently submitted to investigate possible causes and consequences of the COVID-19 disease. The fact that the study population is 40-75 years and

enriched with type 2 diabetes patients, and the presence of extensive phenotyping data of this population generally considered more susceptible for the SARS-CoV2 virus, together with potential data on infection and disease symptoms can help to address new research questions

For me, since my research is mainly epidemiological, it seems that the home-office is going to be my habitat for a little while longer. Luckily, Dr. Jean Scheijen from our lab was able to finish the final measurements for our dietary dicarbonyl database, and I have been able to occupy myself with writing the paper.

In order to make this a place where I can spend the most of my time, my housemate and I decided to spend our weekends renovating the house – as most of the people in the Netherlands did, looking at the sky-rocketing sales of home-stores. In the meantime, all we can do is hope that a second wave will not occur and look forward to the time when we can resume our work at the lab again and meet up with fellow (young) AGERS again, virtually or in real-life!



**View in lockdown:** Using the time in lockdown to start long overdue renovations.

Kim Maasen, June 2020



**Prof Fred Tessier – FMARS**

The COVID-19 epidemic was reported in China in December 2019 and then spread around the world. Among the first European cases, in late January 2020, six were associated with a cluster of transmission in the French Alps. Like in many other European countries the COVID-19 reached the pandemic stage in France at the beginning of March 2020. In response, a travel ban, also called "confinement of the population" (lockdown in English), was enforced from March 17 to May 11, 2020.

In each University Hospital, our physician colleagues were of course fully involved in fighting SARS-CoV-2 but found time to maintain their research activity. For instance, a collaboration between the University of Lille, the Lille University Hospital, the Institut Pasteur de Lille, INSERM and the University Paris-Saclay created a scale estimating the relative risk

of being infected by SARS-CoV-2 and of dying from it, according to age, sex and body mass index (BMI). The COVID-SCORE applied to individuals without known comorbidities, and non-pregnant women. The COVID-SCORE is available on <https://www.covid-score.fr>. It ranged from <0.01 to 61.08. For example, a woman, aged 60 to 70 with a  $25 \leq \text{BMI} < 30$  had a COVID-SCORE of 1.0 corresponding to the mean risk of the population and a man aged 70 to 80 with a  $30 \leq \text{BMI} < 35$  had a COVID-SCORE of 7.0. The authors devised a simple five-colored scale (see figure below) and gave specific recommendations according to each risk color. This COVID-SCORE is a public health tool empowering individuals to make appropriate decisions for daily situations such as meeting family or having collective and work activities, in order to restore some serenity in a highly anxiety-inducing situation.



In all French Universities and institutes, the laboratories were closed on March 17. At the University of Lille, we halted all animal experiments and kept the minimum number of knockout animals in order to maintain their reproduction. Working from home became the only way to make progress in our research and to maintain a relationship between the members of the Francophone Maillard Reaction Society (FMaRS). Varying software for videoconferences such as TEAMS, ZOOM and SKYPE is becoming our best tool for lab. meetings, conferences, teaching and so forth, even after the end of the lockdown.

Three months before the pandemic four academic groups affiliated to FMaRS (The University of Lille, The University of Reims, and two graduate schools, UniLaSalle and Yncréa Hauts-de-France-HEI) started a 4-year scientific project named ExoAGEing. It is being sponsored by the French Agency for Research (ANR).



This project, coordinated by Prof. Philippe Gillery, aims to understand by which biological mechanisms perinatal or lifelong exposure to dietary AGEs contribute to the induction of chronic, low-grade inflammation and the occurrence of related chronic diseases. It has been dramatically slowed down by the closure of all the scientific facilities but our recent return to full laboratory working (with all the safety measures known to limit transmission), will allow scientists to resume normal activity.

Fred Tessier, June 2020

### Prof Ryoji Nagai – JMARS

**Current status of Japan under spreading of coronaviruses** - News about overseas coronavirus started to spread in Japan from approximately mid-January 2020 but the involvement of Japan in such an infectious disease related to an overseas event was hard to imagine at that time. My duties in supporting entrance exams and business trips in January went as planned. However, we suddenly realized that this disease-related problem reached our country as well, only after the Diamond Princess luxury liner, carrying a COVID-19 infected patient, arrived at the Yokohama port on February 3. At that moment, the cruise ship carried a total of 3,711 people consisting of 2,666 passengers and 1,045 crew members and the infection gradually spread to the crew members and passengers were quarantined on board.

Large cities have to handle the largest infected populations. For instance, on March 26, the number of newly registered infections in Tokyo exceeded 40/day for the first time and it reached over 100/day on April 4. Nevertheless, people continued to go out to work and play as, at that time, many of them believed that only the elderly could be infected with COVID-19. In March, there was a rush on masks and they went out of stock nationwide. At the same time, information started to spread about closing Chinese factories that produce toilet paper sold in Japan, leading to toilet paper shortage. This information was a complete hoax but the mass purchase of not only masks but also toilet paper began. The most recognizable event that made people realize the fear of the virus in Japan was the death of Ken Shimura, a famous comedian for all generations on March 29. With his death, the mood to refrain from going out suddenly increased. Although no lockdown was conducted in Japan, the **state of emergency** was announced in 7 prefectures including Tokyo and Osaka from April 7. Such a state of emergency spread throughout the country and was subsequently lifted in Tokyo, Saitama, Chiba, Kanagawa, and Hokkaido on May 25.

In Kumamoto, where we live, all business trips were suspended in February, and the private trip I planned at the end of March was also canceled. The first two infection cases were reported on February 22 in Kumamoto, and the number of infected people increased every day from March. The announcement of new infections has stopped after the last two cases on April 27, and at most one patient's day lasted for weeks.

Regarding the situation of our university, located in the southern part of Japan, both the graduation and the entrance ceremonies on March 19<sup>th</sup> and April 4<sup>th</sup> were canceled, respectively. Students were not allowed to enter the campus from April 4<sup>th</sup>, and online lectures started from May 11<sup>th</sup>. This restriction was lifted in stages, graduate and 4<sup>th</sup>-year undergraduate students thus returned to the campus on June 1 and June 22, respectively. However, the lectures are still live-streamed by Teams or video distribution, and we still do not know when this restriction would be completely lifted.

COVID-19 reminds us that we are in an imbalanced and artificially overcrowded situation in the urban areas. Similarly, after the Great East Japan Earthquake on March 11, 2011, hundreds of thousands of people became refugees who were not able to return home due to the suspension of public transportation in Tokyo, and the planned blackout subsequently trapped elderly people in high-rise buildings. Usually unnoticeable, though the occurrence of a disaster makes it clear that we are living in excess density beyond our biological limits. Overpopulation is vulnerable to disasters.

COVID-19 taught us that most meetings can be done online without having to travel. We believe that the social system will change significantly as online conferences and lectures spread further in the future. The other day, a board meeting of an academic conference was held, but more participants were present at the online meeting. From this event, I assume that online meeting may make it possible to reduce the overcrowding area at urban area. At the same time, since going out is self-restrained, there are fewer flu patients in Japan than usual. Perhaps the Japanese are originally immune to coronaviruses, although there are still infected people, the number of COVID-19-related deaths is approximately 1,000, which is below the average of other countries, and less than one-third of the annual influenza-related death cases in Japan. Coronaviruses could never be eradicated within half a year or a year. In order to restore the social system, it would be important to establish protocols to handle newly suspected infected patients effectively. We are currently restarting our research with a small number of people wearing faceguards. Wearing a faceguard could be slightly inconvenient but we are willing to do so if it allows us to safely restart our research.



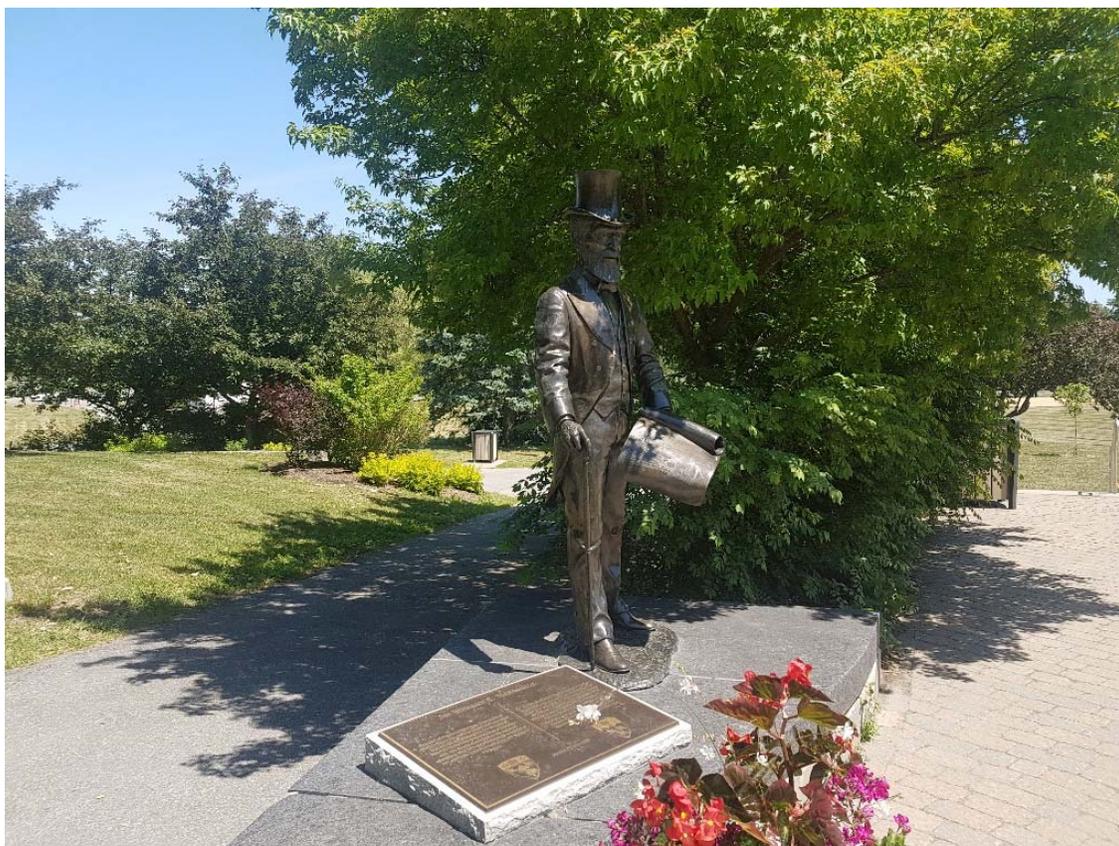
**View in lockdown:** Ryoji Nagai (right, back) and team in the laboratory with personal protective equipment.

Ryoji Nagai, Nana Katsuta, Hikari Sugawa, Rei-ichi Ohno, Mime Nagai, Laboratory of Food and Regulation Biology, Graduate School of Agriculture, Tokai University, Kumamoto, Japan, June 2020.

**Prof Varoujan Yaylayan – immediate IMARS past-President**

While the SARS coronavirus was lurking in the background, most researchers were caught unawares of what the future was holding for their research projects, potential students, scientific collaborations and acquisition of new facilities, when everything came to a sudden hold. All the classrooms at McGill University were empty, the campuses deserted, laboratories abandoned and if we were lucky, we had some accumulated raw data ready to be analyzed and converted into scientific literature. Good luck if you needed new data... Those of us who were teaching courses in the middle of the term, we had to suddenly acquire new teaching abilities of “on-line course delivery”, “on-line assessment” or “remote teaching”. Compounded by the stress or fear of infection, this additional burden left us working twice as much as our usual heavy load. Those of us in the University management had to submit to unending “Zoom” meetings to plan the unplannable, foresee the future of the academic year, to agree on what to communicate to the students, how to revamp a comeback, in addition to lengthy consultation meetings with our graduate students. After a frustrating academic term the students and staff were left equally unease in the face of the impending future that looked shaky on the Canadian horizon dotted with question marks and gloomy predictions.

In this post-pandemic world, we wish the 14<sup>th</sup> International Symposium on the Maillard Reaction (ISMR14) to become a reality in Doha, Qatar, sometimes in September 2021. Best wishes of success to Naila and Paul.



**View in lockdown:** Statue of the benefactor of Macdonald Campus, McGill University.

Varoujan Yaylayan, June 2020.

**Prof Vincent Monnier** – founding IMARS President

Great initiative Paul! The COVID-19 lockdown in the State of Ohio started on March 20. At the time there were ~50 new cases/day. Case Western Reserve University diligently followed the orders of the State and established a list of “essential” vs. “non-essential” workers, implying that the essential workers were allowed to work on premise. Ever since, all teaching, research and thesis defense lectures, as well as our weekly lab meetings and social events are taking place as Zoom sessions. As of May 31, partial State and University reopening is taking place, whereby outdoor and indoor dining and shopping is cautiously reintroduced. Personally, I welcome the reopening of gyms though people are not disciplined in terms of wearing masks. So, experts are expecting no further improvement in drop of new cases (Ohio death rate 215, compared to USA 354, Germany 106, Qatar 25). Today we have 441 new cases/day, unchanged for the past 30 days. There are huge political pressures and lawsuits to reopen, and civil unrest about the George Floyd racial incident, as you well know.

At this time, most students are off site and only postdocs and previously hired lab staff are allowed to work. Administrators are working remote and are quite responsive to our needs. The University has introduced a Return to Work algorithm with mandatory wearing of masks, uncrowded benches, prepacked meals at the Cafeteria etc. Since most summer students are not allowed before August 1, I had to transform a wet glycation project into a remote one. It turned out to be very useful in that Michael Do, a gifted medical school student, is getting fascinating results with molecular docking of aggregation inhibitors of gamma crystallins as a novel paradigm for the prevention of age-related cataract. We are deeply involved in repurposing of FDA approved drugs for the cataract field. Otherwise we are working full speed at understanding how ascorbic acid destabilizes lens proteins and are analyzing mountains of proteomics data with David Sell and colleagues at the University of Oregon.

Finally, given that already a large number of colleagues have COVID-19 related projects, we are not active in the field but decided to stay focused and productive in our area.

Be safe all

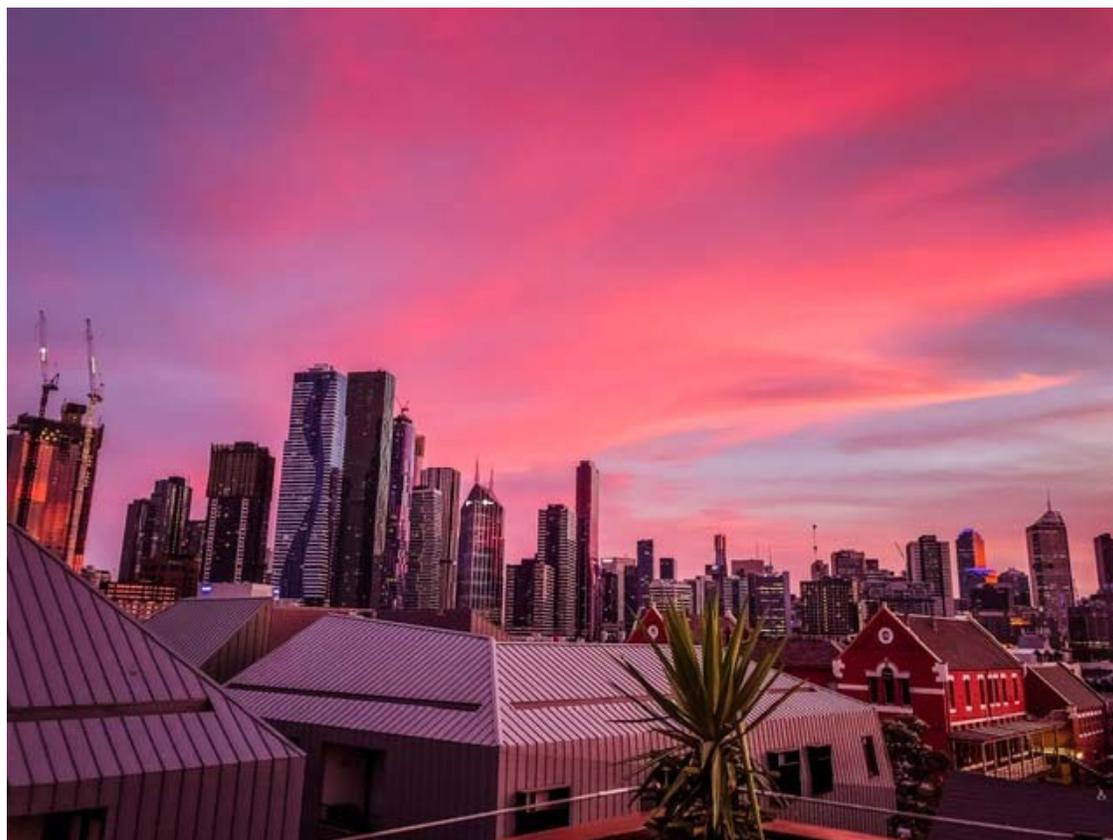


Vincent Monnier, June 2020.

### **Prof Melinda Coughlan – IMARS-Australia**

Here in Australia, we have been in lockdown since mid-March, with Universities and Medical Research Institutes temporarily closing down. The first cases of COVID-19 in Australia were identified in late January. The number of new cases rapidly increased and peaked in March. Since mid-April there has been a sustained and relatively low number of new cases reported daily. Our department of Diabetes is co-located with the Alfred Hospital, rather than on the main Monash University campus. Therefore, our department and others at the Central Clinical School were deemed an “essential service” and our laboratories were permitted to remain open to a small number of researchers. This allowed us to continue critical experiments with researchers social distancing and implementing additional safety measures. The majority of researchers have been working from home; however, this has presented other challenges, particularly for those with young children. Homeschooling and writing grant proposals do not mix well! Challenges aside, in Australia we have been very lucky as the cases of COVID-19 have been low. In total, there have been 7843 confirmed cases in Australia and 104 people have died. More than 2.4 million tests have been conducted across Australia. We are hoping to maintain our low levels of COVID-19 cases over the coming months.

Melinda Coughlan, June 2020



**View of City of Melbourne skyline.**

### Prof Armando Gómez-Ojeda – IMARS Central America

At the end of 2019, the WHO was informed of a cluster of cases of pneumonia of unknown etiology that were detected in Wuhan, China. Eventually, a novel coronavirus was identified as the causal agent for this outbreak. Because other infections, such as SARS and Avian influenza had previously irrupted in Asia, the first news were received cautiously, not being the first time that a common virus in animals somehow crossed the interspecies barrier, yet due to the geographical distance caused little to no concern in other regions. Nevertheless, McLuhan's global village becomes relevant in biological terms and shows us that despite all, the virus can be transmitted worldwide, expanding quickly despite region specificity (climate, diet, etc.). By February, the safety illusion prevailing in other continents was inexorably ending, when Italy and Spain started with massive contagious. In Mexico, the first Covid-19 case was confirmed on February 27<sup>th</sup>; by that date there was approximately 82 300 cases worldwide. Already in February, I realized for the first time the seriousness of the situation, when I was supposed to attend the ASN Nutrition 2020 conference in Seattle but the organizers decided to hold the conference virtually. Soon, a major concern appeared due to the fact that several activities within a collaboration with Prof. Gugliucci at the Glycation, Oxidation and Disease Laboratory at Touro University in California had to be postponed, and with that the possibility of bringing a deuterated isotopologue compound from abroad.

For my University the activities in the middle of March seemed normal, there was no sign of lockdown until March 15<sup>th</sup>. Although by that date, there were only 56 confirmed cases in Mexico, as a precautionary measure and in line with the national lockdown, University of Guanajuato issued an official statement that the University would remain closed until April. Researchers could go to their laboratories only to shut down equipment, freeze biological samples and prepared the lab for a long pause. Along with video conferences for university meetings, I started to teach in virtual rooms, and advising post-graduate students the same way. For Noe, a PhD student, an epistolary advising began in order to tailor his research protocol by email and this went smoothly. A very different situation for M.Sc. Students Juan Pablo and Priscila. Both of them are close to conclude their experimental work; however, Juan Pablo had to postpone his short stay planned in another Mexican laboratory and Priscila has no access to my laboratory for final HPLC analyses.

Both cases exemplify the fate of glycation research in Mexico, there is plenty of work to do, but all this work relies on experimental research. The end of the national lockdown was expected initially for the beginning of May, but this date has already been moved to August 17<sup>th</sup>. Needless to say, how eager I am to reach the lab. Our research topic is especially important in Mexico, since the main co-mortality accompanying Covid-19 are obesity, diabetes and cardiovascular disorders, being the glycation processes associated with all of them. In June 22<sup>nd</sup> there was 142 690 cases and 16 812 deceased in Mexico, and 7 553 182 cases and 429 161 deaths worldwide. In my opinion it seems that several actions taken to deal with COVID-19 outbreak will remain, and subsequently will become part of the "new normality", how big will be the impact for lab work is still to be seen. Meanwhile the best we can do is prepare for it and stay safe.

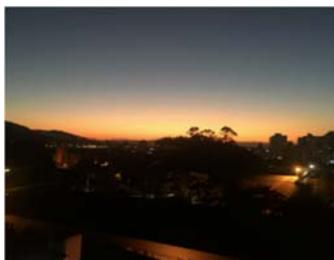
Armando Gómez-Ojeda, June 2020.

### Dr Fernanda Hansen – IMARS South America

In Brazil, the pandemic of infection by the coronavirus SARS-CoV2 and the disease related to COVID-19 began in February 2020, when all teaching, research and extension activities were running normally and we had no real dimension of the state of emergency in which we were living. The first confirmed case of COVID-19 in Brazil was on February 26<sup>th</sup> and by March 26<sup>th</sup> (one month later after the first case), there were 2915 confirmed cases of COVID-19 in Brazil and 77 deaths. Currently, nearly four months after the onset of the pandemic in Brazil, there are records of 1,145,906 cases and 52,645 deaths, with an incidence of 545.3 cases and 25.1 deaths for every 100 thousand residents. Among the five regions of the country, two have higher numbers of cases than the others: Northeast (395,938) and Southeast (397,068). However, the highest incidences of cases (1234.7 for every 100 thousand residents) and deaths (48.5 for every 100 thousand residents) are found in the northern region of the country (227,560 confirmed cases). In the southern region, where I live, there are records of 55,961 and 1238 deaths so far.

Current activities at the Federal University of Santa Catarina, which is located in the southern region and is where I work, have been suspended since March 16<sup>th</sup>. The same occurred at the laboratory of the Department of Biochemistry, coordinated by Professor Carlos Alberto Saraiva Gonçalves, who is a contributor of research in the field of glycation. The lab was closed in March 2020 due to the suspension of activities at the Federal University of Rio Grande do Sul - UFRGS, Porto Alegre, RS (also located in southern Brazil). Tele-working was initiated at this time and, since then, weekly seminar groups have been held remotely, uniting undergraduate (members of the Scientific Initiation Program) and postgraduate students. Meetings for the advising of course completion papers, dissertations and theses are also being held remotely. The team continues working on the analysis of previously collected data, the drafting of research projects and the writing of manuscripts. To this day, research activities at the laboratories of UFSC and UFRGS remain suspended. The number of cases and deaths continue to increase in Brazil. The rate of social isolation was reduced at the end of June in comparison to previous months. Recently, authorities in different locations of the country have once again had to implement measures to minimize the infection and transmission of the coronavirus.

Researchers of different institutions in Brazil, such as UFSC and UFRGS, are working in clinical diagnostic labs and contributing efforts in research directed at COVID-19. Brazil has begun testing a vaccine for the virus developed at the University of Oxford. Therefore, we hope that, by the end of the year, the situation regarding the SARS-CoV-2 pandemic will be much better in Brazil and the rest of the world so that can return to our research activities at the lab and participate in conferences in our field.



**View of lockdown:** Sunset view from my home in Florianópolis, Santa Catarina, Brazil.  
Fernanda Hansen, 24<sup>th</sup> June 2020.