Celebrating Science and Sport at the Village of Sciences of LINGOLSHEIM : My human adventure to contribute to it.

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This article comprises 50 pages.

ABSTRACT

« Determination, Availability, Discipline ; and success is within reach ».

« Research includes and will always include a significant part of creative activity ».

« *Joy is in everything. You have to know how to extract it* ».

These three quotes from Philippe ROTH, Pierre JOLIOT and CONFUCIUS constitute the raison d'être of the Science Village which took place from October 3 to 13, 2023 in LINGOLSHEIM. As part of the 32nd edition of the Science Festival, Mayor Catherine GRAEF-ECKERT (Figure. 1A), Drs. Sylvie FRIANT (Figure. 1B) Research Director at the CNRS, Jean-Claude JANSER (Figure. 1C) Honorary President of the League Against Cancer - Bas-Rhin Committee, Patrick BARTH (Figure. 1D) Retired research engineer of the CNRS, and their team offered participants the opportunity to discover the world of research through workshops and the contribution of science to sport through conferences and a round table (Lingolsheim Science Village | Festival of science (fetedelascience.fr)). An eclectic program, exciting exchanges and a joy of sharing. I titled my closing lecture “Sport and Sciences: Creativity, Sharing and Joy of Living” (Figure. 2). My atypical path has crossed examples of luminous, humble and inspiring life journeys.

INTRODUCTION

The aim of the 2023 edition of the Science Festival was to share topics at the interface of sports and science with citizens in a direct relationship with its stakeholders[1].

In this context and with the perspective to the Paris 2024 Olympic and Paralympic Games, my closing lecture, held on October 13, 2023 at the Maison des Arts in LINGOLSHEIM, focused on: self-sacrifice, the ability to listen and put oneself in question that allow to push limits and overcome obstacles (Figure. 3).

The corresponding document in french language was published thanks to Jean-Pierre PERRIN (Gymnase Jean STURM, Strasbourg). This article is a fraternal thank you to all those who allow us to hope, with their strength and their limits. Authentic confidence in the future punctuates every sentence and every line space.

[1] This document was first published in French thanks to Jean-Pierre PERRIN (Gymnase Jean STURM, Strasbourg) and is accessible at :

https://gymnase-network.blogspot.com/2024/02/le-dr-pierre-antony-bac-1987-partage-sa.html

https://www.calameo.com/books/0033797931a233672cc3d

https://www.calameo.com/read/0033797931a233672cc3d

1. *Chemistry and soccer : two priesthoods for three scientists from the Grand Est*

I chose to show the journey of three chemists from the Grand Est whose interface with football symbolizes the common values of these two priesthoods.

Dino MORAS completed *his 3rd cycle doctorate* in 1971 on the structural study of a mineral chemical compound, Patrick BARTH in 1989 on the purification of two proteins involved in diabetes, Robert WURTZ in 1964 on the production of an Amino Acid (AA) deriving from the genetic code.

An authentic scientific spirit can be summed up by a phrase from Cuban-American actor Andy GARCIA: *«* I think good chemistry starts with mutual respect ». Likewise, an authentic sporting spirit can be summarized by this quote from Zinedine ZIDANE: *« Individual performances are not the most important thing, we win and we lose as a team ».*

1.1. ***Dino MORAS***

A soccer player from the cadet section at UCKANGE in Moselle, Professor MORAS (Figure. 4A) is a supporter of the Football Club METZ and the Racing Club of Strasbourg. Our sports conversations resonate with this credo of Aimé JACQUET, coach of the French team, world soccer champion in 1998: *« Giving, receiving, sharing: these fundamental virtues of sportsmanship are of all fashions, of all eras. They are sport»*. Likewise, these virtues should be the essence of science and require, a) risk-taking, b) an element of luck, c) a sharp look and d) an ability to convert one's observations into a goal.

Thus, Dino MORAS and his team at the Institute of Molecular and Cellular Biology (Figure. 4B), marked the history of their discipline with two fundamental contributions to the discoveries of the molecular mechanisms of the translation of genetic information contained in Messenger RNA (mRNA), the step in the synthesis of proteins which are made up of the chain of AA (Figure. 4C).

His research first targeted transfer RNAs (tRNAs), cloverleaf-shaped intermediates, in mRNA translation and genetic code reading (Figure 5A). It is from the genetic information contained in mRNA that tRNAs bring AA to the ribosome, the cell's factory responsible for manufacturing proteins. In this context of fundamental research, Dino MORAS and his colleagues published in the prestigious journal Nature in 1980, the second atomic scale structure of a tRNA. This model is visible on the Esplanade campus, at the VLES amphitheater of the Institute of Physiology and Biological Chemistry (Figure. 5B). This first milestone culminated, ten years later, with the discovery of two classes of aminoacyl-tRNA Synthetases I and II of equal size, which load the specific AA onto the tRNA. These 2 classes play a major role in the fidelity of

the translation of the genetic message into protein.). In addition, the chemist-crystallographer's view established that classes I and II have two different targets; Class I attaches the AA to the 2' hydroxyl of the terminal adenosine sugar of the tRNA while class II attaches it to the 3'. More simply, class I, represented by the left hand and class II by the right hand, fix the opposite faces of the tRNA. This example of chirality, left hand not superimposable on the right, is an essential characteristic of biology, and therefore of life (Figure. 6). The discoveries of Dino MORAS' team, and those of Professor Pierre CHAMBON in molecular biology and genetics, were decisive in the construction of the IGBMC, whose 30th anniversary celebration will take place in October 2024. Furthermore, in 2014, on a project by Dino MORAS and Jean Claude THIERRY, Director of Research at the CNRS, the Center for Integrative Biology, at the heart of the IGBMC pole, was created to better understand the functioning of biological systems, in particular gene expression, from the atomic scale to the cellular and tissue level, thanks to a technological environment unique in France.

1.2. ***Patrick BARTH***

Likewise, carried out at the Institute of Chemistry and the European School of Chemistry (Figure. 7A&B), one of the major contributions of Dr. Patrick BARTH (Figure. 7C), a very dynamical retired (virtual) research engineer from the CNRS, is at the interface of chemistry and biology. His long-lasting research targeted human aldose reductase, an enzyme involved in the genesis of most complications of diabetes, such as eye and nerve damage. Aldose reductase inhibitors are a class of drugs developed to prevent its complications. To this end, Dr. BARTH achieved the feat of producing crystals of the human protein which diffract at a resolution of a millionth of a millimeter, thus allowing its determination in 3D (Figure 7D) and better drug design.

Success in research and complementary success in soccer (Figure 7E). Indeed, his career began at the age of 8 at the Football Club Lingolsheim, continued at the Football Club Olympique Strasbourg Koenigshoffen, until the age of 16, then at the Pierrots Vauban of Strasbourg with whom he won the Alsace Cup in 1967 under the direction of the Franco-Spanish coach Paco MATEO, finalist of the French Cup in 1947, as central defender of the Racing Club de Strasbourg. Dr. BARTH then joined Football Club Kronenbourg, finally returning to the roots of Football Club Lingolsheim. In a scientific and sporting nod, Patrick BARTH, as striker, and Dino MORAS, as left back, played together, from 1971, in the football team of the Institute of Chemistry (Figure. 8) . In these first two examples, chemistry professionally took precedence over football.

1.3. ***Robert WURTZ***

However, Robert WURTZ showed that a reverse approach is possible and also leads to success. His scientific work focused on the conversion of ornithine, a non-genetically coded AA, into proline which is derived from the genetic code, and which is therefore incorporated into our proteins. Robert WURTZ's footballing passion takes place in a state of weightlessness (Figure. 9A). Thus, he wrote that « *Football is a celebration… The ideal would be to never interrupt the game, to let it develop without disrupting its course… in fact I have never liked to whistle, because it is breaking the rhythm of the match, to break its beauty... Even if it happened to me to make a mistake, I would like to at least leave the memory of an honest man who never favored anyone, except the only beauty of the sport that I 'love above all* ».

A child from Meinau, Robert WURTZ oriented his sporting career towards refereeing, in an operatic and aerial style. He notably officiated as central referee during the final of the European Champion Clubs' Cup between Liverpool Football Club and Borussia Mönchengladbach on May 25, 1977 in Rome (Figure. 9B). Nicknamed "the Nijinsky of the whistle", a phrase from Pelé sums up the career of Robert WURTZ: « *Enthusiasm is everything. It should be tight and vibrating like a guitar string* ».

2. Brazen will and creativity: Between serene insolence and humility

This sense of swing and achievement, in sports as in science, requires careful preparation, where iron will and creativity are often associated with serene insolence and humility.

2.1. ***The art of playing as a team***

Thus, during the last women's rugby world final on November 12, 2022, New Zealand beat England with a 16-pass action full of punch and audacity, concluded by a replacement player. A final reversal of play carried out by the opening half COX, results in a transmission to the foot by FITZPATRICK for FLUHLER who, with an acrobatic pass, sends LETI-I'IGA to the test. In this final, 40% of New Zealand's tries were scored by players *coming from the bench*; A splendid victory for the collective at Auckland Eden Park, with a lot of panache in the broad sense (*https://www.youtube.com/watch?v=69GtwpKXZaE*).

In a similar atmosphère of team spirit, Éric CANTONA wrote : « *All we can do is try to pass the ball and let the sun shine. Hoping it shines for everyone* ». The art of passing the ball leading to Brazil's 4th goal against Italy during the FIFA World Cup final in Mexico on June 21, 1970 shows that, as with a scientific experiment, preparation is essential for success. optimal. Thus, a) the strength of individuals, b) the quality of controls, also essential in research, c) trust

between teammates and d) quiet insolence, as evidenced by Pelé's last blind pass, for his captain Carlos ALBERTO, constitute the ingredients of a winning synergy (*https://www.youtube.com/watch?v=TX8fe6qslS0*).

In a complementary way, the Dutch athlete Femke BOL left her mark on the world athletics championships in Budapest in August 2023 with her simplicity and her ability to bounce back immediately after a fall (Figure. 10A). Indeed, in the final of the mixed 4 x 400 m, she fell and dropped the stick a few meters from the finish line, while she was in the lead. Failure is part of a journey, but, as Pelé said « *Success is not determined by how many times you win, but by how you play the week after losing* Thus, with lucidity and determination, Femke BOL drew conclusions from her failure, and 8 days later produced an exceptional performance in the final of the women's 4 x 400 m (Figure. 10B). Starting more than 10 m behind her opponents, she came up one by one, thanks to an optimal distribution of efforts as well as a methodical and relentless race and path of competing, to offer the world title to her teammates on the wire (https://www.youtube.com/watch?v=oxZCkZ48YTw).

2.2. ***The joy of surpassing yourself***

In Sports as in science, pushing one's limits represents a very personal notion.

Many examples show that the risk is often not trying.

Thus, Australian Professor Barry MARSHALL proved that the bacteria Helicobacter pylori is the cause of most stomach ulcers, breaking medical dogma stating that they result from stress or excess acidity (Figure. 11A). To demonstrate his hypothesis, Barry MARSHALL ingested the contents of a test tube containing the bacteria and developed gastritis, which he then successfully treated in less than three weeks with antibiotics. His finding, associated with rare panache, cured millions of patients, and earned jointly with his colleague, Dr. Robin J. WARREN, the Nobel Prize in Physiology or Medicine in 2005 for « their discovery of the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease ». (*https://www.nobelprize.org/prizes/medicine/2005/summary/)*.

In this self-improvement, Jessica MAURER-SPOERK developed managerial responsibilities at the Institute of Advanced Mathematical Research of the University of Strasbourg associated with a career as a high-level basketball player in disabled sports (Figure. 11B). Likewise, the Colmar resident Béatrice HESS has this double role. She is the most successful French swimmer in the Paralympic Games. (Figure. 11C). Nicknamed “the torpedo”, she won 20 gold medals in 5 Olympics and said with a smile: « *We are never finished in life* ».

This last sentence resonates in a special way for me. Indeed, I had an accident in the laboratory on Wednesday July 20, 2022 resulting in an almost zero probability of survival. Science and sports have been two essential drivers of rehabilitation and life. I moved forward, step by step, with determination, serenity and confidence thanks to exceptional medical teams and friends.

*3. **scientifiques How I benefited from the skills of medicine, including that of sport as a springboard to approach two scientific objectives***

I dedicate this very personal section to all the healthcare workers around the world who, through their skills and self-sacrifice, allow us to hope.

*3.1. **Three doctors save my life***

Dr. Sophie LÉCORCHÉ emergency doctor (Figure. 12A), Stéphanie PERRIER surgeon (Figure. 12B), Ali HAMICHE, M.D., Ph.D., doctor researcher, Class 1 Research Director of the National Center for Scientific Research (Figure. 12C), all three played a key crucial role in my rescue. Their three incredible interventions combine a sense of timing, listening, and decision-making: in summary, they deploy LEADERSHIP, with incredible medical and human skills that is matched only by their humility. A combination of exceptional circumstances allowed me to work with them on the day of my accident and to benefit from their knowledge. In summary, a dream team to save my life through knowledge, sense of measure and tempo.
My probability of survival was less than 1 in 1 million; that of recovering enough to continue is less than 1 in 1 billion. The speed of the rescue and the sequence of strategic decisions concerning the post-traumatic consequences of my accident flowed like a symphonic poem termed the “Moldau” by Bedrich SMETANA.

*3.2. **Three physiotherapists, two surgeons, their teams and examples of athletes to help me live on my feet***

This functional rehabilitation training was facilitated by all members of the UGECAM cardiology team in Illkirch, in particular Laëtitia LEEMANS and Ophélie GRANGIRARD, physiotherapists (Figure. 13A). I would also like to cite Jean-Paul GANGLOFF (Figure. 13B), my physiotherapist who was instrumental in enabling me to be on my starting line in order to achieve two of my scientific objectives whose deadlines had been set before my accident. At my request, I benefited from additional exercises, and progressed, without risking an accident, thanks to their sense of listening and efficiency (Figure. 13C&D).
I was able to progress in my career thanks to the competence of two exceptional surgeons: Prof. Nabil CHAFKÉ, Head of the Vascular Surgery and Renal Transplantation Department of the

University Hospitals of Strasbourg and President of the European Research Group on Prostheses Applied to Vascular Surgery (GEPROMED, *https://gepromed.com/*) and Benoit LAMBERT, Department of General and Digestive Surgery - Bicêtre Hospital - AP-HP Figure. 14A&B respectively). Beyond the accuracy of the execution of their art, their humor associated with the kindness and efficiency of their teams allowed me (i) a faster recovery and (ii) a launch into orbit to fully live and go forward.

The common thread that punctuated my days was this reflection from Wolfgang Amadeus MOZART: « The most necessary and most difficult thing in music is tempo ».

In this context, atypical approaches and achievements of two athletes served as my benchmarks to a) adapt my approach, and b) approach my goals.

Olympic Games, the American Kerri STRUG twisted her ankle while landing her first attempt on vault (Figure. 15A). However, out of respect for her colleagues, she decided to perform her 2nd jump, successfully landed and offered the gold medal to her country (Figure. 15B&C). Kerri STRUG took ra risk and owned it.

In this assumption of responsibility, the French cyclist Bernard HINAULT, nicknamed "the badger", decided to abandon the Tour de France in 1980 on the eve of the 1st stage of the Pyrenees, due to tendonitis in his knee (Figure. 16A). That day, he set his end-of-year course: to be in optimal physical conditions to win the road world championship organized at Sallanches, Haute Savoie (France), which he did two months later, by dropping a to one his adversaries (Figure. 16B).

A mind made of tempered steel, an irrepressible desire to move forward, these are unusual journeys, which allowed me to write my own score in an atmosphere of combat and serenity. Thanks to these examples of life and strength of character, I was able to leave in sufficient physical conditions to be “in the race” and to take on the challenges that I had promised myself to take on before my accident.

Having the joy of entrepreneurship is a singular privilege. Fighting for a goal that aims to unify an incredible source of life. When it is shared by teams and a caring environment, the responsibility for efficiency and humility is synergistically increased.

4. Achieve two goals to pass the baton

The commitment and competence of my medical teams, my friends and my desire to move forward allowed me to respect these two promises, first human and then scientific, that I had made before July 20, 2022. My actions are a contribution to the passing of the baton.

4.1. ***Support Dr. Ariane ZALOCSZYC in her Accreditation to Direct Research by being an examiner member of her Jury***

The Habilitation to Direct Research (HDR) represents the highest university degree in France. Dr. Ariane ZALOSCZYC, pediatric nephrologist at Hautepierre hospital, gave me her manuscript on “Rare kidney diseases: towards improving treatments and understanding of physiopathological mechanisms”, a few days after my surgery, starting point of my convalescence at the Nouvel Hôpital Civil (NHC) de Strasbourg. I would also like to thank the nurses and caregivers of the UGECAM cardiology department who allowed me to work optimally in their meeting room so that I could exercise my role as examiner.

This document was my bedside book for 57 days and a motor of life. *Indeed, my first scientific objective, which was to support Dr. Ariane ZALOSCZYC towards her HDR*, is part of my personal history over more than 40 years, with the Pediatric services, in particular, that of Hautepierre’s hospital. I was very lucky that the defense was carried out by videoconference, otherwise I would not have been authorized by my hierarchy to be present. On the day D, as the only CNRS representative on the jury and not a doctor, I was able to make, beyond my questions, the scientific, human and personal remarks that seemed appropriate to me Ariane gave an exceptional presentation and brilliantly answered the review committee's questions. What a joy to have had the privilege of accompanying him until our final deliberation!

Ariane (M.D., Ph.D.) is responsible for pediatric nephrology at Hautepierre hospital, and with her colleagues, is writing new pages in her discipline. From Professor Jean GEISERT, Founder of the mother-child hospital at the Hautepierre hospital to Ariane’s path, via Professor Michel FISCHBACH, the baton in this field of medicine and research has passed, the flame still also perennial for the benefit of patients, families and future caregivers of the service (Figure. 17). Ariane's success, both sober and luminous, was a source of joy and an essential step in the continuation of my initiatives.

4.2. ***A symposium beyond the genetic code: Teamwork for a human, scientific and musical adventure***

My second objective was to participate in *promoting exchanges between experienced scientists, AND young researchers at the academic AND industrial level* in the field of Aminoacyl-tRNA synthetases, which are keys in decoding genetic information *(https://straars2023.org/)*.

If I initiated the StraARS2023 international symposium, the scientific program is 99% the work of Prof. Hubert BECKER, team leader and specialist in this topic at the Laboratory of Molecular

Genetics - Genomics and Microbiology at the University of Strasbourg (*https://straars2023.org/scientific-program*).

I would like to emphasize that Hubert had the class and lucidity to bring me his proposal for the StraARS2023 scientific program at UGECAM hospital, understanding *that this human adventure was a lever for my reconstruction*.

The probability that this congress would take place was less than 1 in 10 billion. Life allowed that: (a) Professor MORAS accepted my friendly proposal for him to return to his first scientific love and (b) Hubert and I, who belong to institutes located on 2 different campuses, met at the Society of Biology of Strasbourg (*http://societe-biologie-strasbourg.fr/*), 6 years ago (Figure. 18).

StraARS2023 took place on May 23 and 24, 2023 in the Louis PASTEUR room of University Palace of Strasbourg.

The members of our scientific committee were composed of Drs. Ali HAMICHE, Catherine FLORENTZ, Marie SISSLER, Magali FRUGIER, Gilbert ERIANI, Jean CAVARELLI, Hubert and myself… And to complete our human coherence and committee, we have Dino MORAS and Patrick BARTH, chemist-footballers once again in the same team, 51 years later. Our requests for funding to organize this symposium resulted in numerous: a) academic, b) institutional, c) industrial and d) associative supports (Figure. 19).

StraARS2023 was organized by a fantastic team made up of Alizée KABEL from the Alsace CNRS delegation, Aline KEILBACH, Bruno SENGER, Jérémy BECKER, Nassira MAHMOUDI, Laurence HUCK, Solène ZUTTION, all members of Prof. Hubert BECKER's team (Figure. 20).

More than 120 participants were able to: a) learn, b) share, c) exchange, and d) numerous collaborations emerged (Figure. 21).

We celebrated 60 years of essential discoveries in molecular biology, which is the "*marriage of crystallography and genetics*" according to Dino MORAS.

One generation says goodbye, another is already hard at work. Thus, *during the preparation of our congress*, Solène ZUTTION, 1st year Ph.D. student, under the direction of Hubert BECKER and Dr. Sylvie FRIANT, Director of Research at the CNRS, was invited by Prof. Yusuf HANNUN, pioneer of the role of lipids in cancer and Director of the Stony Brook Cancer Center in New York, to present her work. Her conference, given 20 days after our congress, focused on the relationships between a signaling pathway involved in cancer AND aminoacyl-tRNA synthetases (Figure. 22). I am honored of being on her thesis committee

Our human, scientific adventure has also been musical. Indeed, we had the opportunity to invite the student choir from the music department of the University of *https://arts.unistra.fr/faculte/departements/musique*) and their conductor, Professor Amanda HASCHER, co-responsible for the license and master's degree « Musical interpretation and composition » (Figure. 23). This concert left its mark on the spirit of each of the participants. Indeed, their chiseled interpretations of works by Georges BIZET, Jean-Philippe RAMEAU, W.A. MOZART, Gaetano DONIZETTI and Giuseppe VERDI captivated the audience, and the lyrical flight of the musicians underlined the diversity and complementarity of the talents of our University (Figure. 24). I thank Dr. Mathieu SCHNEIDER, Vice-President of Culture, science-society and solidarity actions at the University of Strasbourg for his time and wise advice in the potential direction of this musical choice.

In summary**, I had the honor of being able to achieve my 2 objectives, thanks to a) my family, b) my medical teams and c) my friends and colleagues who increased my desire to "wet my shirt" tenfold, to cross the finish line together…**

5. Forward! Ahead ! « Breath, Swing, Audacity and Humor »

Cette dernière partie constitue ma synthèse de tous les parcours sportifs et scientifiques décrits, à travers *des insatiables du mouvement, humbles et déterminés alliant souffle, swing, audace et humour*. This last part constitutes my synthesis of all the sporting and scientific journeys described, *through insatiable movement enthusiasts* who are humble and determined, *combining breath, swing, audacity and humor*.

*5.1. **Carlos KLEIBER and Audrey KOST : unifying and aerial chemists***

The first two, *chemists by training*, are Carlos KLEIBER, *conductor* (Figure. 25A) and Dr. Audrey KOST, *INSERM research engineer, Director of the Prospective and Strategy Mission of the University of Strasbourg* (Figure. 25B). *The main theme of the 4th movement of Beethoven's 7th symphony* (Figure. 25C), termed *the apotheosis of the dance*, is in fusion with their two approaches. Indeed, Carlos KLEIBER gave incandescent interpretations of this musical work, notably with the Vienna Philharmonic Orchestra and that of the Amsterdam Concertgebouw in 1976 and 1983 respectively, succeeding in uniting the energies of all his musicians. Likewise, Audrey KOST *has made a strong contribution to putting into music international projects*, which are long-term, in the field of science. Thus, both evolving in an atypical "Music of the Spheres" accessible to all, they can "*force destiny at every crossroads*" as Jacques BREL wrote.

Carlos KLEIBER studied chemistry at the Swiss Federal Institute of Technology in Zurich, before becoming, *against the will the of his father*, himself a famous conductor, an *exceptional maestro*. *His swing, surgical precision and humor* shined through the music. Thus, during a rehearsal of a concert given during the Munich carnival, he disguised himself as Boris BECKER, a German tennis player nicknamed "Boum-Boum". Carlos KLEIBER a dirigé l'orchestre de la raquette, et *obtenu, comme à son habitude, la quintessence du potentiel* de ses collègues. Carlos KLEIBER conducted the orchestra with a racket, and obtained, as usual, the quintessence of the potential of his colleagues.

A similar force is that of Audrey KOST, doctor in chemistry from the University of Strasbourg. Her research focused on photo-modifications of DNA by organic molecules as part of the "*Study of molecular mechanisms leading to chronic cutaneous photosensitivity*". Director of scientific affairs of the IGBMC in 2017, Dr. KOST contributed decisively to the initiation and implementation of a UNIFYING PROJECT of a University School of Research in Biology called IMCBIO, awarded by the Program of Investments for the Future, for an amount of 6.7 million euros over 10 years.

IMCBIO (*https://imcbio.unistra.fr/*) aims at:

- attracting talented doctoral students of all nationalities and
- starting innovative projects, by offering an integrated training course from Master to Doctorate.

IMCBIO results from research developed in four Strasbourg institutes:

a) Institute of Genetics of Molecular and Cellular Biology,
b) Institute of Molecular and Cellular Biology,
c) Institute of Molecular and Cellular Biology et
d) Laboratory of Molecular Genetics - Genomics and Microbiology, GMGM.

These four institutes of the University of Strasbourg, located on two different sites, cover all areas of molecular and cellular biology, at the level of genes, cells and animal models.

5.2. ***Never give up, move forward, always and again***

In this voluntary approach, where the limit is that of starry creativity, the Slovak soprano, Lucia POPP, favorite performer of Carlos KLEIBER, gave cosmic recitals by going to the end of herself. Defying a brain tumor, her last recording in March 1993 was that of Vitella in Mozart's Clémence de Titus, an opera which is the fusion of the human voice and the clarinet. Thanks to the mastery of her breathing and her humility, she is, to my knowledge, the only one to respect all the nuances of the musical protocol written by MOZART, *which allows her to restore, with*

luminous intensity, all the sporting and partition scientists. In these conditions, the flame is always present, and dreams are within reach (Figure. 26).

This requirement for self-effacing one's ART is the mark of Professor Daniel STORCK, *Head of the Internal Medicine Department in Medical A, at the Hospices Civils de Strasbourg* until 2004. Prince of Medicine, his teaching and his commitment to patient service continues to shine through the humanity and knowledge of its students. Tomorrow is being prepared and **the PASSING of the TORCH CANNOT BE MISSED** (Figure. 27).

In this approach, where vibrant souls allow us to hope, I warmly thank all those who allow me to move forward, with a special nod to the team of rheumatology Hautepierre hospital: Dr. Rose-Marie JAVIER, doctor, Anita JAKOB and Perrine BRIGEL nurses and Sophie GENÉTON, teacher in Adapted Physical Activity for health (Figure. 28).

I have, and we are very lucky to be have the opportunity to be cured in France.

5.3. Ali HAMICHE team : With rock-and-roll and fire

I work as an Engineer at the Institute of Genetics and Molecular and Cellular Biology (IGBMC) in Illkirch. Our biomedical research center, which aims at developing knowledge about living things, consists of three buildings: the mother building-IGBMC, the Integrative Biology Center and the Mouse Clinic (Figure. 29).

Since September 1, 2023, I have joined the team of Dr. Ali HAMICHE (https://pubmed.ncbi.nlm.nih.gov/?term=hamiche+a+&sort=date&size=50) which is made up of colleagues following in alphabetical order (Figure. 30) :

a) Christian BRONNER,
b) Caroline BUND,
c) Abdulkhaleg IBRAHIM,
d) Fatima EL KHALOUFI,
e) Fengfeng MEI,
f) Yuliia MOROZIUK,
g) Christophe PAPIN,
h) Abdul Kareem Mohiden PATEL, and
i) Isabelle STOLL

Each year we welcome many trainees as part of collaborations (e.g. Dr. Julien TODESCHI, neurosurgeon, Hautepierre Hospital, Strasbourg) or awareness of science.

The goal of our research is to better understand chromatin and epigenetic regulation in healthy and diseased tissuesChromatin is made up of DNA and proteins called histones found in the

nucleus of our cells. Epigenetics studies changes in gene activity that (a) do not involve changes to the DNA sequence, (b) are reversible, and (c) can be transmitted during cell divisions (Figure. 31).

In this context, Abdulkhaleg IBRAHIM[#], Christophe PAPIN[#], KAREEM MOHIDEEN-ABDUL[#], Isabelle STOLL, Christian BRONNER, et Ali HAMICHE published an article in the prestigious journal Science in 2021 (https://pubmed.ncbi.nlm.nih.gov/34324427/) leading to a better understanding of the mechanisms of Rett syndrome ([#], cofirst author). This syndrome represents a serious neurological disorder, caused by a mutation affecting a gene located on the X chromosome. The disease corresponds to 2 to 3% of all cases of profound intellectual disability, and to 10% of those recorded in women. (Source Inserm). Also co-authors of this work are STEPHANIE LE GRAS, Stefan DIMITROV and Bruno KLAHOLZ.

In another approach, Dr. Caroline BUND (M.D., Ph.D.), uses her skills to determine the targets for future treatments for glioblastoma. More precisely, her work aims at determining the regulation of gene expression in gliomas and correlating it with the metabolism studied with different radiotracers. Recipient of a thesis prize from the Société de Biologie de Strasbourg sponsored by the non-profit association Alsace fighting against cancer in 2020 (http://societe-biologie-strasbourg.fr/laureats/prix-de-these-2020/), Dr. BUND is a specialist of nuclear medicine and oncology in the department led by Prof. Izzie NAMER at the Strasbourg Europe Cancer Institute (ICANS).

The future of research is notably represented by doctoral students. Three Ph.D. students from the Doctoral School of Life Science of Strasbourg University have chosen to join our team. Fatima EL KHALOUFI, Fengfeng MEI, Yuliia MOROZIUK, are respectively of Spanish, Chinese and Ukrainian origin. Their humor, their constructive punch and their sense of perspective and responsibility are the guarantees of the success of their projects targeting the molecular biology of cancers. I am very happy to have had the opportunity to be part of the Fatima Thesis Committee and to belong to Dr. HAMICHE's team.

CONCLUSION

The competence and humility of my Strasbourg, Parisian and American medical teams were and are part of my human shield. Thanks to a combination of extraordinary circumstances, I can move forward and contribute to scientific projects in Dr. HAMICHE's team.

A medical service is firstly made up of caregivers, nurses, device operators, administrators and doctors treating patients in walls and souls that are increasingly fractured. Our situation remains

fragile. Any concession promoting the illusion of being together or reducing access to knowledge is prohibitive and beyond lifes. Likewise, saying that "the hospital system is holding up" means nothing. It is the strength and self-sacrifice of all healthcare staff that allows us to move forward and helps build our live.

I am serene and confident for the future because nothing can resist creativity. In this context, the last picture I took during my post-doctoral studies in Nashville (TN; USA), represents a dancing circle of children symbolizing the circle of Peace, on the square of the Pediatric Center of Vanderbilt University (Figure. 32). This symbol concluded my presentation at LINGOLSHEIM. The kindness and wonderful welcome from the Mayor of LINGOLSHEIM, Catherine GREAF-ECEKERT, Vice-President of the European Community of Alsace, in charge of economic, tourism, agricultural dynamics, employment and energy and climate transition, and her team showed that every moment of sharing is precious. In this spirit, the 2nd edition of the LINGOLSHEIM Science Village was a rare human and scientific success where the joy of undertaking and providing access to knowledge to as many people as possible allowed all generations to interact with the actors of the various research professions. This edition calls for many others, beyond the theme chosen by the Ministry of National Education and Youth. Science, like sport or music, is unifying.

Thank you to those, present or gone, who contributed without calculation, directly or indirectly, to enable me to be one among others and fully experience this moment of sharing.

To conclude, I want to fraternally greet the nurse student who told me on July 24, 2022, after my surgery : « Now, you will be able to appreciate, as a miraculous, all the minutes that life will grant you ».

Long live Science! Long live Sports! Long live to Medicine! Long live to Research!

ACKNOWLEDGEMENTS

I dedicate this manuscript to my wonderful parents Gabrielle and Maria Susai ANTONY, to my entire family, to my teachers from the Paul LANGEVIN elementary, primary and secondary school in Cronenbourg, from the Jean Sturm Gymnasium to those at the University, my friends and all caregivers.

General practitioners / family doctors have and will have a determining role in the coming years. In this permanent breath, thanks to Drs. Valérie ANDRÉ-BERHART, Jean EHRHART, Claire MUGEL-STURTZER, Sophie BARBIER, and Emeline HESS for their skills and humanity. A friendly and grateful nod to Drs. Michèle LIEBERHERR-Research Director at CNRS (INRA-

Jouy-en Josas), Louis FREYSZ-Research Director at CNRS, Daniel METZGER- Research Director at CNRS, Jean-Claude THIERRY-Research Director at CNRS, Géraldine SPRINGINSFELD-Dermatologist, Raoul MEYER-Rheumatologist, Roland MEYER-Dentist, to Prs. Guy VINCENDON-Honorary Dean, Jean-Marie MANTZ-Honorary Dean, Serge BABIN-Honorary Professor, Patrick DUFOUR-Oncologist Founder and first administrator of the Regional Cancer Institute-Alsace, Jean SIBILIA-Dean of the Faculty of Medicine, Pierre CHAMBON -Co-founder of the IGBMC, Anne LEJAY-Pr. of Vascular surgery, Sylviane MULLER-Director Emeritus at CNRS-Institute of Advanced Studies University of Strasbourg (USIAS)-chair of Therapeutic Immunology, Pr. Jean-Christophe WEBER-Head of Medicine Department Intern and Pr. Yves HNASMANN-Head of the infectious and tropical diseases department, to Marie-Claire BURGER-Dietician, André her husband and Philippe her son, Simone MORAS and Marie-Félicie UHLRICH ("Mademoiselle WÜRTZ")-Teachers, Sandra BOUR-Computer graphic designer -Technician and Hélène MARTINA (University of Strasbourg), to Pr. Jacek HAWIGER-Chair of the Department of Microbiology and Immunology (1990-2010), to Prs. Elizabeth Ann RICE, and Jill JONES-Internal Medicine, to Drs. Kristen L. HOEK and John LOWE (Vanderbilt University, Nashville, TN; USA), to Prs. Wasif N. KHAN-my post-doctoral mentor (University of Miami, FL; USA), Prs. Yusuf HANNUN and Lina M. OBEID (Stony Brook University, NY; USA), to Prs. Mary Kathleen FIGARO-Endocrinologist (Iowa, USA) and Claude LAPRAS-Head of department-neurosurgery (University of Lyon-Sud), to Drs. Delphine DUTEIL-Researcher at INSERM, Charles CUNY and Floriane ZEYONS-Cardiologists, Julie TERZIC-M.D. Ph.D.), Mélanie KRÉMER-Director of the CompOpt platform-Research engineer at the CNRS, Binta MESMACQUE-Administrative Manager of the Earth and Environment Institute of Strasbourg-Study Engineer at the CNRS (University of Strasbourg), Florent DIETRICH-Technician at CNRS, Benoit SPECKEL and Jean-Bernard BUEB-Research engineers at CNRS, Drs. Raymond SELTZ-Research Director at the CNRS, Sandrine COURTIN, Director of the Hubert CURIEN Multidisciplinary Institute of Strasbourg, Rémi BARILLON-Vice-President Research, doctoral training and open sciences of the University of Strasbourg and Fabien HOELLINGE. I thank Dr. Christophe ROMIER, Research Director at the CNRS for all his help and Mrs. Bettina MOISSONIER, member of human resources of the IGBMC for her exceptional efficiency regarding the management of my file, the whole team of the prevention assistants of IGBMC as well as my colleagues from the Alsace DR10 Delegation of the CNRS.

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Chromatin and epigenetic regulation in healthy and diseased tissues

Figure. 32 : *Never let it down. Go forward,*
Always and again

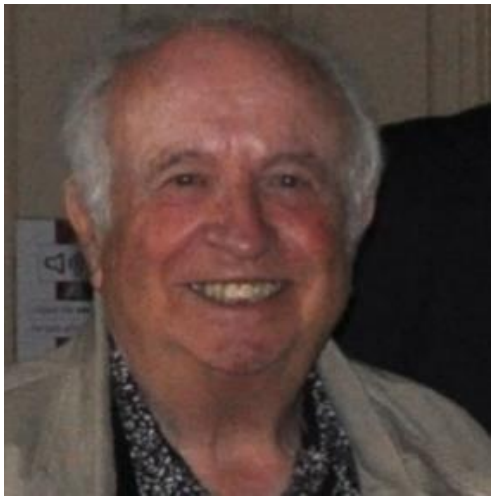
LINGOLSHEIM Science Village Festival :

The organizing team serving the community

A) Catherine GRAEF-ECKERT
Mayor of LINGOLSHEIM

B) Sylvie FRIANT
Research Director at CNRS

C) Jean-Claude JANSER
Honorary President of the Cancer League, Bas-Rhin committee



D) Patrick BARTH
CNRS Enginner retired from CNRS

Figure. 1

MINISTÈRE
DE L'ÉDUCATION
NATIONALE
ET DE LA JEUNESSE

Liberté
Égalité
Fraternité

fête de la Science

Édition 32

LINGOLSHEIM

LA LIGUE CONTRE LE CANCER
BAS-RHIN

FEMMES & SCIENCES
association

Sports and Sciences : Creativity, Sharing and Joy of Living

Pierre ANTONY, Ph.D.

gmgm

igbmc
institut de génétique et de biologie moléculaire et cellulaire

cnrs

La Région Grand Est

ALSACE
Collectivité européenne

Université de Strasbourg

Figure. 2

LINGOLSHEIM Science Village Festival:
Closing Conference at the Maison des ArtsArts

Figure. 3

Dino MORAS, from Chemistry to Biology :

*Contributions to discoveries of molecular mechanisms of **translation** the genetic information*

A)

Web site of the Cercle GUTENBERG

B)

***I**nstitute of **M**olecular and **C**ellular **B**iology*

C)

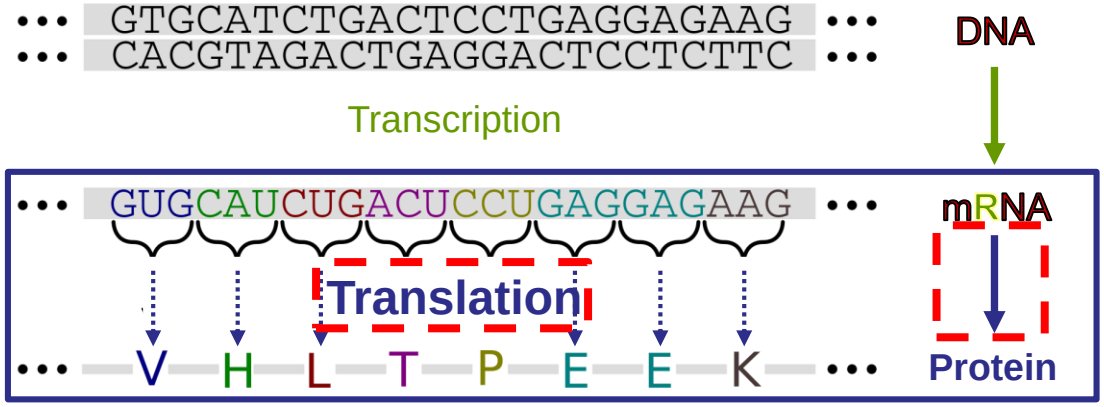


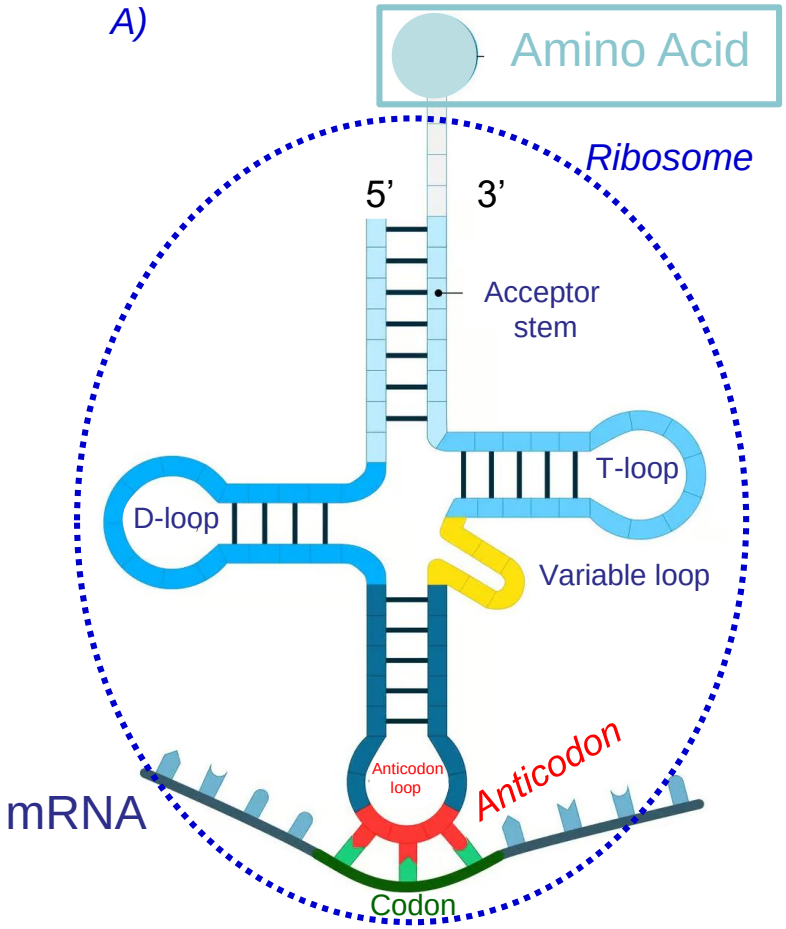
Figure. 4

Dino MORAS, from Chemistry to Biology :

Fundamental research

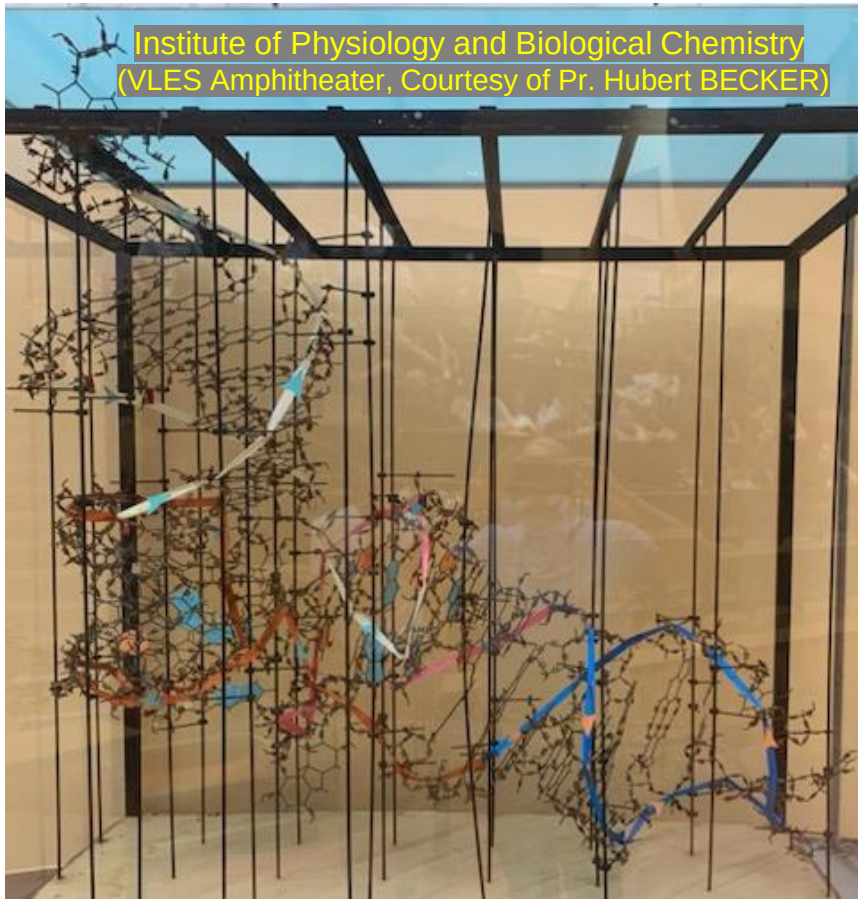
Determination of 3D structure of yeast tARN^{Asp}

A)



Translation of the genetic code : tRNA
(Adapted from wikipedia)

B)



2nd atomic structure of a tRNA
(Moras and collègues. 1980, Nature)

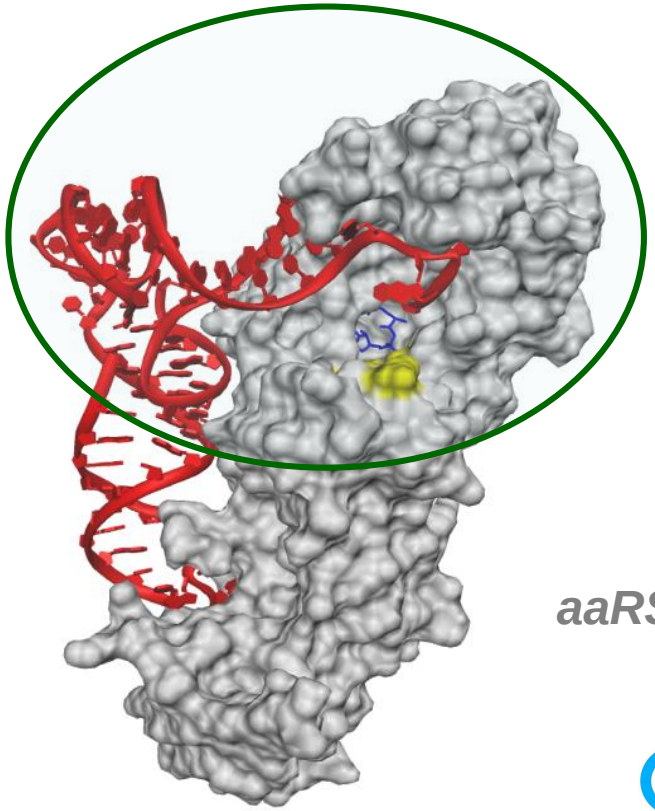
Figure. 5

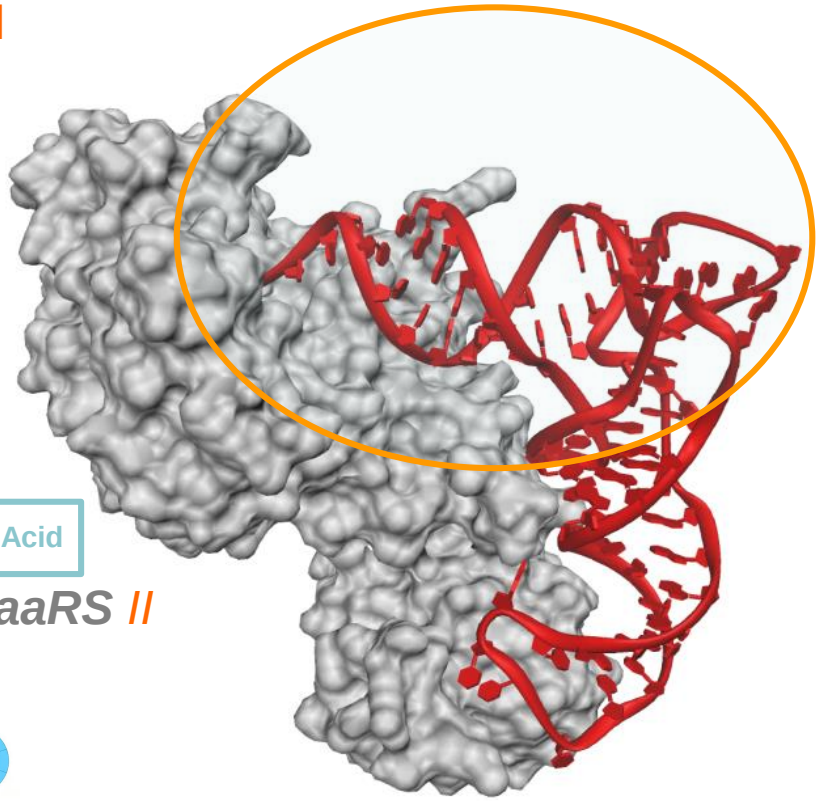
Dino MORAS « **Chirality** is Life»

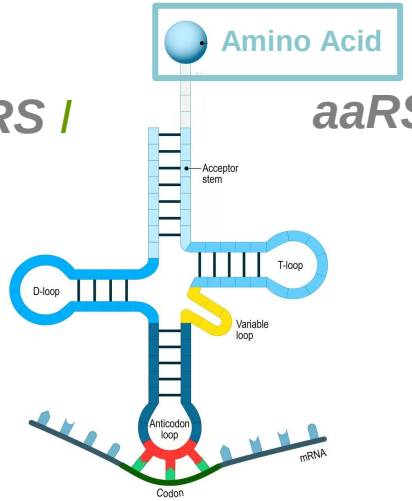
- ***aaRS I and II have two distinct targets***

« Seeing is believing »

2'OH	3'OH
Arg	Gly
Ile	His
Cys	Pro
Leu	Thr
Met	Ser
Val	Ala
Glu	Asn
Gln	Asp







aaRS I ***aaRS II***

Classe I
*(**2'OH** of the* terminal adénosine of tRNA*)*
(Rould and collègues, 1989, Science)

Classe II
*(**3'OH** de l'*adénosine terminale de l'ARNt*)*
(Eriani, Delarue and collègues. 1990, Nature; Ruff and collègues. 1991, Science)

Figure. 6

Patrick Barth :
Research and… Soccer

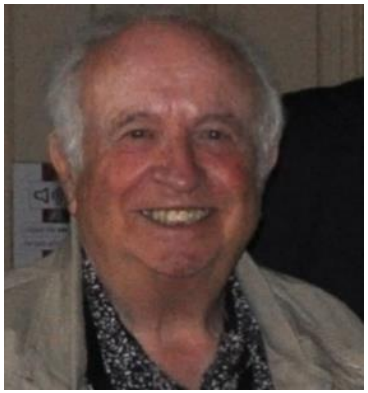
A)

Institute of Chemistry

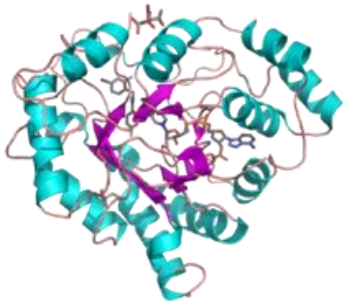
B)

EPCM

C)



D)



Human
Aldo Reductase

E)

Alsace Cup, (season 1966-1967)

F)

F.C LINGOLSHEIM 1911

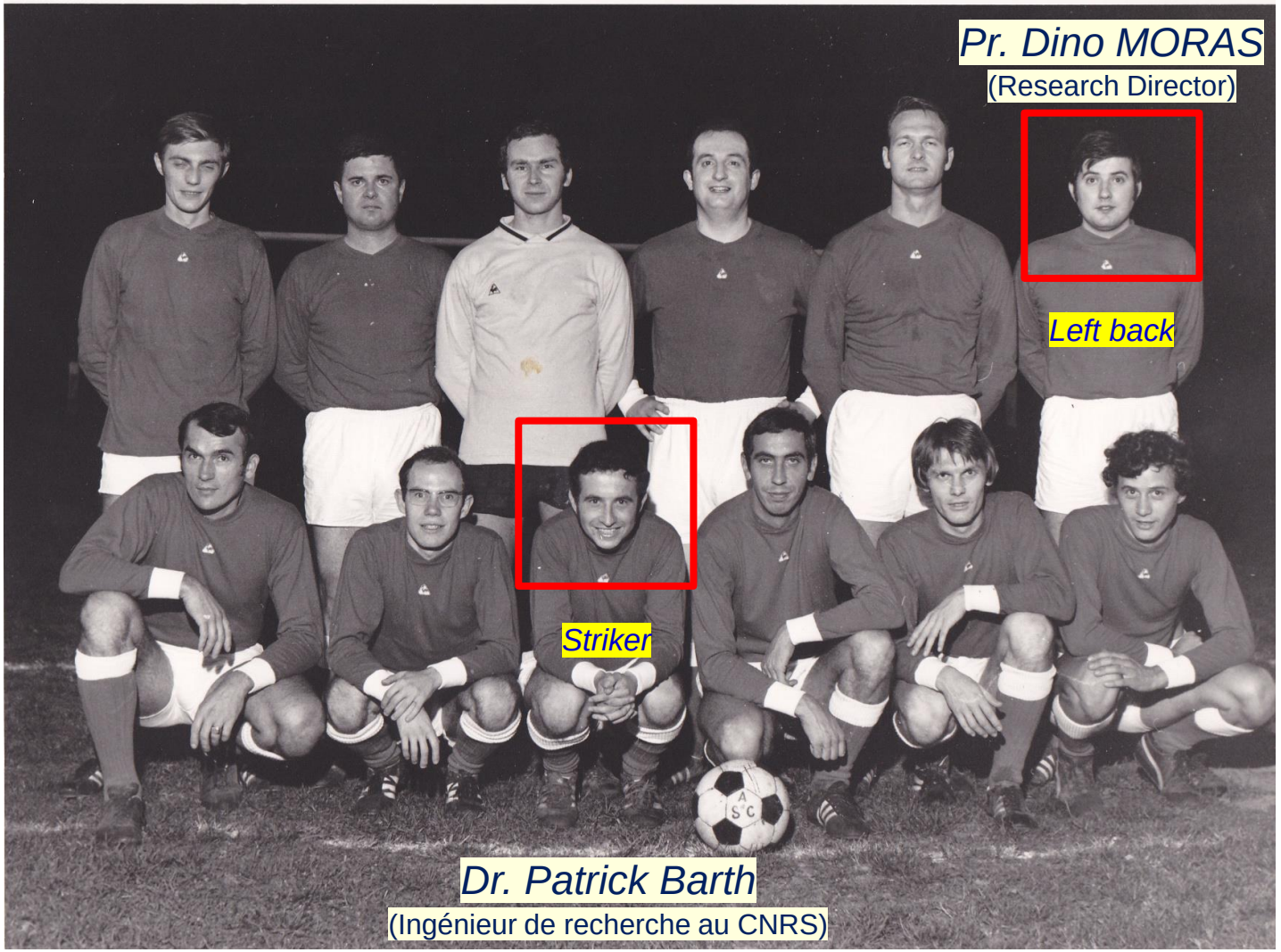
FCOSK 06 — FOOTBALL CLUB OLYMPIQUE STRASBOURG KOENIGSHOFFEN 1906

AS PIERROTS VAUBAN STRASBOURG

F.C KRONENBOURG 1908

Figure. 7

Interface between Chemistry and Soccer :
Human Coherence and scholars dosage



Courtesy of Pr. MORAS (Institute of Chemistry, 1971)

Figure. 8

Robert WURTZ : A child from the Meinau

*Lyrical referee and « **Nijinski of the whistle** »*

A)

B)

Finale, Ligue des champions, (Rome, 1977.05.25)

« Enthusiam is everything. It should be tight and vibrating like a guitar string »
Edson Arantes do Nascimento (Pelé)

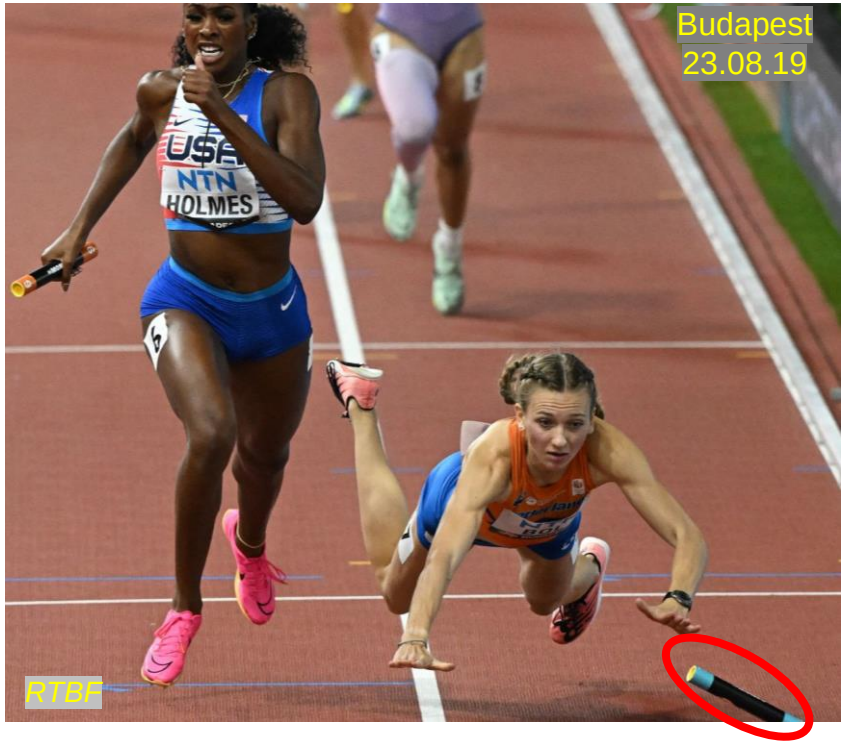
Figure. 9

Femke BOL : Athletic world championship

From the fall in the mixed 4 x 400 m…

To victory in the women's 4 x 400 m

A)



B)

« Success is not determined by how many times you win, but by how you play the week after losing »

*Edson Arantes do Nascimento (**Pelé**)*

Figure. 10

Science and Sports : Going beyond risk

To each their own challenge, to each their own quest

A) Barry MARSHALL
Physician - Researcher

Helicobacter pylori Bacteria
⬇
Stomach ulcers

B) Jessica MAURER-SPOERK
Administrative and basketball competitor

IRMA and Basketball
⬇
Two synergistic passions

C) Béatrice HESS
Swimming competitor

Paralympic Games
⬇
20 Gold medals

Figure. 11

My three gardian angels :
Leadership and complementary skills
« We need to look » J. Brel

A) Dr. Sophie LÉCORCHÉ
Urgentist
University of Strasbourg

B) Dr. Stéphanie PERRIER
Surgeon
University of Melbourne

C) Dr. Ali HAMICHE
Physician - Reseracher
University of Strasbourg

Saving my life thanks to knowledge and Humility

Figure. 12

Three fantastic physiotherapists and a team *to recover and hope…*

A)

B)

Jean-Paul GANGLOFF

C)

D)

Figure. 13

Two exceptional surgeons and their teams
to continue to rebuild myself and move forward…

A) Pr. Nabil CHAKFÉ
Surgeon, President of GEPROMED
Université de Strasbourg

B) Dr. Benoit LAMBERT
Surgeon
KREMLIN-BICETRE Hospital, APHP

Figure. 14

Kerri STRUG, Women's Artistic Gymnastics, 1996 Summer Olympics - **team competition**

a gold medal beyond her commitment

A)

B)

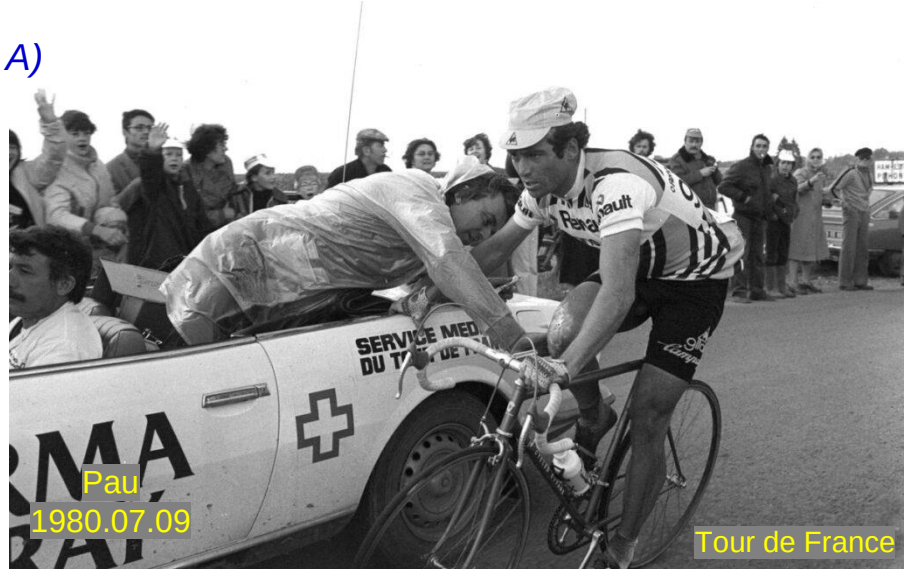
C)

Where is the limit ?

Figure. 15

Bernard HINAULT and the sense of tempo :
Knowing how to abandon himself to win

A)



B)

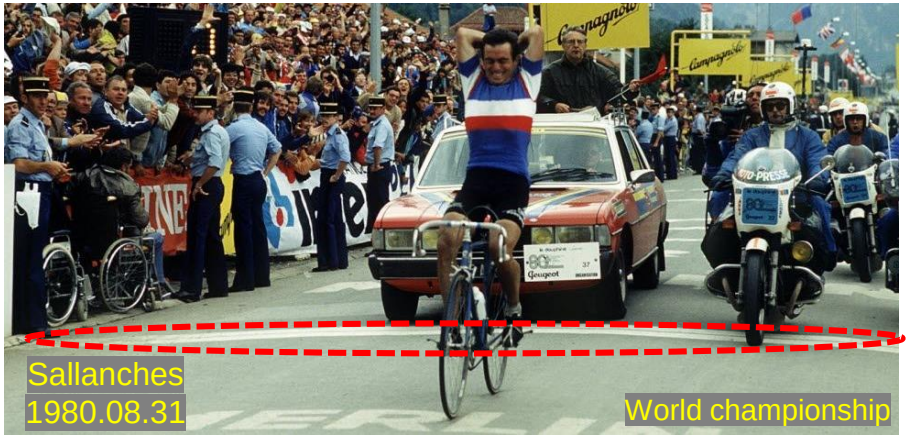


Figure. 16

Handover of responsibilities in pediatric nephrology: *50 years of Leadership*

Pr. Jean GEISERT

Pr. Michel FISCHBACH

Pr. Ariane ZALOSZYC

	Commission d'examen
Pr Vincent LAUGEL	Garant
Pr Pierre COCHAT	Rapporteur externe
Pr Thierry LOBBEDEZ	Rapporteur externe
Pr Jacques-Eric GOTTENBERG	Rapporteur interne
Dr Pierre ANTONY	Examinateur
Pr Justine BACCHETTA	Examinateur
Pr Olivia BOYER	Examinateur

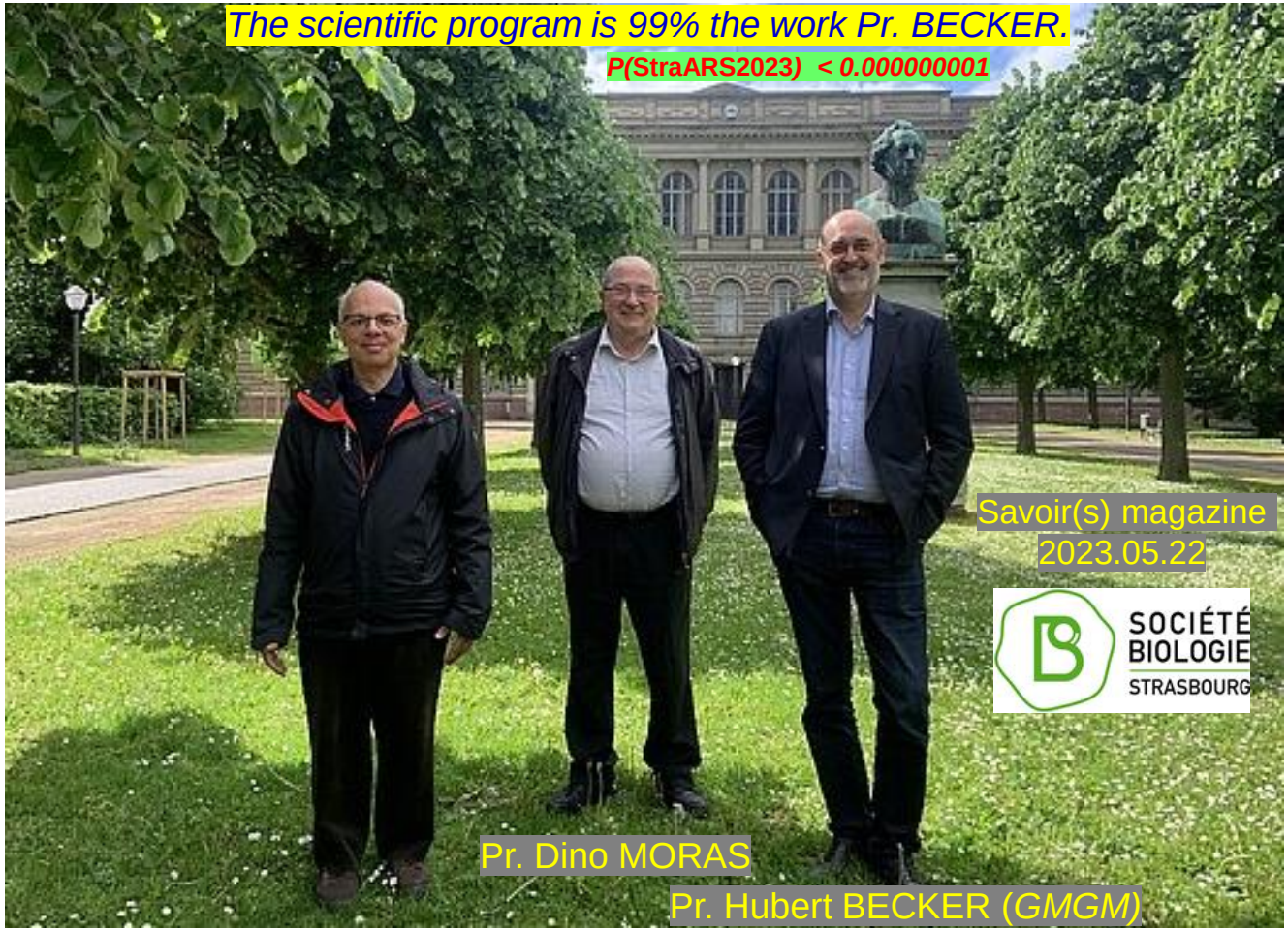
Certificate to conduct independent research

Rare kidney diseases :

Towards improved treatments and understanding pathophysiological mechanisms

Figure. 17

StraARS2023 symposium :
Aminoacyl-tRNA synthetases
Sculpting codes and shaping cellular physiology



A human adventure and a team spirit

Picture of Marion RIEGERT, co-editor-in-chief of the Savoir(s) magazine , science journalist at Unistra

Figure. 18

Setting-up StraARS2023 to with my colleagues :
Numerous financial supports

« Aminoacyl-tRNA synthetases :
Sculpting codes and shaping cellular physiology »

Scientific committee

Hubert BECKER, Pierre ANTONY, Dino MORAS, Patrick BARTH, Ali HAMICHE, Catherine FLORENTZ, Marie SISSLER, Magali FRUGIER, Gilbert ERIANI, Jean CAVARELLI

Figure. 19

StraARS2023 Symposium Organizing Committee :

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Figure. 20

More than 120 participants at StraARS2023 :
Numerous collaborations have emerged.

Figure. 21

Solène ZUTTION

1st year Ph.D. student speaker (23.06.13) at Stony Brook Cancer center, NY, USA

Invited by Pr. Yusuf HANNUN, M.D., Ph.D., Director

Figure. 22

Participants of the StraARS2023 symposium S2023 :

*A human, scientific and **musical** adventure*

Choir of Students of the Department of Music of Strasbourg University

Figure. 23

The StraARS2023 audience captivated :
The joy of sharing through a lyrical flight

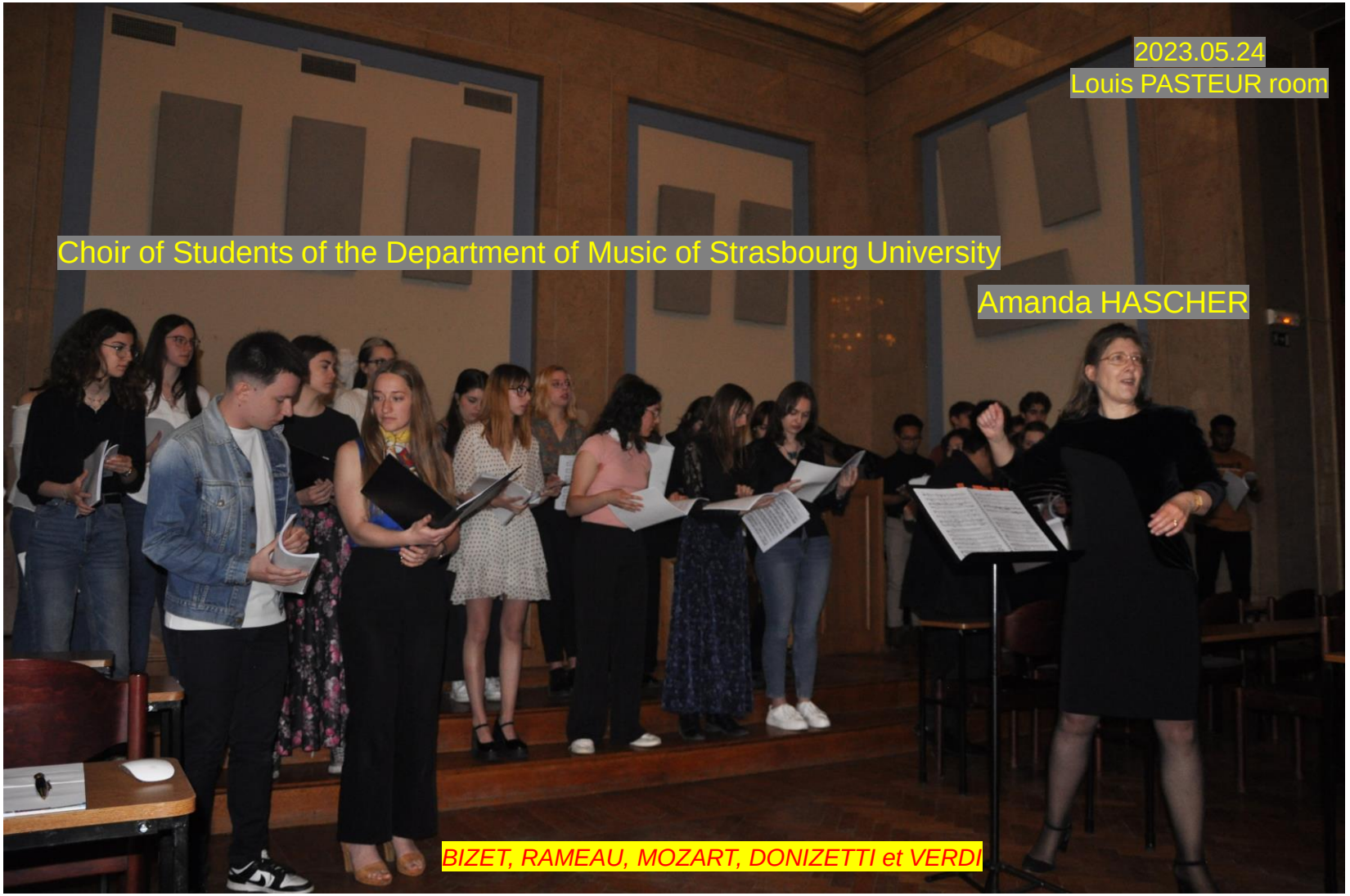


Figure. 24

Chemistry, Unifying creativity and… sense of swing :

*The breath of two **leaders** at the service of movement*

A) *A free and starry musician*

Carlos KLEIBER
Conductor

PARIS 2024

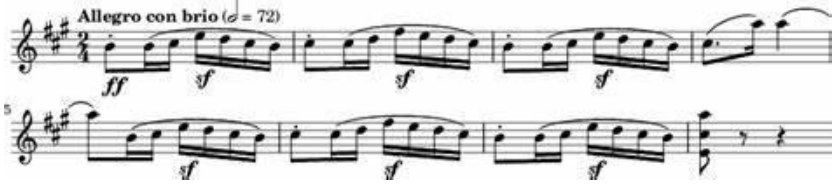
PARIS 2024
PARALYMPIC GAMES

B) *A free and starry scientist*

Dr. Audrey KOST,
Director of the de la Forsight and Strategy Mission
at the University of Strasbourg

C)

Ludwig van Beethoven,
Symphonie 7



Apotheosis
of dance

Figure. 25

Lucia POPP, lyrical artist : Defying gravity

Keep the flame and meet the stars

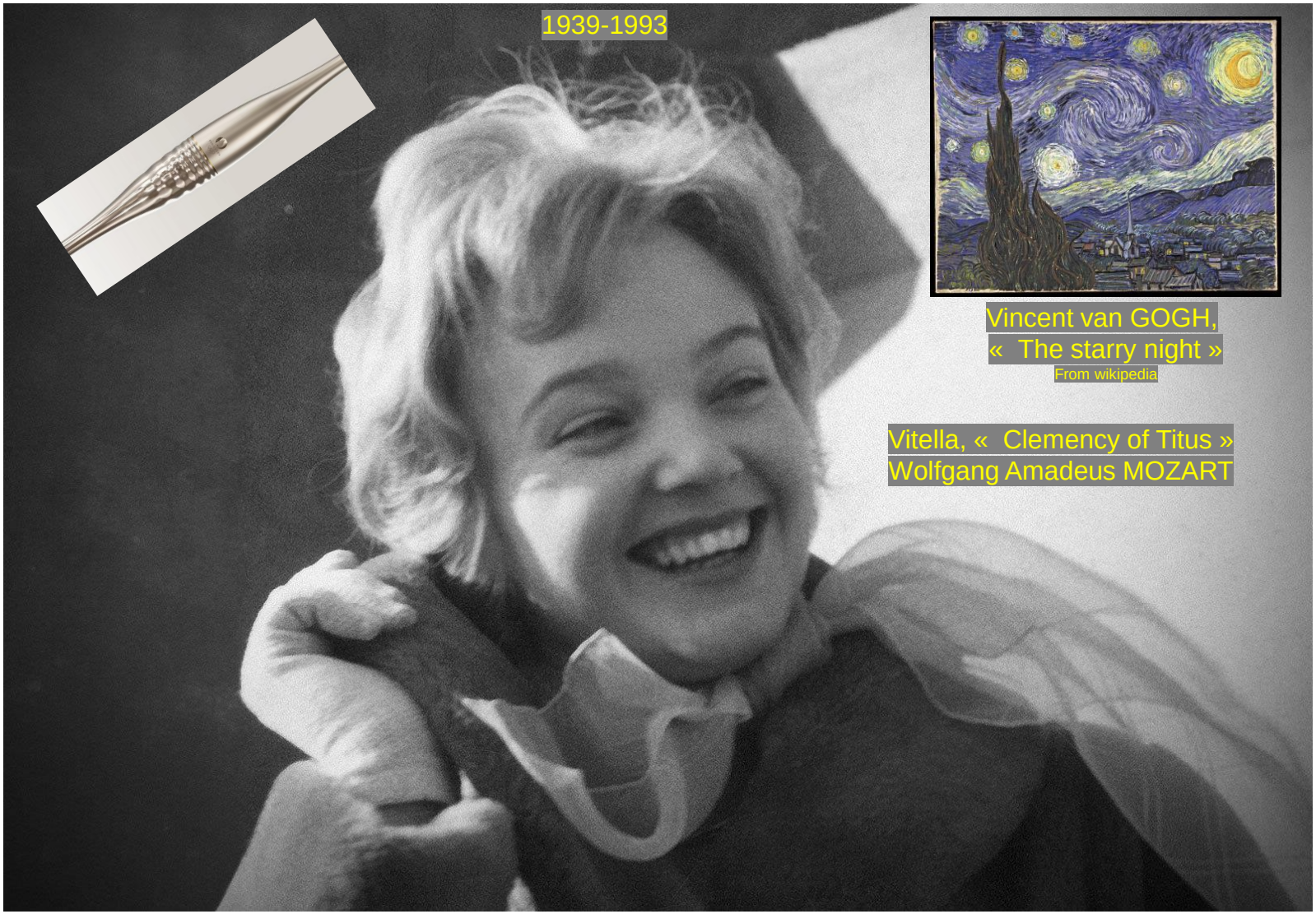


Figure. 26

Pr. Daniel STORCK, Physician : the MENTOR

*Step aside in front of his ART to **better** SERVE it*

« PASSING THE TORCH cannot be missed. »

Beyond the vibrating soul

Figure. 27

Department of Rheumatology, Hautepierre Hospital :

Long live Medicine, Science and Sport !

HUS
05.09.2023

Figure. 28

Institut of **G**enetics and **C**ellular **M**olecular **B**iology :
Generating knowledge on biological sciences

Mouse Clinic | Center of Integrative Biology | IGBMC

Figure. 29

Integration into Dr. Ali HAMICHE's team

A new human and scientific adventure

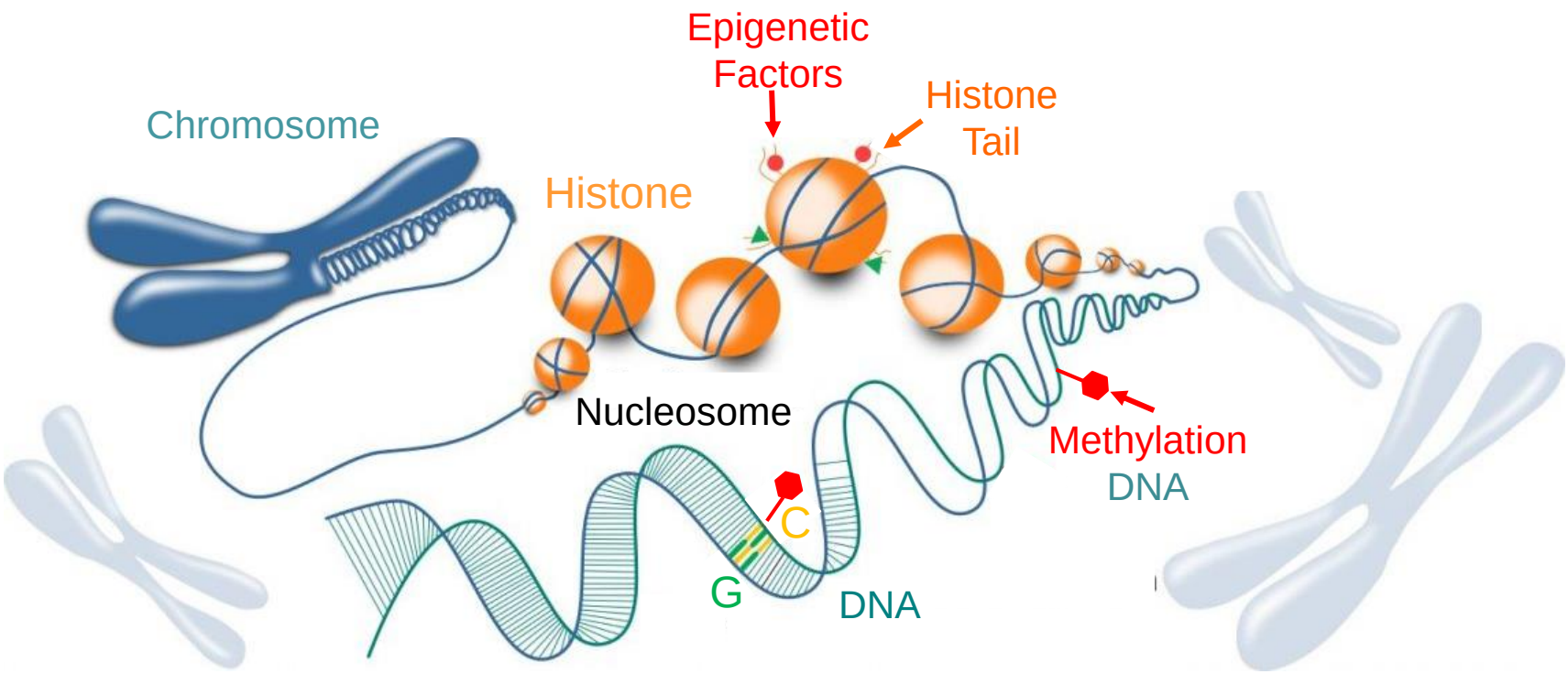
Figure. 30

Goal of our research :
Chromatin and epigenetic regulation in healthy and diseased tissues

No modifications of DNA sequence

Reversible Modifications

Transmission during cellular division



Chromatin structure and epigenetic regulation

Adapted from https://www.antibodies-online.com/areas/epigenetics/

Figure. 31

Never let it down. Go forward, always and again

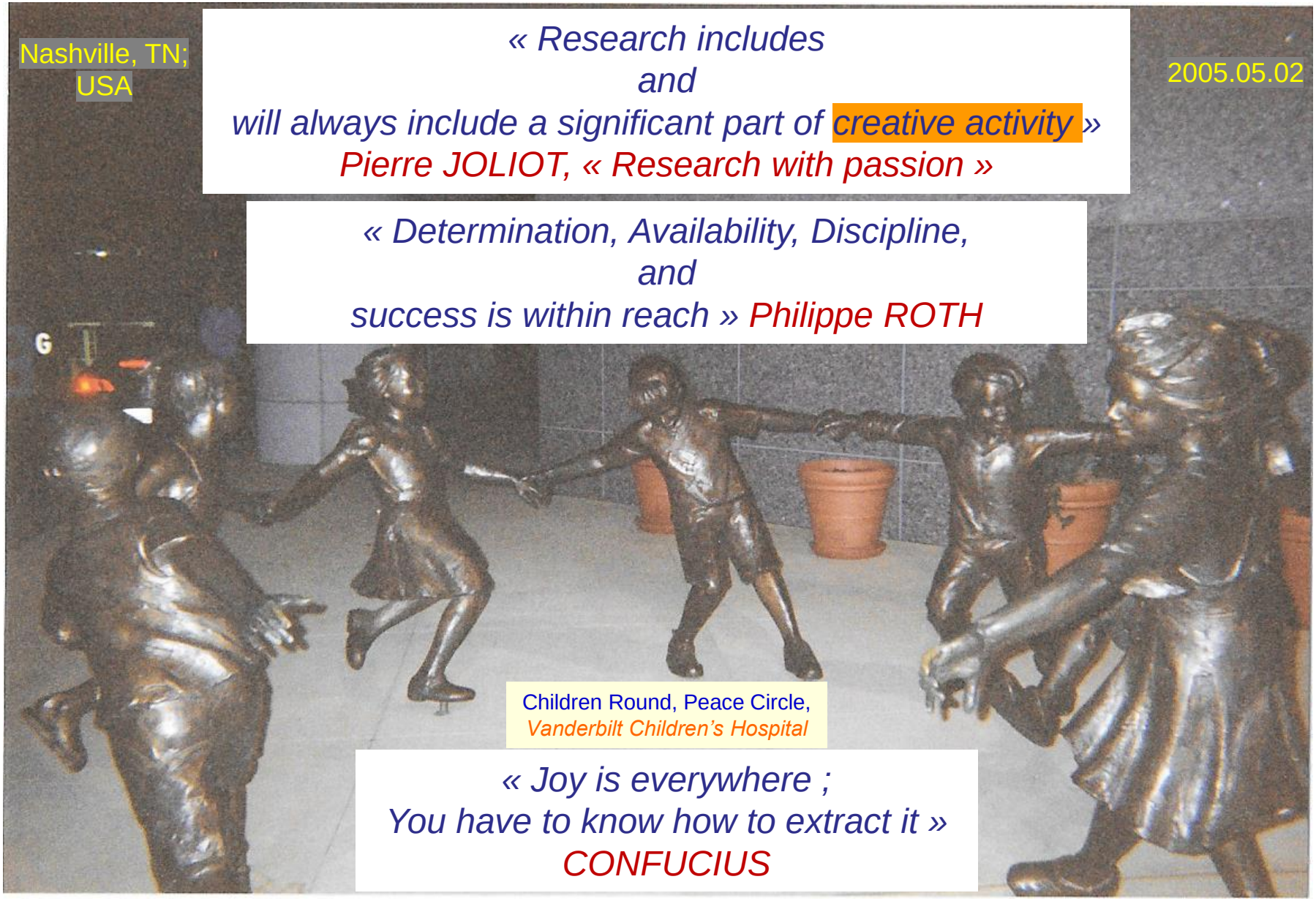


Figure. 32