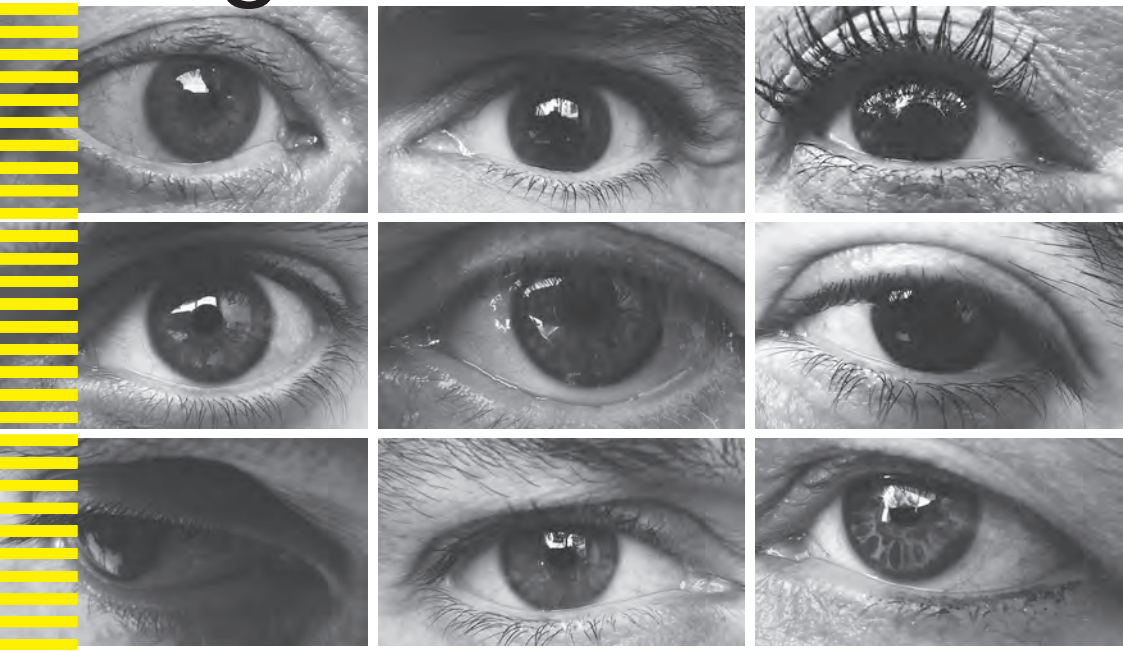
Perception of Self
and Nonself in Life

Dear Cell

Regina Hübner



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RÉSIDENCE
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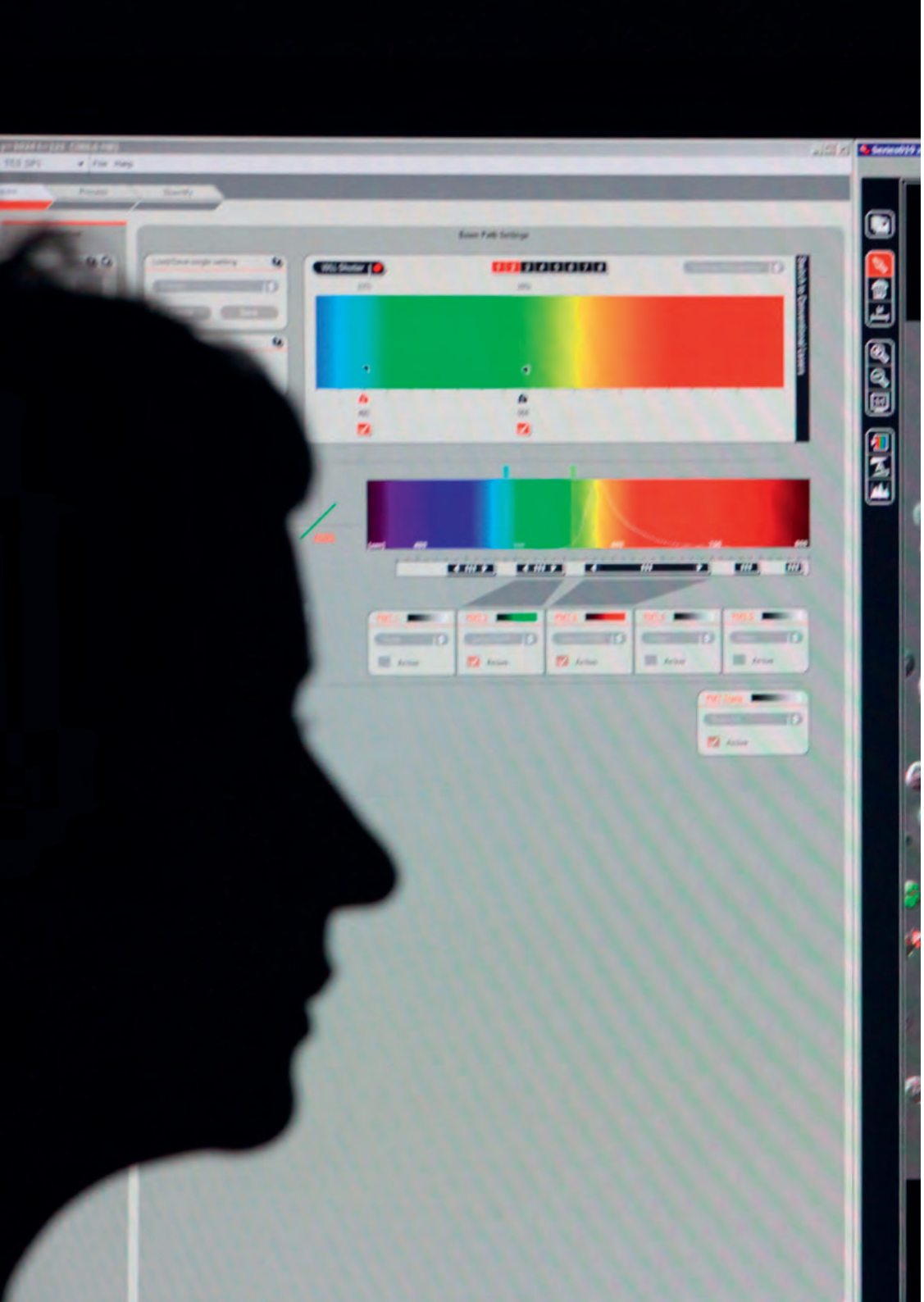


Du projet de recherche *Perception of Self and Nonself in Life* à l'œuvre *Dear Cell* / Regina Hübner

Un parcours d'artiste en résidence à l'IMéRA en collaboration avec le Centre d'Immunologie de Marseille-Luminy

FOCUS#1/IMéRA-AMU
RÉSIDENCE + ART + SCIENCE

La présente brochure est co-éditée par :

Provoquer la rencontre / confrontation entre démarche scientifique et démarche artistique

Denis Bertin

Président de l'IMéRA

L'accueil d'artistes en résidence, pour développer des projets en collaboration avec des scientifiques, constitue l'une des originalités de l'IMéRA dans le paysage des instituts d'études avancées, la seconde étant son ouverture aux scientifiques de toutes les disciplines du savoir.
Depuis le début de ses activités en 2008, l'institut sélectionne ainsi chaque année des artistes dont les projets nécessitent des collaborations avec des unités de recherche de l'université d'Aix-Marseille. Comme pour les scientifiques, les résidences d'artistes sont des résidences de recherche, en l'occurrence une étape de travail dans un processus de création.

Fondation de l'université d'Aix-Marseille, l'IMéRA est un institut d'études avancées de type UBIAS, qui accueille chaque année en résidence une vingtaine de chercheurs et d'artistes internationaux, issus de toutes les disciplines. Les résidents y développent leur propre projet de recherche en lien avec des équipes et des laboratoires du site d'Aix-Marseille.
L'IMéRA promeut les approches interdisciplinaires innovantes dans tous les domaines du savoir et contribue à l'internationalisation de la recherche sur le territoire d'Aix-Marseille. Installé dans le centre de Marseille, sur l'ancien site de l'Observatoire d'Astronomie, il organise tout au long de l'année des conférences et séminaires interdisciplinaires ouverts au public.
Membre du Réseau Français des Instituts d'Etudes Avancées (RFIEA), l'IMéRA fait également partie du réseau européen NETIAS (Network of European Institutes for Advanced Study) et du réseau mondial UBIAS (University Based Institutes for Advanced Study). Il participe en outre au programme de résidence Cofund FIAS-FP.
imera.univ-amu.fr/

L'objectif de ces accueils est de provoquer la rencontre/confrontation entre démarche scientifique et démarche artistique sur des objets partagés, afin de déplacer les questionnements, de renouveler les approches et de favoriser l'émergence de nouvelles questions et de nouvelles formes, pour les scientifiques comme pour les artistes. Il s'agit avant tout de tentatives de fécondation réciproque, avec l'idée que les chemins habituels de chacun pourront s'en trouver perturbés, modifiés, enrichis.
C'est dans ce cadre que s'est déroulée la résidence de Regina Hübner de février à juillet 2019, sur le projet *Perception of Self and Nonself in Life*, en collaboration avec le Centre d'Immunologie de Marseille-Luminy. De cette collaboration particulièrement fructueuse, des observations de l'artiste et de ses interactions avec les chercheurs est née l'œuvre *Dear Cell*, qui transforme les chercheurs en « Protagonistes » d'une œuvre d'art, assumant leur rapport personnel à leur objet de recherche.
Au public, *Dear Cell* permet de percevoir la passion qui anime le chercheur, loin de l'image de la science dure. Elle donne aussi à s'émerveiller face aux images scientifiques des objets qu'ils observent. Elle met enfin en lumière combien la science est dépendante, pour progresser, de femmes et d'hommes fortement engagés.
Une telle exposition avait naturellement toute sa place au sein de l'université d'Aix-Marseille, qui regrette de n'avoir pu la présenter comme prévu dans le cadre des Parallèles du Sud de Manifesta 2013, en raison de la crise sanitaire.

Pourquoi accueillir une artiste au Centre d'Immunologie de Marseille-Luminy ?

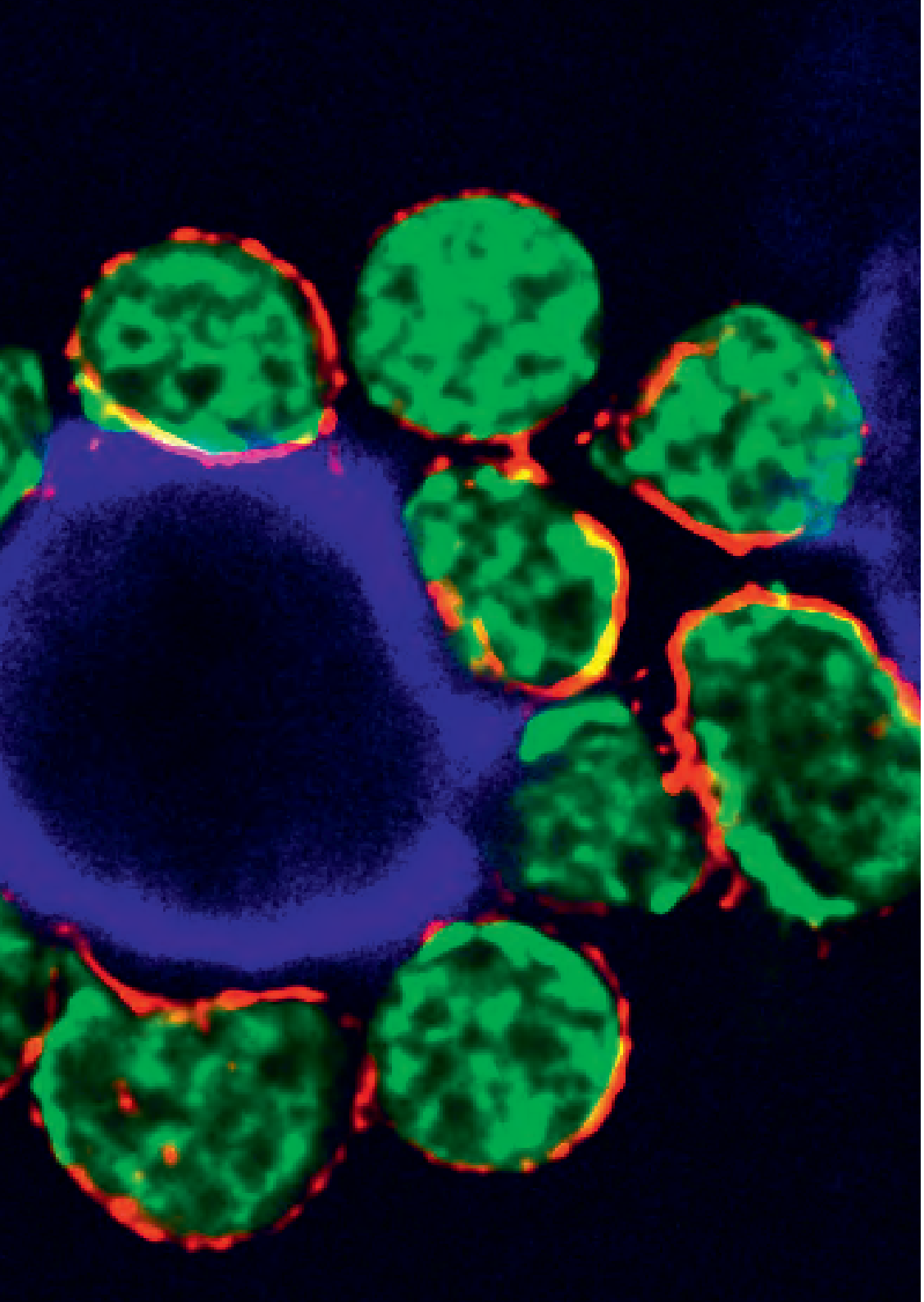
Philippe Pierre

Directeur du CIML

La caractérisation globale et la dissection de millions d'interactions moléculaires et chimiques responsables de la vie sont le challenge journalier des chercheurs en biologie. La recherche en immunologie ou en neurobiologie fait aujourd'hui appel à des technologies d'analyse de masse et d'intelligence artificielle qui entraînent le chercheur vers un monde d'une complexité difficilement appréhendable par le cerveau humain. De plus en plus, l'intuition du chercheur en biologie laisse place à la statistique, au modèle mathématique ou physique qui rapprochent la biologie des autres sciences dites "dures". Ce biais technologique change radicalement la manière d'aborder la recherche sur le vivant et le processus de la découverte qui, par le passé, s'est souvent révélé seulement dépendant de l'intuition du chercheur et de la sérendipité.

Pour essayer de remettre l'humain au centre de l'investigation de la vie, il est apparu opportun de donner l'occasion aux chercheurs du Centre d'Immunologie de Marseille-Luminy d'explorer l'interface possible entre l'art et leur sujet de recherche. L'ambition du projet *Dear cell* était de sensibiliser chercheurs et publics à la dimension proprement humaine de la science, au-delà de la déshumanisation de la recherche sur le vivant, tout en révélant sa beauté. Dans ce projet conjoint avec l'IMéRA, Regina Hübner a été capable d'entraîner un type de réflexion différent sur l'objet de recherche, en rendant le chercheur à la fois spectateur et protagoniste de son aventure personnelle et humaine. De manière surprenante, cette nouvelle perspective a séduit la plupart des chercheurs impliqués qui se sont prêtés à ce jeu de miroir en toute sincérité. L'éloignement de la finalité de la publication ou du résultat à tout prix, a favorisé une introspection chez ces chercheurs qui leur a permis de trouver une nouvelle motivation à leur engagement sans faille dans les sentiers souvent tourmentés de leur métier passion, tout en mettant en lumière l'objet tant chéri de leurs investigations.

Fondé en 1976, le Centre d'Immunologie de Marseille-Luminy (AMU-CNRS-Inserm) est un institut de recherche internationalement reconnu dans la discipline qui, dès sa création, a développé une organisation et des pratiques propres à favoriser la créativité et la prise de risque de ses chercheurs. Les dix-huit équipes de recherche qui constituent le CIML abordent tous les modèles, toutes les échelles, tous les champs de l'immunologie contemporaine. Du ver à l'homme, de la molécule à l'organisme entier, du physiologique au pathologique, le CIML étudie la genèse des différentes populations cellulaires, leurs modes de différenciation et d'activation, leurs implications dans les cancers, les maladies infectieuses et inflammatoires et les mécanismes de la mort cellulaire.
ciml.univ-mrs.fr/fr



Sommaire

Perception of Self and Nonself in Life

A project developed at Institute for Advanced Study of Aix-Marseille University (IMéRA), in collaboration with Centre d'Immunologie de Marseille-Luminy, AMU-CNRS-Inserm (CIML).
February – July 2019.

Presentation of the research by Regina Hübner

Outlines

The main outlines were to highlight the reciprocal dependence and influence between the perception of what we are and what we are not, on a personal, social and cellular basis and whether strong parallelisms can be established between these different systems, to testify of its interdisciplinarity by creating an artwork using different media with the imaging data generated at CIML.
To translate concepts into a visual form which evokes emotion and identification to increase interest in immunology and stimulate young people to engage with science or art and to involve local as well as international scientific and cultural realities.

Process

The process of realization went through information, inspiration and creation, with the visit of CIML Institute's all laboratories, personal meetings and approaches with 27 Research Directors, Group Leaders and Researchers from CIML and Inmed and public presentations of the project and previous artworks related thematically at IMéRA and CIML and study of basic immunology functions.

I was deeply impressed by the researchers' high specialization, knowledge and use of cutting-edge technology, by their involvement in dissemination through publications and conferences, by their capability to search for something specific and being contemporarily able to capture the unexpected, by their special relationship with the object of research and by their passion and devotion.

My inspiration was to invert the habitual relationship between researcher and object of research and to stimulate a new perception of the basic concept in immunology, the differentiation between self and non-self and to discover unknown parts.

Researcher and research are under the lens of observation: the researcher as an individual with unmistakable characteristics and his or her exclusive relationship with the object and, on the other side, the object as a self-standing entity lying on the plate under a microscope, with its special relationship to the researcher, from which its future life can be influenced.

Researcher and object are therefore the *Protagonists* in this *artistic system*.

The characteristics of the researchers are revealed throughout their intimate thoughts, their calligraphy, and their eye. Those of the objects are revealed throughout their real image and their "thoughts", as well. - Who else could give voice to the object,

Regina Hübner

Born in Villach, Austria. Lives in Villach and Rome, Italy.
Award Winner of *Monument to Paul Watzlawick*, Austria, 2020.
Fellow at IMéRA Institute for Advanced Study of Aix-Marseille University, 2019.
Experimental photography, video, performance, concept, subjects and objects and *Ambientations*.
Collaborations with personalities from visual art, literature, music and science and key-figures, the so-called *Protagonists*.
Inspiration from existential questions about nature and life in relation to others, emotional approach. Iconography generated from reality, often autobiographical connotations. To find the right visual form means for Regina Hübner to visualize a possible answer.

Exhibitions at MANIFESTA 13, Nuit Blanche Paris 2018, Vilnius National Museum, Dinzlschoss Villach, MMKK Museum Moderner Kunst Kärnten, EXPO Milano 2015, MLAC Museo Laboratorio Arte Contemporanea, Forum Austriaco Roma and Milano, Istituto Italiano di Cultura Vienna, FulgorAzione Arte Contemporanea, change + partner contemporary art, et al.
Participations at VIDEOFORMES 2019, Čiurlionis National Museum, Friuli-Venezia Giulia Fotografia, CAPC Bordeaux, ZKM Karlsruhe, Temple Gallery of Arts, Goethe Institut Rom, Istituto Polacco Roma, et al.
Festivals like BIM Buenos Aires, Now & After Moscow, OVER THE REAL - Lucca Film Festival, ADAF Athens, FIAV Casablanca, et al.
www.reginahuebner.net

if not the person who knows it best, the researcher?

For this, I asked the researchers, to write by hand a sincere letter to their object of research. Then, to perform an artistic act by personifying this object and to address such a letter to themselves.
The handwriting was video recorded, the manuscripts transcribed. The eye of the researchers was filmed.
The researchers provided photographs and videos of their objects, produced in their laboratories.

Results

Each of the 27 approached researchers were interested in the project. One researcher denied being a *Protagonist* while appreciating the project. 17 researchers participated. 32 letters were produced, 85 photographs and 20 videos of the objects were provided, 17 eyes were filmed.
The resulting artwork is entitled *Dear Cell* and consists of four independent videos.

Presentation of *Dear Cell* born of research

Dear Cell consist of four independent videos, Dear Cell (letters), Dear Cell (transcriptions), Dear Cell (cells) and Dear Cell (eyes).

By Regina Hübner

The relationship between researcher and object of research is enlightened and its inversion offers a new perception of what we are and what we are not. The contributions by 17 researchers of Centre d'Immunologie de Marseille-Luminy (CIML) and Institute of Mediterranean Neurobiology Marseille (Inmed) are constituent. Researchers and objects are the so-called *Protagonists*.

Dear Cell (letters) – digital video, b/w, 60', 2019.

Dear Cell (transcriptions) – digital graphic video, b/w, 59'40", 2019.
A handwritten letter is rare nowadays. It is therefore important. It is classic. Writing by hand takes time and presumes dedication. The calligraphy is the seismograph of our inner status and identifies us. When the line appears, it evokes a living system with its singular shape and speed. A letter is a vehicle of communication, its message lasts. A dedicated letter makes us feel important and our heart beats, we are happy when we receive one from our beloved ones. A typed letter is clearly to be read. It is abstract. It is a documentation.
The researchers wrote by hand a letter to their object of research (Letter from ME-researcher to you-object) and they addressed such a letter to themselves (Letter from YOU-object to me-researcher). The handwriting was video recorded with a graphic pen on a digital tablet, the manuscripts transcribed.
The letters, most in English, some in French, share high sincerity, intimacy, profoundness, and literature quality. They go from historical or autobiographic descriptions to love-letters, pure poems, and concepts.

Dear Cell (cells) – digital video, colour, 34'35", 2019.
The images, on which the researchers work, are impressive, astonishing, beautiful. We carry those infinite parts in our bodies, some of the images remind us on our universe. They are attractive and stimulate phantasy. Their aesthetic is independent from their value. The image is a proof of what is taking place.
The researchers provided images of generated data, photographs, and videos of their objects of research,
produced with confocal, multiphoton, and light sheet microscopy by CIML and Inmed.

Dear Cell (eyes) – digital video, b/w, 56'38", 2019.
The researchers use highest technology, however they observe with our most beautiful organ, nature's gift, the eye. It is an "instrument", which works for each one in the same way, but there is no same eye in the world, it is the filter between exterior and interior. The iris distinguishes and identifies, it is exclusive. The eye is beautiful, it is precious. To look into the eyes means to come in deep touch, we do not need words to understand each other. The eyes are the mirror of the soul, eyes cannot lie, a glimpse can petrify someone, with a glimpse we can fall in love.
The eye of the researchers was filmed in close-up. They go from darkest black to lightest turquoise, have marble-like conformation of irises, show reflections of surrounding environment, have slow or fast movements of eyeballs with blinking eyelashes and penetrating glimpses.

Technical presentation of the exhibition

Dear Cell at MANIFESTA 13 – Les Parallèles du Sud* is a solo exhibition by Regina Hübner at Espace Fernand Pouillon, Campus Saint Charles, University Aix-Marseille, from 6 to 28 November 2020.

Curated by IMéRA - Institute for Advanced Study of Aix-Marseille University (AMU) and Regina Hübner.
Text by Arnulf Rohsmann *forschung und eros*.

Dear Cell was selected by the jury of MANIFESTA 13, Colette Barbier, Alya Sebti, Michèle Sylvander and Hedwig Fijen for the program Les Parallèles du Sud, which is supported by Région Sud.

The exhibition shows *Dear Cell* for the very first time in its complete version in an exclusive *ambientation*.
It developes in the whole space of around 200 m², harmonizes with the minimalistic style and the rhythm of the architectural structure of Espace Fernand Pouillon.

Exhibitions

MANIFESTA 13 Marseille – Les Parallèles du Sud, Marseille (2020).

VIDEOFORMES 2021, International Digital Arts Festival, Clermont-Ferrand (2021).

KAUNAS 2022 Contemporary Capital, European Capital of Culture, Kaunas (2022).

Presentations, Ante Prima (2019)

IMéRA, *Perception of Self and Nonself in Life – Dear Cell*.

CIML, *Perception of Self and Nonself in Life*.

A*Midex, FRAC Marseille, *Doing and Saying Science Differently*.

Mandel Center Tel Aviv, *Instant Conversation about you and me*.

National Museum Vilnius, *Instant Conversation about you and me*.

Text

Arnulf Rohsmann, *regina hübner / forschung und eros*, Depliant MANIFESTA 13 and Booklet IMéRA (2020).

* Exhibition cancelled due to the health crisis

List of Protagonists

(alphabetical order)

17 Research Directors, Group Leaders, Professors and Researchers of CNRS, Inserm and Aix-Marseille University

Agnès Baude
Chargé de recherche Inmed, Neuroscience

Marc Dalod
Research Director, Group Leader CIML, Dendritic Cell and anti-Viral Defense

Evelina Gatti
Research Director CIML, Dendritic Cell Biology

Mauro Gaya
Chargé de recherche, Group Leader CIML,
B-Cell Immunology to Infection

Jean-Pierre Gorvel
Research Director, Group Leader CIML, Host Pathogen Interaction

Dario Armando Leone
Researcher CIML, Endolysosomal Trafficking in Immune Cells

Didier Marguet
Research Director, Group Leader CIML, Membrane Dynamics and T Lymphocyte Signaling

Pierre Milpied
Chargé de recherche, Group Leader CIML, Integrative B Cell Immunology

Françoise Muscatelli
Research Director, Group Leader Inmed, Function of the Brain during Development

Bertrand Nadel
Research Director, Group Leader CIML, Genomic Instability and Human Hemopathies

Philippe Naquet
Professor, Group Leader CIML, Tissue Inflammation and Immunity

Serge van de Pavert
Chargé de recherche, Group Leader CIML, Development of the Immune System

Philippe Pierre
Research Director, Group Leader and Director CIML, Dendritic Cells and Pathogens Sensing

Sandrine Roulland
Research Director, Group Leader CIML, Genomic Instability and Human Hemopathies

Sandrine Sarrazin
Chargé de recherche CIML, Stem Cell and Macrophage Biology

Michael Sieweke
Research Director, Group Leader CIML, Stem Cell and Macrophage Biology

Sophie Ugolini
Research Director, Group Leader CIML, Innate Lymphoid Cells and Neural Regulation of Immunity

Agnès Baude

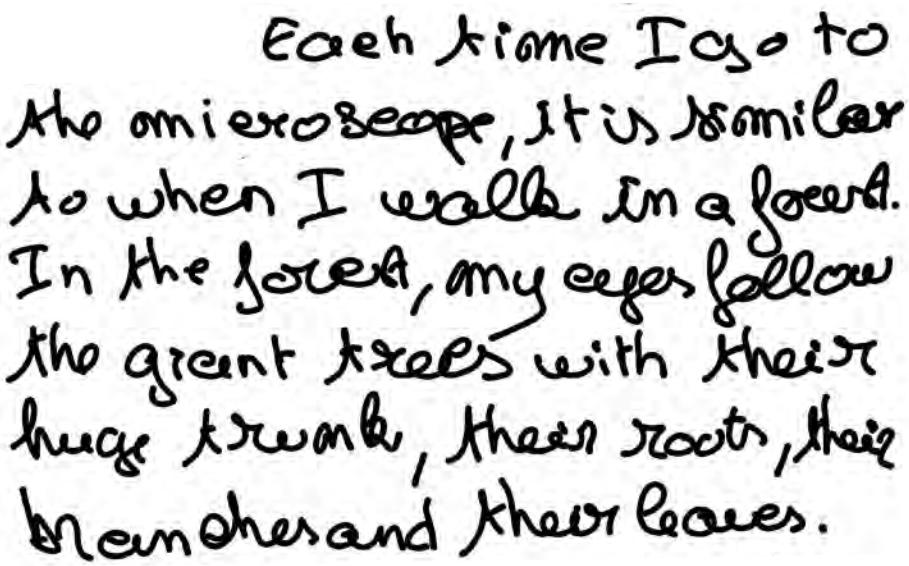
Letter from ME-researcher to you-object (The Neurons)
10 September 2019

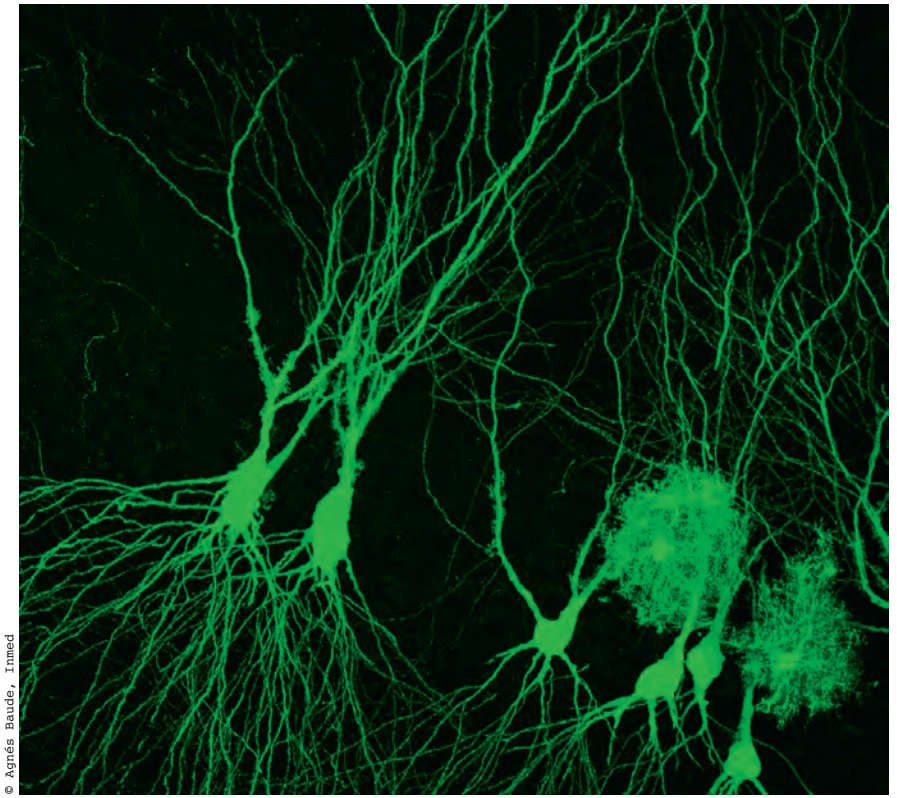
Thanks Ramon y Cajal to have given me the taste to wander in the neuronal forest. Each time I go to the microscope, it is similar to when I walk in a forest.
In the forest, my eyes follow the giant trees with their huge trunk, their roots, their branches and their leaves.
Under my microscope, when I observe pyramidal cells in the neocortex, I also follow their trunk, their basal dendrites their apical dendrites and their spines.
Suddenly, a bird leaves a branch and flies away. I follow it, but I end up losing it. I have forgotten my binoculars.
Suddenly, something arouses my curiosity. An axon comes off and goes away. I have my microscope and I can follow it all along his way through the depth of the brain.
In the jungle of the brain, you can observe new types of cell with different roots, branches or leaves, new species.
When, because of neurological diseases, epilepsy or trauma, your jungle is in fire you can lose some cells, some species. It is the same when the amazonian or the siberian forests are in fire, we lost trees and animal species.
When I observe you, small neurons, through my microscope, when I observe you, giant trees, my only conclusion is that we are all coming from the same world.

Letter from YOU-object (The Neurons) to me-researcher
10 September 2019

You are looking at me?
But who are you? What are you spining*?
Ah… it is you! But you were still here yesterday, are you not able to leave me quiet?
Every time you come to see me, you take out all your big equipment and I have to light up**, all that requires energy!
OK, it's good for today, you can explore the forest, let me warn others!
"Hey guys, she is back, be nice with her, she is just here to observe. Don't change anything"
Have you seen Emma*** (a new neuron). She has grown, her dendritic branches are almost as long as those of Robert**** (an old neuron).
So, OK, you have finished?
Will you come back and when?
Please tell me in advance, as I can warn my colleagues. We will prepare something for you, SURPRISE!!!

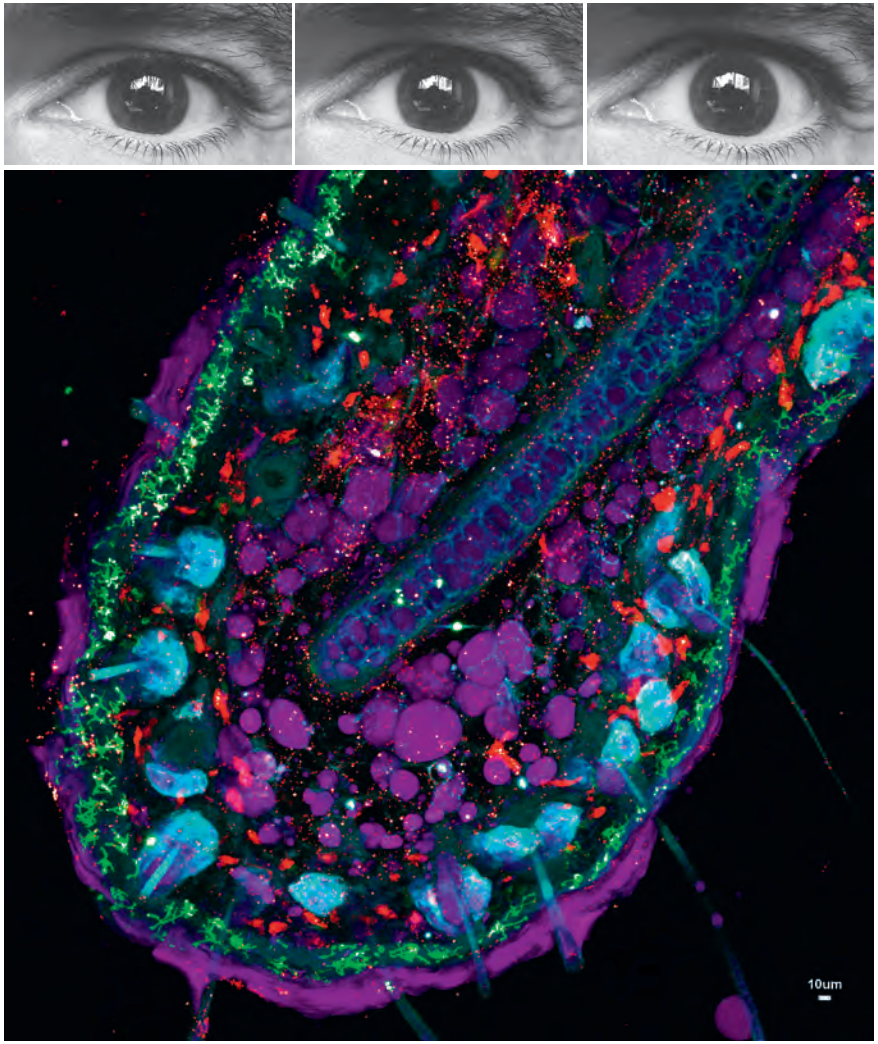
* spining (from spine) = spying in neuronal language
** to be visualized, neuron express fluorescent protein
*** in mouse, adult neurogenesis occurs in cortex
**** an old neuron, a neuron generated during embryonic neurogenesis





Focus on tree-like excitatory cells in mouse hippocampus

Marc Dalod



© Marc Ambrosini, group of Karine Crozat, team of Marc Dalod, CIML.

In ear skin, cDC1 (red) are localized in the dermis, around hair follicles (cyan). Occasionally, they can be seen interacting with T cells (green)

Letter from ME-researcher to you-object (Type 1 Conventional Dendritic Cell)
15 September 2019

My dear type 1 conventional dendritic cell,

For many years, I have been searching for the key cell type promoting our protective immune defences against cancer and viral infections. I am convinced this is you.

My quest probably started because, when adolescent, I had been deeply shocked by my grandmother's rapid but agonizing death as a victim of breast cancer. I was also horrified by the pandemic caused by human immunodeficiency virus and how it was leading to a devastating and deadly disease, leading at the time to a terrible ostracizing of the infected individuals in all countries. I became aware of the similarities between the mechanisms used by our body to eliminate cancer and viral infections. Our immune system had to discriminate healthy cells from those affected by the infection or the transformation, allowing the specific killing of the latter. I decided to help understanding how this ability of our body to discriminate normal from altered self could be circumvented by cancer or certain viral infections.

Like many researchers in the field, I initially focused on one of the main soldiers of our immune system in charge of carrying out the death sentence against abnormal cells: the cytotoxic CD8 T cells. However, by the end of my PhD, I realized that I should rather look for the general in charge of designing the battle strategy. I wanted to identify the cell type able to identify the nature of the threat and to decide which types of soldiers to hire, with which weapons, and where to position them. I thus decided to focus on dendritic cells, asking whether their recently described heterogeneity could allow identifying the special immune cell type uniquely able to sense infected or transformed cells and to orchestrate their destruction by directing the activities of effector immune cell types.

My quest has been further reinforced by each additional toll that my family and friends paid to cancer over the years, including my mother's death to ovarian cancer.

I am happy that I found you. "I have got you under my skin" as Ella Fitzgerald would have sung, and as might be understood from the title of an "Immunity" editorial I wrote when you were shown to reside in human skin.

I could not help but felt jealous when other researchers got greater credit for discoveries about you that my team had been the first to make. I regretted that I was not directly involved in baptising you with your current consensus name. I have been sad when we were scooped in revealing something new about you.

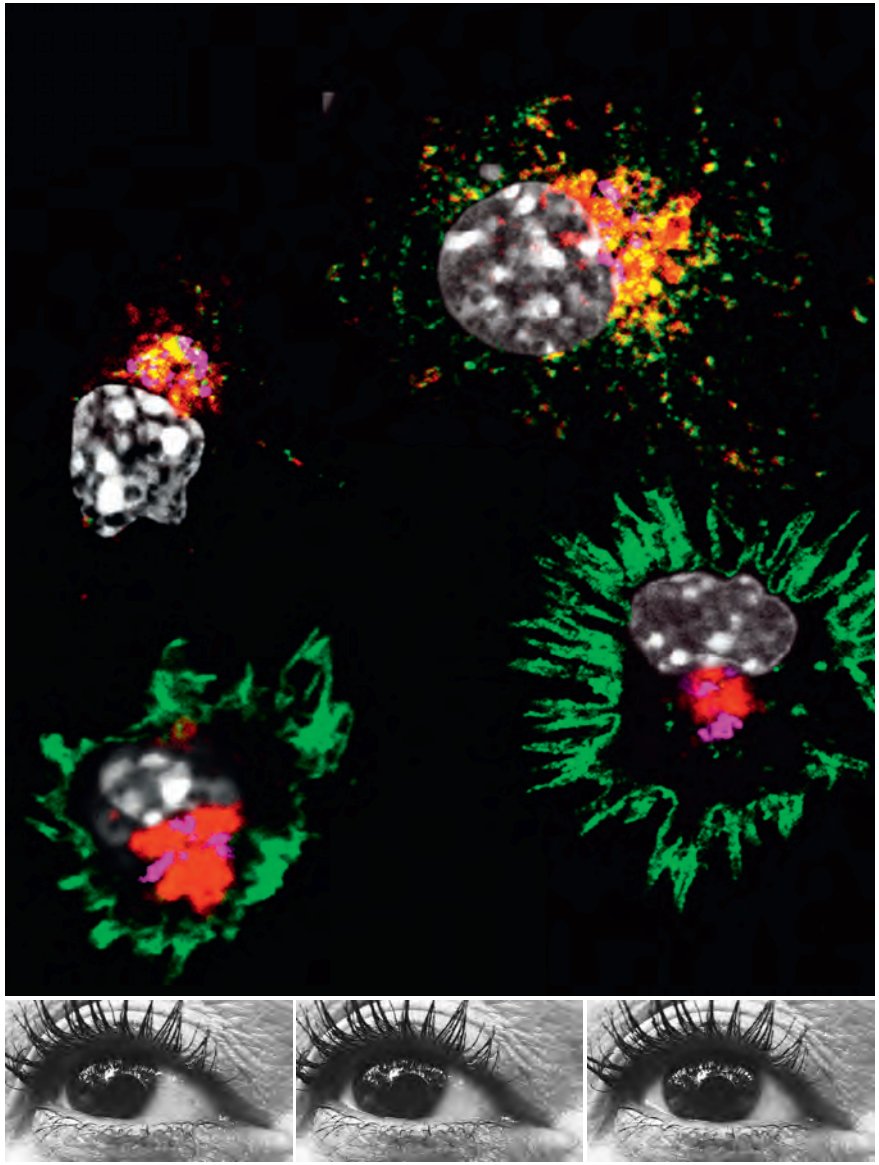
However, these transient jealousy episodes are nothing compared to my pride that so many people are now scrutinizing you, trying to understand whether and how you promote health over disease. I am happy that ongoing clinical trials specifically aim at harnessing your functions for the benefits of patients. I hope that you will fulfil these great promises, to help our body discriminating its healthy from altered self in a way further accelerating the ongoing revolution for treating cancer and other diseases.

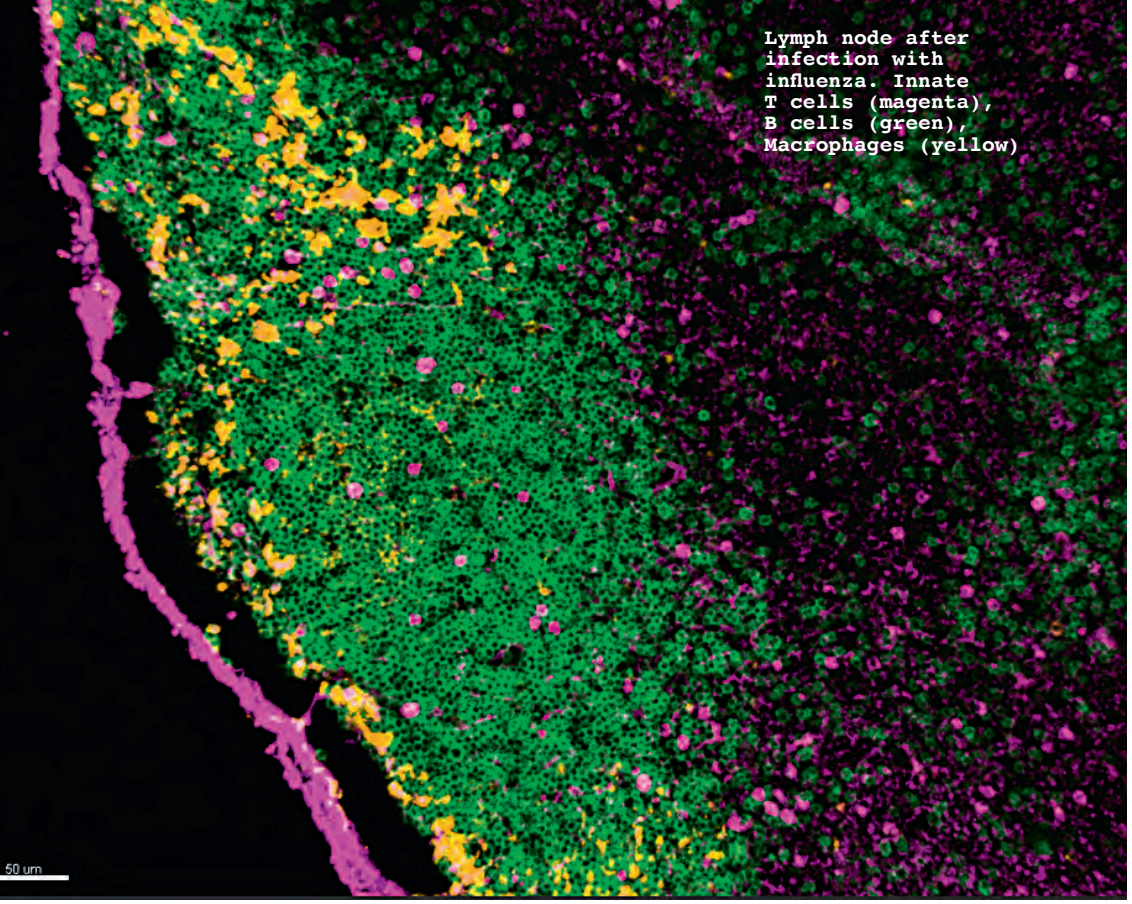
Letter from YOU-object (Type 1 Conventional Dendritic Cell) to me-researcher
15 September 2019

Dear Marc,
Thank you for writing how much passion you feel for studying me.
In return, I want to let you know how happy I am that you revealed my existence in humans and contributed to put me under the spotlight after many years of gross neglect.
I was first identified in 1992, when Ken Shortman and his colleagues decided to explore the heterogeneity of mouse dendritic cells and determine whether this population encompassed distinct cell types endowed with different functions. My discovery clearly belongs to these pioneering researchers. Their perseverance in pursuing their original studies to characterize me was all the more remarkable as for many years they were regarded with contempt by peers who accused them of conducting useless studies similar to stamp collection. Even after I was reported to play a major role in mouse antiviral defence, many researchers interested in understanding human Immunology to improve public health thought that I was a peculiarity of this animal model not worth studying. This is likely because my superficial mouse and human identities differed based on empirically defined cell surface markers.
I was thrilled when you undertook to compare mouse and human dendritic cell types and unravelled the evolutionarily conserved core molecular makeup underpinning my deep identity. However, before I finally got the attention I deserve, it took independent confirmation of your work combined with its persistent publicity by renowned independent researchers. In 2010, your perseverance was rewarded with the contribution of one of four papers published back-to-back in the Journal of Experimental Medicine and considered by many researchers as the studies that put me in the spotlight as the candidate cell type orchestrating human immune defences against cancer and viral infections.
I can understand the jealousy that you wrote feeling when others began to show a keen interest in me, inasmuch as their relationship with me eventually attracted greater visibility. However, as you know, the success of your discovery can be measured by how rapidly and broadly it diffuses in the community and escapes your control to go on with its happy own independent life.
I am glad that you did not relish too long in petty feelings, and that you are happy for me to attract the attention that I deserve. This is necessary for me to get all the support required to help harnessing my unique functions for the development of innovative treatments to improve clinical care of patients suffering from cancer or other diseases. Please keep your trust in me for that.
I hope that our relationship will last for many more years, remaining serene and fruitful, while you are focusing on pursuing your studies of my functions and their molecular regulation.

Evelina Gatti

The activation of dendritic cells, MHC II molecules (green) and lysosomal associated membrane protein 2 (red).





Lymph node after infection with influenza. Innate T cells (magenta), B cells (green), Macrophages (yellow)

© Mauro Gaya, CIML

Mauro Gaya

Letter from ME-researcher to you-object (Invariant T Cells)
20 September 2019

Dear iT cells,
Thanks to you I've earned some money to investigate what you do in our body. That's a nice start! At the beginning, I was happy to see how important you were in protecting us against infectious bacteria. However, with the pass of the time, it's getting harder and harder to find out what exactly you do to keep us healthy. I know that this is science and I need to continue trying until I find your tricks. I wish you could enter into my dreams and tell me in which direction I should go. I hope our relationship finishes, or continues, as good as it started.
Best,
Me

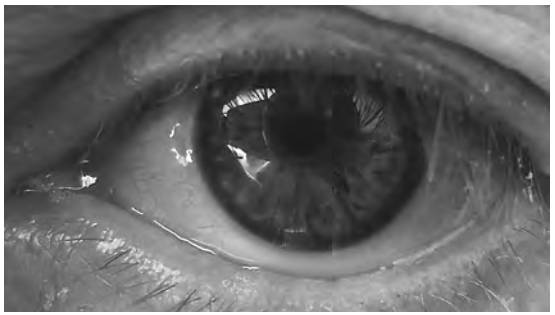
Letter from YOU-object (Invariant Lymphocyte) to me-researcher
20 September 2019

Dear Mauro,
I know you have been trying hard to find out which is our physiological role, why we have been selected throughout evolution and why people didn't find us until only recently. You know we are important because without us you don't survive when little bugs infect your respiratory tract. We cannot tell you what exactly we are doing but I promise you that you won't be disappointed once you find out. Keep trying hard, we need you to shed light into us and show the world that we rock.
Wish you the best,
The iTs!

Dear Mauro,
I know you have been trying hard to
find out which is our physiological role

Jean-Pierre Gorvel

Letter from ME-researcher to you-object (Brucella and other bacteria)
13 June 2019
Dear Brucella and other bacteria,
We have come a long way you and I. I came from a pure cell biology background and you permitted me to draw a bridge between basic and biomedical research. Instead of studying inert beads, you led me into the complicated war between a pathogen and its host. On the other hand, you, the beneficial bacteria, like the microbiota, blur the division between self and nonself.
I now realize how much nonself we are. Indeed, depending on the scale, we are much more nonself than self. Therefore, the idea of self from a microbiological point of view is clearly an illusion. How much of a self can we consider ourselves when microorganisms outnumber human cells ten to one? We are increasingly aware of the pivotal role these microorganisms perform in human health for good or for ill.
On the other hand, during an infection, the sense of self is heightened because it results in a war between the organism: in this case the human being, i.e. me and you, the pathogen.
Brucella, you are such a worthy and ancient opponent. The relationship between your species and mine is extremely old. You are related, in evolutionary terms, to one of the most outstanding acts of symbiosis, the mitochondria. Virulence decreases as the time of the relationship between the host and the pathogen increases. You come into our bodies, practically unannounced. You fool our immune system. You are incredibly difficult to diagnose as, in the acute stage of the infection, you can disguise yourself as a common cold. You can stay in our bodies for years, and only in the long term, you will camouflage yourself again as arthritis. Your capacity to confound our defences is outstanding. Such capacity has been the focus of study and research for many years of my life. In addition, it is still not resolved. You will continue to surprise me.
As to the microbiota, you might turn out to be the real captain of our bodies. In this case, the lines of the self are blurred. How much self-will can we pretend to have if you are the ones who are in charge of our well-being? You can control one of the most human characteristics: our moods. If the balance between the trillions of microorganisms and the cells in our bodies is attained, we can thrive with this perfect symbiosis and we can aspire to become a united self within this cellular and microbial community.



I now realize how much nonself we are.

Letter from YOU-object (Brucella) to me-researcher
13 June 2019
Dear JP,
I am not sure if I like you. In fact, I think not. You have spent your time trying to decipher the mechanisms in which I, Brucella, can fool the immune system of your species. It is a very ancient battle, I would even call it a war, and to be honest, I am not sure you will win this one… I am very conscious of my *self* and of your self, you, a host in which I could live for as long as you live, provided that you do not diagnose me and treat me with vaccines (in the case of animals) or with antibiotics (in your case).
I have had a very long time to perfect my weapons. The first one is to invade your organism without causing too much alarm. I am able to withstand a huge loss at the beginning of infection making you believe you are winning. I will infect a few cells (macrophages) which will be enough to keep on living for many years in your organism. I am even able to hijack your own cells (neutrophils) as a Trojan horse to disseminate myself in your body. In summary, I am the bee's knees.
At the beginning of the infection, you will think it is a common cold or, in the worst case a flu, both caused by viruses and you will therefore not think of attacking me with antibiotics. Many years later, I will live in your body and you will get confused again thinking that you have arthritis, and again, fail to treat me with antibiotics. In many cases, I will live for a very long time and die with you.

I am able to cause havoc in your livestock as well: cattle, pigs, sheep and goats. However, if you think you are safe because in 40 years you will all be vegans, think again. I am able to infect wildlife as well: camels, boars, deer, voles, frogs, worms and even your beloved dogs and dolphins.
You have spent a long time studying my weapons and me. You have made good progress and I salute you for trying. At least you have deciphered my mechanism of entry, how I am able to withstand big losses at the beginning, the cell in which I can multiply while hiding, the blurred messages I am sending to your immune system to keep concealed for many years. In addition, you have an excellent candidate for a vaccine for cattle and sheep. You have won many battles but your war is lost. My capacity for hiding will continue to surprise you. The ways in which I can pass blurred signals to your immune system will still confound you.

Dario Armando Leone

Letter from ME-researcher to you-object (Endolysosomal Trafficking in Immune Cells)
15 September 2019

Blood circulating human immune cells are a very good model, they are accessible, almost free and by using them you can directly draw conclusion on human diseases without keep asking yourself whether the results obtained using mice, worm or zebra fish are true also in humans. The drawback is that is very difficult publish in the top impact factor journals without an in-vivo model but when you gain something on one side, you have to lose something else on the other side; it's an equilibrium. The main hallmark with the equilibrium is that they last in a given position only for a moment or as a physicist would say: it last in its status until an external force intervene and perturb the equilibrium and then the system needs to re-equilibrate itself. This concept can sound trivial but it contains two fundamental concepts that apply to physics, chemistry and biology (i) everything is in constant movement, like the vibrating atoms in a piece of solid wood that define a space dimension and (ii) the concept of time that is necessary for the matter to perform the movement.
The inside of a cell is not different, at a first look of an electron microscope picture, you have the impression to see a very organized space; you can clearly see the nucleus and the organelles like the endoplasmic reticulum, the Golgi network etc. However, when a stimulus hit the cells, all these compartments need to re-organize in response to that stimulus and to do that, they need time. The most disorganized and reactive intracellular compartment, especially in innate immune cells, is the endolysosomal system composed of a huge number of round vesicles that constantly fuse between them and with other organelles. They intercept anything that enter the cells, regulate the degradation of intracellular protein and whole compartments sorting out the molecules expressed at the cell surface and visible by the neighbourhood cells as well as messages that need to reach cells that are far away in form of circulating vesicles called exosomes. It looks like this intricate network in constant movement is never ever in equilibrium or better the moment in which this system is in a given status is so short that every picture you take results different from the previous one. So, Time is the problem I have to solve because when you study lysosome you are not interested in knowing where they are within the cells (space) but you need to determine where they are going (time).

Letter from YOU-object (Peripheral Blood Immune Cells) to me-researcher
15 September 2019

Cell A: And here he goes again, he is doing another attempt to track the trafficking of that small subset of endosome that travels to the plasma membrane but also this time he did not pay too much attention on the type of stimulus he is using to stimulate us.

Cell B: I was so motivated into the blood stream but here in this artificial space there is no pulse, no flux, it's too static for me.

Cell C: The molecules around me are hitching, I never saw something like this, I am not sure what I am doing but the inputs I am receiving are forcing me into a very different status.

Cell D: He still did not understand that the molecules do not behave like he imagines.

Cell E: Eheheheh, of course not, he does experiment all the time! He should read more, think more, discuss more and open a bit his mind to be able to see.

Cell F: I don't understand why it is so complicating for him, it's so easy! Within the cells all the possible interaction between all the proteins will occur in a given time and in the subsequent moment only that one able to create a bond strong enough, but not too strong, will be maintained.

Cell G to Cell F: How do you know all of this?? I have no idea what I am doing, I am just moving!

Cell F to Cell G: Of course you have no idea, you are still immature!

Cell H: Why he does not map all the proteins that are included into the surface of each endosome to be able to identify the strongest partner?

Cell F: Yeah, and then? You know they change too quickly for him, he is so slow, he would work only if he could generate the map over-time of the protein composition of the endosome surface.

Cell I to F: It will not be feasible for him, he is alone. He will continue to search and research until he will find the only condition in which the equilibrium he is looking for is established, this will be enough for him.

Cell K: At least he is not forcing us to express molecules that we are not supposed to have. I remember that when they do it, they force all the system to re-equilibrate like they wish.

Cell F to K: You must be a memory cell, then remember this, they are too busy in looking the details and dissect single pathways as they are good in this but they are not evolving a deeper knowledge of the interaction between all the processes going on within a cell, they are not looking to see the big picture.

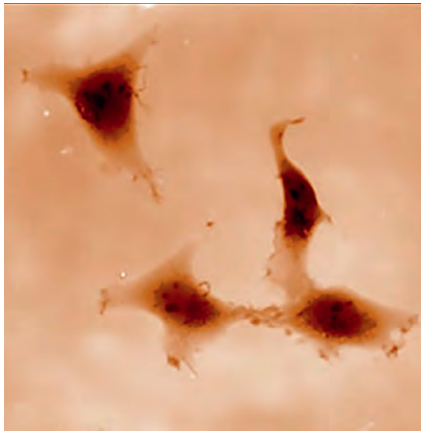
Cell G: But why they are not able yet?

Cell K to G: You know, they need time.

Didier Marguet

Letter from ME-researcher to you-object (The Cell Membrane)
3 September 2019
« On a toujours cherché des explications quand c'était des représentations qu'on pouvait seulement essayer d'inventer. »
Paul Valéry, Cahiers, 1933

Comme le trait sur la feuille de papier, tu sépares deux mondes, frontière entre le dedans et le dehors. Et pourtant plastique, fluide, solide et liquide à la fois, tu modèles les êtres vivants tout en épousant l'édifice qui t'abrite.
Je ne peux te réduire à ce trait, je veux t'appréhender dans ta complexité, imaginer les mots pour te décrire,



Live COS-7 cells growing and dividing

t'expliquer et te penser.
Te voir.
Tout reste affaire d'interactions électives, de répulsions, de cohésions et de coopérations.
Alors, il me faut réinventer une « camera obscura » pour te figurer dans une image qui restera cependant sans relief. Il me faut sans cesse perfectionner l'outil pour espérer te dévoiler un peu plus, un peu mieux. Il me faut convoquer aussi de nouvelles épistémès pour imaginer l'espace-temps dans lequel tu évolues, mieux saisir les vibrations qui se coordonnent ou s'annihilent, te rendent malléable à tout instant, vivante.
Chemin faisant, avec ceux qui m'ont rejoint et m'accompagnent encore dans l'aventure, en se prenant au jeu des amis devenus, il nous faut expérimenter et comprendre, comprendre et expérimenter, et sans relâche toujours recommencer pour mieux t'imaginer.
Tu es si simple et pourtant si complexe à saisir. Paraphrasant Edgar Morin dans la *Méthode*, par ta complexité, tu n'ordonnes pas mais tu organises, tu ne manipules pas mais tu transmets, tu ne diriges pas mais tu amènes à la vie.
Aujourd'hui encore, tu restes insaisissable, tu m'enchantes et me désespères.
Fascination.

Letter from YOU-object (The Cell Membrane steaking of the molecules that make it) to me-researcher
3 September 2019
"A violent order is disorder; and a great disorder is an order. These two things are one."
Wallace Stevens, Connoisseur of Chaos, 1942

Dans l'obscurité de la nuit.
Je suis l'unité, riche des multitudes et des diversités qui me font. Aujourd'hui, quelques-unes d'entre elles, pour l'occasion, revêtues de strass et paillettes, attendent pour briller, pour t'offrir dans l'instant la vision d'un désordre apparent, fruit de leurs gesticulations incessantes.
Pour toi.
Sous tes faisceaux de lumière.
Telles les sirènes émergeant du chaos de la nuit.
Feux d'artifice, tournoiement, transe, ou bien carole, branle, tarentelle, mime ou pantomime, que sais-je encore ? Amour et désamour, faisant et défaisant continument les liens qui les unissent, elles t'offrent au travers de ta « camera obscura » de baroques et insouciants spectacles, complexes et singuliers. Oui, ensemble, gouvernées par d'antinomiques liens, molle matière elles se déclarent, pour mieux s'apprêter entre elles, rester unies. Pour le meilleur et pour le pire.
A toi, maintenant de décrypter

leurs ballets incessants. Pour t'aider, ou te désorienter un peu plus, elles ne se dévoileront certes pas toutes au même instant. Interroger chacune qui me compose, les unes et puis les autres, les unes et les autres en même temps. De-ci, de-là.
Alors, patiemment, il te faudra saisir chaque mouvement, le décomposer pour mieux le reconstruire et révéler les lois qui forgent mon tout, actif et communicant, s'accommodant la vie durant à mes sœurs circonvoisines.
Pour que le mystère s'accomplisse — VIVRE —.

La lumière les efface. Dans l'obscurité de la nuit, elles retourneront.
Poussières d'étoiles, pour l'éternité…

Pierre Milpied

Letter from ME-researcher to you-object (a/the Germinal Center)
2 July 2019
Dear germinal center,
I love you. I have loved you from the day I met you, even before that, from the day I learnt about your existence. You are such a fascinating object. I love your shape, I love your dynamics, I love your purpose and determination, I love your mess and uncertainty. I love your transience, your essence and your diversity. There are so many of you yet you all share the same essence, you all carry the same evolution.
I would like to get to know you better, but so far I have been intimidated and shy. For now, I watch you, focusing my molecular lenses on all cells that you harbour and that together make you. It has been enough to satisfy my obsession and get to know you. I know I am not the only person obsessed by you. I am not the jealous type, I like seeing others love you too and expose you in poses that I had not seen through my eyes. You are always beautiful. But maybe in the future I will want more from you. Maybe talk to you, tease you a little, or push you in directions you do not want to go to see how you react.
How did you become so perfect? How will you be in thousands, millions of years? I wish I could see through your past and future evolutions. As much as I am frustrated by my own limitations, I live in the peaceful hope that the next generations, my children and their progeny, will get to know you and love you even more than I do.
Yours sincerely,
Pierre

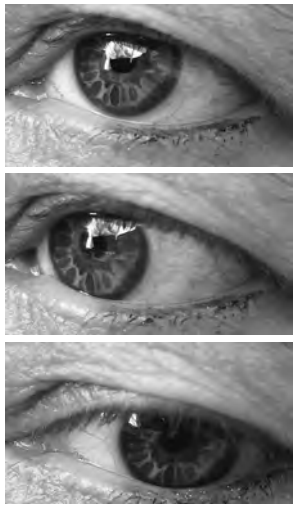
Letter from YOU-object (a/the Germinal Center) to me-researcher
2 July 2019
Dear Pierre,
I love it that you love me. But I am wondering: do you really love me as a biological object? Or do you love the concept of me? The essence of what I do? It seems to me that by watching me, or should I say us since you are observing many of us, you try to understand our commonalities, not our singularities.
You scientists aim for the absolute model, the one equation that governs our behaviour as if there was only one germinal center. Do not forget that what makes us fascinating is our uniqueness, our adaptability, our history, our evolution.
In your models, leave enough room for us to move and express our singularities. Look at us as a complex ecosystem of cities. Our inhabitants have stereotyped behaviors but they are all unique. Our streets are paved with the same asphalt but our maps are different. Our number and our complexity is our strength. Don't you think evolution would have kept us simpler otherwise?
Keep that in mind, and keep watching us, we love it too!
All the best, G.C.

Françoise Muscatelli

Letter from ME-researcher to you-object (Research)
25 September 2019
My dear Research,
For more than 20 years, I have been doing research in biology to understand very small pieces of life's mechanisms. What I find fascinating about complex organisms is how, from a single cell (the egg), we create a complex organism with many different organs that interact to form an individual. So I look at the function of a gene, a molecule, a cell or an organ and the individual as a whole. I can't identify the object of my research as a permanent object. The object is a black hole and as I progress, I begin to see the extent of what we don't know but which tends towards infinity. I'm just identifying questions to pursue my research. In this quest for new questions that follow one another to understand life, I search for myself, I try to understand who I am. In this quest for new questions that follow one another to understand life, deep down, I am looking for myself. I try to understand who I am, how, as a human being, I interact with everything around me. It is finally a very self-centered approach.
My dear Research you help me, you reassure me, but life will remain an unmanageable alchemy.

Letter from YOU-object to me-researcher

My dear Françoise,
Why this need for anthropomorphism? How can I have a human thought? We don't live in the same space or time... your life is short and ephemeral and I will continue my journey for years, centuries and even over. You will not impact me as far as you respect me. Observe me but don't try to change me, you will not manage the consequences because as I told you we do not share the same window of time.



Bertrand Nadel

Letter from ME-researcher to you-object (the cancer cell and its ecosystem)
13 October 2019

A l'invisible

Il existe des yeux,
Des yeux qui clignent encore
Dont je me souviens

Ils occupent mes pensées quand je te regarde

Je te vois tenter de les clore
Sais-tu qui tu es ?
Sais-tu ce que tu fais ?

Autrefois Soi
Tu es devenu Autre
Non-Soi

Avec le temps, tu as su convaincre
Tes voisins, les armées
Que tu pourrais rester
T'installer, instruire, croitre et aller conquérir

Tu es devenu maitre dans l'art d'être invisible
De contourner les obstacles et les dangers
Survivre, Evoluer, s'Adapter
Comme ont toujours fait
Tous les êtres vivants de l'humanité

Sais-tu si tu es normal ?
Si tu es Nuisible ?
De quel point de vue te places-tu ?

L'homme aussi est assis sur une branche
Qu'il scie, sciemment

Letter from YOU-object, la cellule tumorale percevant le monde de façon autocentrée (est-elle normale ou indésirable, elle ne peut le savoir, et quelle importance pour elle?), to me-researcher
13 October 2019

Aux yeux cerclés de vide

Il existe des yeux, des yeux qui clignent sur le monde
Sur le monde en mouvement, que rien n'arrête..

Des yeux cerclés d'optiques et de lasers puissants,
Observent
Questionnent

Scrutant des territoires lointains
Peu accessibles
Et qui s'ouvrent soudain
Révélant une part commune de notre humanité

Certains restent humbles
D'autres sont avides
Tous à l'affût sans qu'aucun ne converge

Voyez
Voyez donc comme ils s'agitent

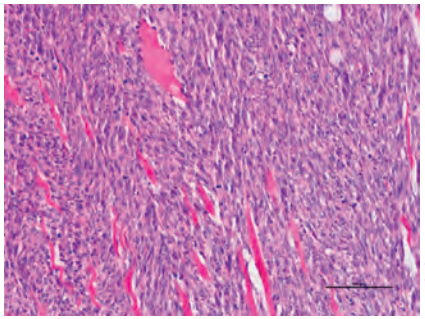
Peut-on y voir la lueur tout au fond qui les anime ?

Philippe Naquet

Letter from ME-researcher to you-object (The elusive Vanin)
1 July 2019
Strange and elusive object you were, a true conundrum. It took us almost 20 years to identify your intimate nature that was in fact written in your birth history but invisible to our eyes. You took us along unknown trails, shortcuts or endless zigzags, always hiding your identity to us. On this uncertain path, it took a few years to realize that you belong to the response to stress. We, as immunologists, were taught that the immune system can discern self from altered self, yet the nature of these alterations have remained quite out of focus for many years. And you were beyond the obvious answers; we sometimes thought that we had quit the trail of immunology to see the problem from another viewpoint. At least some of our colleagues thought so. But we persisted and believed in the rationale of our exploration. Progressively, clouds cleared up here and there. Indeed, your absence in mice influenced so many (too many?) modalities of immune responses. Your history as a protein shouted that you came from the confusing world of metabolism. We had to embark towards new worlds to decipher your contribution to the alteration of self, learn new techniques, meet new scientists from other scientific backgrounds. Their welcome was polite but we were strangers to them and again, arguing in favour of your potential interest required a dedicated and significant effort. A first light started to shine when we found that your expression in some tumours drastically changed their outcome in mice and funnily also in patients. We found ourselves hunting down a crowded path, for a novel regulation of a process that had been discovered a century ago and had been a highly motivating area of research for so many scientists over the world. And suddenly, we could position you in this new frame. You changed the ability of a cell to adapt its metabolism to stress. Not only that, this concept of plasticity could apply to non-tumor cells and ultimately to immune cells. The gap starts to vanish and what was a concept progressively became part of reality. Indeed, stress is a costly metabolic process also in the life of cells and our immune cells knew that much before us.

Letter from YOU-object (a molecule for self-resilience) to me-researcher
1 July 2019
Dear scientist, sorry to have been a burden to your team. As you may remember, my first discoverer Silvestro was a very charming Italian scientist. He named me without knowing me. I was a process for him, a groundless process on a garbage pathway and everything was fine. Then I was forgotten for almost a decade. Thank's to you!

you saw me from another angle although you did not know what was the real story. In fact it was like a new birth and I am happy to say that I was fully responsible for your encounter with Silvestro with whom, as I heard, you got along well. The problem is that suddenly I had two unrelated names, I had two identities and each one totally ignored the other one. Silvestro was a bit frustrated about that and created a chimeric name between the two. You also discovered my little brothers. I know that in order to reconcile everybody, you had to generate a living mouse in which I had totally disappeared as by magic. And yet, this mouse was perfectly alive to your despair. I have been responsible for much suffering in hundreds of mice but what is reassuring was to realize that I participate to mouse comfort and repair. I am a molecule for true self-resilience. That's fun! Don't abandon me too early, I still have a few things to teach you, trust me! Keep fighting!



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In the heart of tumors.

Serge van de Pavert

Mouse embryo in second week of gestation, stained for neurons in green, hematopoietic cells in white, maximum projection.

© Serge van de Pavert, CIML

Letter from ME-researcher to you-object (Ultramicroscope Version II)
18 September 2019
To my microscope
You are merely a collection of glass, metal and plastics. However, every time I look at you, and look through you I'm amazed & dazzled by the window you present on life's wonders. It is the joy of science, and my professional life, to just look at the images you present. Mesmerized by observing the sheer beauty of cells working together to form, maintain and function together and showing the living wonder of Nature. The way you present the marvels of nature makes it also very easy for me to impress others and provide beautiful seminars. I love just sitting behind you, leaving all thoughts, irritations and worries behind to watch what you have to offer me. Just witness all splendours of nature unfold before my eyes.

Letter from YOU-object (Ultramicroscope Version II) to me-researcher
18 September 2019
To my researcher
I'm your window to explore Nature. Behold and be amazed. There is so much to explore together. Set me up properly, align my laser, focus neatly and start the acquisition. I will be your Ziggy Stardust; new, original and above all amazing. Just keep me clean and updated. Please take care of all my little mirrors, prisms, relais, motors, camera and filters. Take care of me and I will show you all. Let's explore!

Philippe Pierre

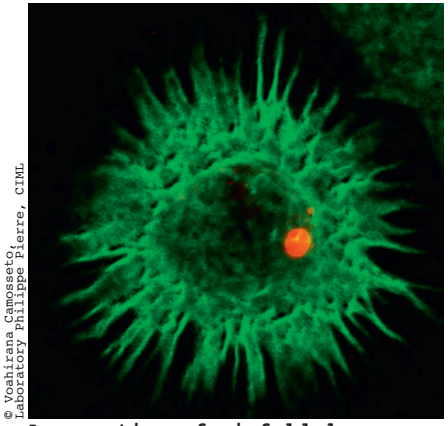
Letter from ME-researcher to you-object (Dendritic Cells and Innate Immunity)
22 June 2019

Ma vie se confond avec l'objet de ma recherche. Méandres des sentiments humains, où, magie de l'inconnu, volonté de comprendre, et imagination, se rencontrent pour contribuer à ma personnalité. Obsession de comprendre l'inexploré, de résoudre les puzzles de la vie, en décortiquant les cellules à l'envi, en donnant aux molécules des attitudes humaines et en reconstruisant des histoires biochimiques à la façon des romans d'aventures.
Te choisir, toi, l'immunité, dans toute sa complexité refoulée, comme sujet de mes interrogations, était probablement un choix narcissique. L'idée même de te comprendre pour rendre la vie des autres moins douloureuse et moins dure face à la maladie est un choix égoïste et arrogant ! Comment penser pouvoir faire seul la différence face à la complexité incommensurable de l'organisation de ta vie ? Poussé par cette envie tellement humaine d'aller là où nul n'est déjà parvenu, je ne peux résister à essayer de te comprendre, comment toi, cellule du système immunitaire, t'organises-tu pour résoudre tant de problèmes et parvenir à tes fins en organisant des actions d'éclats et préserver ton hôte des attaques incessantes de l'autre ? Comment arrives-tu à distinguer les marques de la sécurité de celles du danger ? Le soi de l'autre, quand leurs différences sont si ténues ?
Ton savoir est tellement ancestral, je suis tellement béotien ! Certes mon attitude, bien que bienveillante, est souvent destructrice à ton égard. Te détruire pour mieux te comprendre, c'est dans la logique de l'approche scientifique, une sorte de psycho-analyse biochimique de tes changements et de tes comportements face à l'adversité de ton environnement. Parfois, tu t'égares et deviens une menace pour ton hôte que tu as juré de protéger. En dépassant tes attributions, tu propulses le système entier dans le chaos et l'autodestruction, pourquoi ta perfection devient-elle si imparfaite ? Ma quête sera-elle donc sans fin ? Probablement ! Mais j'ai compris que cette obsession m'a finalement permis de te comprendre plus intimement, oh, peut-être pas complètement mais suffisamment pour pouvoir t'apprivoiser. Mais grâce à toi, surtout j'ai pu rencontrer d'autres humains ayant la même envie de partager l'aventure et la découverte de la perfection imparfaite, je ne suis plus seul !

les puzzles de la vie.

Letter from YOU-object (Dendritic Cells and Innate Immunity) to me-researcher
22 June 2019

Dear Researcher,
Many times, I have wondered what was my mission and fate, the origin of my existence and my purpose in life, or was I life itself? Clearly to become the subject of your interrogations, I had to be special! The way I form, I react and carry what seems to be a purpose is clearly of interest for you, but to me! It is simply what should be done without emotions or thoughts. I just obey to my program, integrated deeply in the matrix of other programs that together achieve what you call the host physiology and immunity. You have revealed, that I am multifunctional and spend my time giving instructions to maintain the integrity of the host, I am currently writing from. Indeed, you see me as a conductor, as a General, commanding to multiple fellow cellular effectors, instructing their programs, changing the behaviors of these would be soldiers to canalize their natural aggressiveness, towards the right kind of external enemies and obviously not against my host. My evolution has been long, I know how to adapt, to evolve, to carry my mission in complex and ever changing environments, to make sure that you, my host, lasted as a specie. Of course in the long run, I can make individual mistakes leading to collateral damage and individual drama, that despite what you think, should be disregarded, because I work for your collectivity, not



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Aggregation of misfolded proteins (DALIS, red) in activated dendritic cells (MHC II in green).

for you as an individual.
My task is harder than you think, it is so difficult to distinguish between the enemies and the host, they look so much alike, most of the time I succeed, but sometimes not, this despite my millenarian expertise. From angel, I can then turn into demon, and unleash my wrath to kill indiscriminately, slowly ordering the destruction of my host, instead of its enemies, further creating distress and incomprehension in your eyes. You try to forget that you are also an host and that you indirectly became the object of your own research by investigating me. You, with your simplistic ideas and reductionist views, always missing the big picture of my integration in a larger matrix program. If you want to pierce my deepest secrets, this is where you should start, by forgetting your individuality. You will start to see me as a global entity, I am not human and have no purpose, the survival of my host specie is my priority across the times, and individuality is not my *concern*.

Sandrine Roulland

Letter from ME-researcher to you-object (Lymphoma Cells)
9 July 2019

Dear lymphoma cells
First time I speak to you directly. I have the impression that you have been part of my life for a while now. We met for the first time more than 20 years ago. At that time, you were just a naive and inoffensive cell travelling around waiting for a signal to get waked-up but suddenly something happens! A break, a failure inside your milieu interieur and your destiny get changed for the rest of your life.
From now on, YOU will last forever in the body hidden in obscure niches, circulating within organs waiting to be reactivated, accumulating DNA alterations, growing but still latent and insidious. This situation can persist for a lifetime and will certainly never progress but we have no clues on that and this Epée de Damocles is not acceptable. You are no more part of the SELF. You are not either NON-SELF as you arise from an endogenous part of the immune system. You are an ALTERED SELF that the immune system will have to fight against.
For years now, I try to run after you in order to catch you, to understand who you are, where you go, how you communicate with your environment and what you plan to become in the future. I'm fascinating by such a long natural history that makes my day for years now. I wish to thank you for the pleasure you give me to motivate me every day to work deeply on you. Sometimes, I hate you for staying almost permanently in a small part of my brain but this is certainly what we call a passion.
BUT MY HOPE is that one day, I will succeed to capture you and your neighbours, to dissect the deepest I can and finally kill you!
If one day, my research saves a Human being life, it will be my victory!
Best Regards,
Me — lymphoma researcher

Letter from YOU-object (B-Cell) to me-researcher
19 September 2019

B this is not simply the second letter of the alphabet. I'm also a Cell, a B lymphocyte not to say the BETTER lymphocyte. It's a bit pretentious but people are used to say that B cells are Boring, which I think is not true!
You have been working on me not for what I'm the best (protecting the host) but for what I'm Bad. I'm one of the most tolerant cell with an extraordinary capacity to proliferate, mutate my genome and tolerate these genomic changes to improve my functions. But this has a cost, I can also acquire and tolerate deleterious breaks and mutations, become a transformed cell, stay silent for years in your body and then suddenly cause disease.
One single message for you Sandrine: You need to pursue your work and your attempt to fight me to keep people alive.

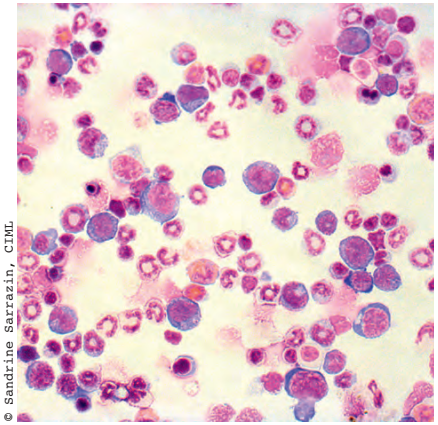
Sandrine Sarrazin

Letter from ME-researcher to you-object (Hematopoietic Stem Cell)
17 September 2019

Ma douce,
ma belle,
ma si rare et si précieuse.
Pourquoi te caches-tu comme ça ?
Pourquoi te dérobes-tu ainsi ?
Je ne te veux aucun mal.
Je veux seulement te voir, te toucher, te comprendre.
Tu es si belle et si mystérieuse.
J'aimerai tellement savoir d'où tu viens et où tu vas.
Comprendre ton monde et voir ce que tu fais. Je ne te veux aucun mal, je suis si curieuse de toi.
J'aime quand tu te dévoiles.
Quand tu te caches et que je fini par te trouver.
Quand tu feins l'indifférence et qu'enfin tu me fais signe.
Mais que c'est difficile. Nous ne parlons pas le même langage, nous n'avons pas les mêmes codes, nous ne fréquentons pas les mêmes lieux ni les mêmes amis. Nous ne sommes pas du même monde et pourtant tu es bien à l'intérieur de moi.
Tu vis en moi et pourtant je te connais si peux.
Et toi me connais tu un peu ?

Letter from YOU-object (Hematopoietic Stem Cell) to me-researcher
17 September 2019

Mais que me veux-tu à la fin ?
J'en ai assez que tu me déranges, que tu me réveilles, que tu me secoues, que tu m'oblige à sortir…
Assez que tu me pousses, que tu m'enfermes, que tu me déplaces.
Assez que tu me bouscules, que tu me tritures et que tu m'isoles.
Assez des attaques et des déceptions.
Assez du chaud et du froid.
Assez de tout !
Laisse-moi tranquille.
Rien, je ne te dirai rien, je ne te montrerai rien, je ne t'expliquerai rien. Tout ce que tu vois c'est ce que je veux bien te donner mais au fond tu ne comprends rien…
Tu ne pourras jamais comprendre.
Tu ne pourras jamais ME comprendre.
Tous tes efforts son vain, inutile de poursuivre.
Fiche-moi la paix !



Normal bone marrow cells smear colored with May–Grünwald–Giemsa stain

Michael Sieweke

Letter from ME-researcher to you-object (Macrophage)
27 September 2019

Dear Macrophage

How old are you? Will you divide? Can you divide? Why not? What is keeping you back? Can you cope with your job? Can we help you?

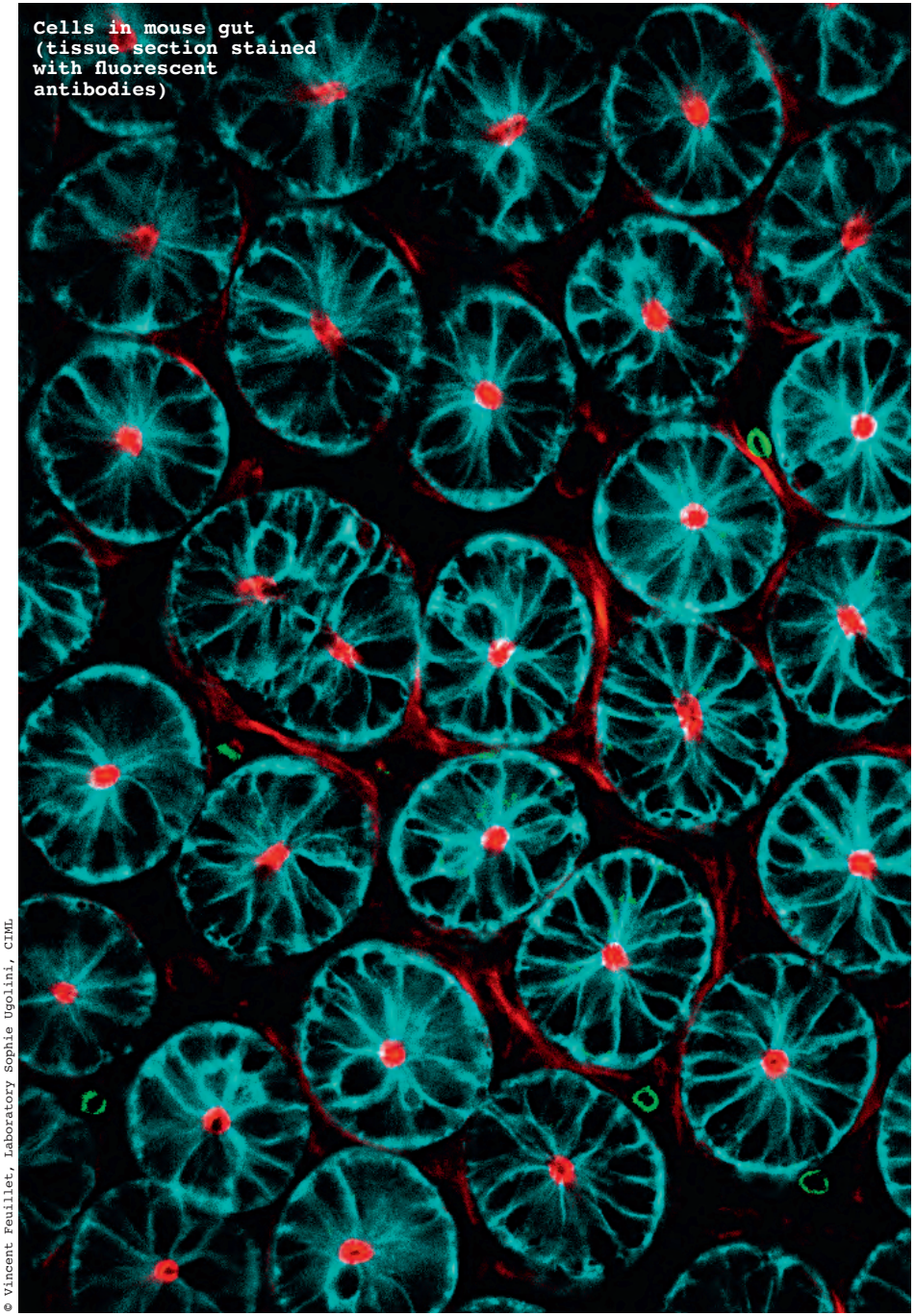
Best
Michael

Letter from YOU-object (Macrophage) to me-researcher
27 September 2019

Dear Michael

Thanks for asking. I am fine.

Best
Your Macrophage



Cells in mouse gut (tissue section stained with fluorescent antibodies)

Sophie Ugolini

Letter from ME-researcher to you-object (Incroyable vivant)
27 September 2019

Incroyable vivant,
Ta complexité me fascine.
J'essaye de comprendre comment, de tous les éléments chimiques inertes qui te composent… surgit la vie… Une vie si fragile et si robuste à la fois.
Comment ces molécules qui te constituent s'agencent-elles, interagissent-elles et surtout sont-elles en cohérence dans le temps et l'espace pour former un être vivant unifié ?
Une entité unique composée d'une multitude d'éléments de nature et de fonction différentes, qui est capable d'évoluer en permanence, de se défendre, de préserver son intégrité… Un être qui aime, raisonne, évolue, s'adapte. Un être traversé de pensées construites, mouvantes, furtives, complexes, d'émotions intenses, douces ou violentes… Un être qui souffre et lutte pour sa survie… Un être qui rit et jouit de la vie.
Comment d'une combinaison d'interactions chimiques à l'échelle atomique émerge une telle cohérence ? Une cohérence qui, non seulement, permet d'assurer des fonctions physiologiques et métaboliques en perpétuelle transformation mais aussi qui permet à l'individu de faire à tout moment des choix conscients ou inconscients qui impactent profondément sa vie.
C'est prodigieux !
J'ai la sensation que cela tient du miracle…
La sensation…
Sensation créée grâce à nombre incalculable d'interactions chimiques dans mon cerveau, dont j'ignore tout, et que j'ai pourtant l'impression de contrôler… Mais, ne serait-

Je sais que tu cherches à me comprendre, à m'étudier.

ce pas plutôt elles qui me contrôlent ?
Ce modèle moléculaire, qui constitue notre vision de la biologie aujourd'hui, est-il vraiment compatible avec la notion de liberté ? Une véritable liberté de choix peut-elle émerger d'une série, même ultra-complexe, de réactions chimiques et biochimiques ? A quel moment se fait la bascule entre le « oui » et le « non » ? Et comment ce basculement d'un côté ou de l'autre se produit-il à l'échelle atomique ? à l'échelle moléculaire ? à l'échelle cellulaire ?
Y a t-il vraiment la possibilité qu'une cascade d'évènements chimiques alternative se mette en place à chaque instant ?
Si oui, quelle est la nature de ce « je » qui fait ce choix ?
Notre liberté de mouvement, de décision, de penser est-elle une pure illusion ?
J'aime t'étudier car tu es un lieu ou Science et Philosophie se rejoignent. Une source infinie de questions sans réponse.
Je sais que même si j'y consacrais tous les instants qui me restent à vivre, je ne percerais pas ces mystères.
Je sais que je n'ouvrirai que quelques minuscules fenêtres sur ta complexité… Et pourtant, je continue passionnément à te regarder, à t'observer, fascinée.
Des outils plus performant me manquent. Ils restent à inventer. Le chemin est long, tortueux, semé d'embuches… Mais c'est avec enthousiasme et espoir que je me lève chaque matin avec la soif de découvrir une part de ta vérité.
Sophie

Letter from YOU-object (Incroyable vivant) to me-researcher
27 September 2019
Sophie,
Je sais que tu cherches à me comprendre, à m'étudier. Je me demande parfois si, à travers moi, tu ne chercherais pas, au fond, à te comprendre toi-même, à donner un sens à ton existence.
Tu as de bonnes intuitions, beaucoup d'idées, beaucoup de pistes à suivre, de fils à tirer mais parfois tu te laisses distraire par des tâches connexes, futiles qui te détournent de ton objectif.
N'hésite pas à prendre des risques, à fouiller encore plus hors des sentiers battus, à suivre tes idées les plus audacieuses. Aie le courage de poser des questions vraiment excitantes, celles qui valent le coup d'être adressées, même si c'est difficile, même si le risque d'aboutir à une impasse est élevé, même si cela peut être hasardeux pour ta « carrière » …
Finalement, ce n'est peut-être pas le résultat le plus important mais le chemin… Le plaisir et l'enthousiasme que tu mettras à parcourir le chemin.
J'ai l'éternité devant moi mais le temps est compté pour toi…
Ne le laisse pas filer trop vite ou toutes tes bonnes idées et intuitions risquent d'être diluées dans le néant… avant d'être peut-être rattrapées, conceptualisées à nouveau par d'autres…
L'important est de garder la flamme et l'espoir !

regina hübner / research and eros

by arnulf rohsmann

1.

dear cell engages personally with something that exists corporeally within each and every one – and more generally, within all organisms – but which we know more or less nothing about.

a cell is incredibly small and discreet, only revealing itself under the scrutiny of machines and media of one kind or another. yet it is also a mechanism which exerts control – all the more so when unnoticed. and it feels free to fulfil its task, regardless of being detected or not by an observant subject.

it is irrelevant whether it leads its life in an inorganic or organic environment, such as in a photosensitive selenium cell or a fat-sensitive liver cell: one stores, regulates and potentially memorizes; the other is able to develop its own initiative, in that it hands out instructions without being asked to do so.

using *dear* to address this object of interest opens up the possibility of establishing a dialogue with and about an optically, chemically and mathematically identifiable object, which cannot be perceived by the human senses alone.

what begins as kindly interest turns into a research imperative, accompanied by research eros.

a research imperative is often steered by an order giver, as is the case in applied sciences. to a certain extent, this imperative also comes from the researcher's own urge to know.

research eros has got a vague impetus. it works by scanning the area of observation, then selectively intensifies the researcher´s interests till the focused matter is turned into a burning object. that is the crucial twist.

2.

visual research is based on watching which first seems to be unpragmatic and without any explicit research w.

reflective research involves things that already exist and is therefore retrospective.

visual research focuses on recording the here and now. the visual transformation process has an underlying structure, which may not be apparent to the observer straight away and needs to be decrypted – as is the case in other works by regina hübner.

visual research is predominantly non-verbal and non-discursive. consequently, it tends to be rather fuzzy until it is transformed into an image product. the process of stabilising and fixing this end statement comes later.

visual research is a projective work reserving for itself a high grade frankness and artificial wording as it shows interest in the unknown. subsequently, the problem is how to realize a specific visual statement about the unknown and partly immaterial matter.

scientific research generally studies something that already exists, with a few exceptions, such as bacteria culture or cell growth, which are monitored as they evolve.

in contrast, visual research generates something new and observes it in its nascent state – *in statu nascendi*.

the incentive arrives before the concept and the analysis, setting the flywheel of research humming before it starts to turn: it is antagonistic.

things waiting to be given some kind of visual, discursive or formula-based shape or form secretly build up.

this intentional build-up comes from encountering an initially unknown quantity. it stirs up a desire for what might be – *forse che sì, forse che no*.

3.

dear cell describes the emotional and dialogical aspects of this work by regina hübner.

the emotional aspect lies in the tentative appeal and the anticipation of the outcome; the dialogical aspect refers to a private letter to a recipient not yet officially known, whose reply either remains fictitious and can only be guessed at, or is conclusive.

the dialogue leads to a yearning for the other half, the reply. this *contradictio in adverso*, or tension, is key to guaranteeing the supply of project questions in science. this is reflected by the open research approach which tries to predict the object's response.

the recipient is a cell – but which one? take your pick.

at first, the recipient can only be approached in terms of categories, or at best, in terms of so-called standard setting. only deviation from the norm and the standard representation lets the recipient stand out from the crowd and be brought into sharp focus.

the question is: what can constructively bridge the gap between the concrete question asked in the letter and the fictitious reply to enable a discussion to take place?

as soon as the letter´s message has been mailed it´s out of control like a bullet leaving it's barrel. at best it will find a place containing a potential that is ready to respond on a matching stylistic level.

the desired answer fulfils the sender´s wish and represents the remnants of poetry in scientific research as well. it is research´s *non finito*. *finito* would mean stagnation.

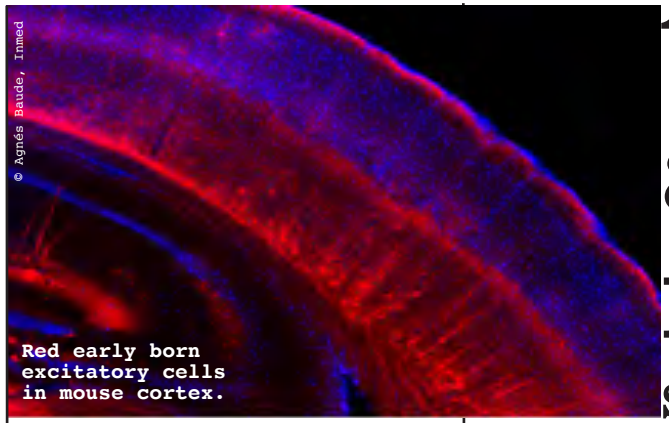
the hoped-for reply is open-ended because its shape and form remain slightly elusive and hard to prove. besides, the desired partner formulating the reply is hard to pin down and nigh on anonymous.

an open reply makes it possible to think freely, unburdened by the institutional powers that be.

how much time does visual research need? how does it shift towards discursively mediated research? what are the mechanisms involved in this shift?

what are the strategies for giving weight to visual arguments in discursive and analytical debates? which holds sway – rhetoric or image? how can we move on? both the end image and the rhetoric are clear in the mind's eye.

research eros consists of approaching an object that is neutral, at first, and which then becomes treasured and observable. it can take possession of the object, without consent or mutual understanding. this effectively means that the observed object cannot protest and is in a position of potential rape. this would mark the end of eros.



the desired answer fulfils the sender's wish

eros is the attraction for researchers, be they scientific or visual – it is irrelevant. eros always focuses on the future; it never looks back. it is a process within science. the search for a temporary research objective is petty bourgeois. objectives are renewed as the researcher sets themselves new tasks. besides, eros is not simply restricted to the intellectual plane, which is but a small part of the wider existential plane.

research eros consists of an endogenous component, and perhaps also an autoerotic one – the desire for self-development.

the endogenous component needs a client that has to be self designed. regarding to the exogenous component the order gets lost and independent within research eros activities.

this pleasure factor comes from toying with the possibilities and temporarily holding back on decisions. desire is kindled by the process of searching and discovering. the objective can wait until later.

depending on the subject area, the objective may be crystal clear or may come as a whole range of possibilities.

conventional sciences prefer a clear-cut structure; visual research is happy to propose a whole series of comparable solutions because there is no single truth, whatever we consider that to be. series aside, there can only be one visual solution left in the end: an image, a film, a text, a formula. the time for "other possibilities" is over; they served to beckon the way through the garden of delights

regina hübner / recherches et éros

arnulf rohsmann

1.

dear cell est une approche intimiste de cette réalité si nébuleuse et si familière présente dans notre corps comme dans l'organisme de tout un chacun, dans tout corps organique en fait.

trop petite et souvent cachée aux regards, toute intermédiation directe est exclue, hormis moyennant un appareil ou un dispositif médiatique ; outil de pilotage aussi, elle est efficace mais méconnue ; qu'elle soit appréhendée ou ignorée par le sujet scrutateur : elle remplit sa tâche.

qu'elle agisse dans un milieu anorganique ou organique, dans une cellule de sélénium sensible à la lumière ou un hépatocyte spécialisé en néoglucogenèse – peu importe. l'une remplit une fonction de stockage, de régulation et potentiellement de mémorisation, l'autre a des qualités smart : elle peut donner des ordres de son propre chef.

par le truchement de l'attribut *dear*, elle passe du statut d'objet de l'intérêt à celui d'objet d'un dialogue - envisageable grâce à n'importe quel intermédiaire optique, chimique, mathématiquement avéré - car elle dépasse les capacités sensorielles de l'être humain incapable de détecter son immédiateté.

ce premier intérêt plutôt bienveillant se mue ensuite en une pulsion investigatrice, doublée d'éros.

cet impératif investigateur est habituellement piloté par un commanditaire : scénario classique des sciences pragmatiques. parfois cependant il obéit aux propres intuitions du chercheur.

l'éros investigateur est porté par un élan flottant. il tâtonne et sonde le champ de son observation, il synthétise soigneusement les points d'intérêt et transforme ainsi l'objet de l'observation en objet du désir. c'est une étape décisive de la mutation.

2.

la recherche visuelle dépend du regard inquisiteur qui, dans un premier temps se fie à ses partis pris, suit ses intuitions ; il n'a pas d'objectif catégorique de recherche.

la recherche réflective se centre sur l'existant, elle est donc rétrospective.

la recherche visuelle essaye d'appréhender des contenus objectifs actuels. sa réalisation visuelle utilise un système structuré même s'il n'est pas forcément tout de suite reconnu ni décrypté en tant que tel par l'observateur ; cela vaut d'ailleurs aussi pour d'autres œuvres de regina hübner.

jusqu'à sa transformation en un produit-image, la recherche visuelle est soumise à un degré supérieur de floutage : elle procède de manière non verbale et non discursive. l'étape de fixation de l'affirmation ne se produit que plus tard.

la recherche visuelle est la recherche d'un projet. elle veille à se préserver un grand degré d'ouverture sur la thématique et sa formulation artificielle : son intention, c'est de s'approprier l'inconnu. par la suite, elle devra trouver une solution pour matérialiser l'inconnu et ce qui est partiellement immatériel, en une affirmation concrète et visuelle.

la plupart du temps, la recherche scientifique observe un objet préexistant (sauf par exemple pour les cultures bactériennes ou encore la croissance cellulaire) ; elle observe son évolution.

la recherche visuelle en revanche crée un objet qui n'existe pas encore et l'observe *in statu nascendi.*

avant toute projection, avant toute analyse, il y a une impulsion qui donne un élan à la recherche, à l'instar d'un volant d'inertie encore immobile. c'est antagonique.

il se produit comme un engorgement secret de ce qui n'a pas encore été formulé – soit de manière visuelle ou discursive, soit par une formule.

cette accumulation antéréflexive repose sur une rencontre avec ce qui n'est pas encore connu. elle suggère l'envie de développer ce qui va peut-être advenir - *forse che sì, forse che no.*

3.

dear cell décrit la composante émotionnelle et dialogique de cette œuvre de regina hübner.

la composante émotionnelle n'est qu'une timide invitation, l'attente du rapport ; la composante dialogique évoque un courrier privé, une lettre à un destinataire resté inconnu du public ; sa réponse est soit fictive et à peine perceptible, soit elle est déterminante.

le dialogue se termine sur le désir de sa moitié : la réponse. la *contradictio in adverso* garantit le questionnement projectif de la science. pressentir le reflet de l'objet traduit le système de recherche ouverte.

le destinataire, c'est la cellule, mais laquelle ? embarras du choix.

au début, le choix se décline exclusivement sous forme de catégories, dans le meilleur des cas en essayant d'établir une norme. seules la déviation à la norme et la standardisation permettent l'individualisation et donc l'ajustement de la focale sur la cible.

le défi, c'est d'arriver à réduire l'espace entre l'interrogation concrète contenue dans la lettre et la réponse fictive afin de le rendre dicible.

à partir de l'envoi du message par courrier, la bille s'est mise à rouler, rien ne peut plus l'influencer. dans le meilleur des cas, elle parvient sans anicroche à trouver une piste d'atterrissage, potentiellement prête à résonner sur le même niveau de langage.

la réponse attendue peut être discursive ou aussi courte qu'une formule ; il est impossible de vérifier son exactitude, mais elle ouvre de nouveaux points de départ.

la lettre résume le projet de l'expéditeur : elle est en quelque sorte le dernier vestige lyrique que l'on peut encore trouver dans la recherche. le *non finito* de la science en quelque sorte. le *finito* serait synonyme de stagnation.

la réponse attendue est ouverte : il est impossible de la formuler jusqu'au bout ni de la vérifier. la définition du partenaire désiré pour la réponse est très vague - aux confins de l'anonymat.

la réponse ouverte permet en toute impunité de continuer à penser, en faisant fi de la puissance des institutions.

à quelle vitesse se produit la recherche visuelle ? et quelle est la passerelle qui permet d'arriver à une recherche analysable ? quels outils sont nécessaires pour ce passage ?

comment démontrer l'utilité d'arguments visuels pour l'argumentation analytique ? est-ce la rhétorique qui demeure ou l'image ? qu'est-ce qui fait avancer ? l'image visualisée, tout comme le mot, est limpide.

l'éros de la recherche, c'est s'approcher d'un objet qui est neutre tout d'abord, puis que l'on observe affectueusement. il peut devenir l'objet de l'appropriation sans qu'il y ait assentiment ni accord réciproque. cela signifie que l'objet observé n'a aucune possibilité de s'opposer, il est dans un état de viol potentiel. ce qui signerait la fin de l'éros.

l'éros, c'est ce qui attire le chercheur – chercheur visuel ou chercheur scientifique, qu'importe. il est toujours tourné vers l'avenir, jamais rétrospectif ; il n'est qu'un élément du rouage scientifique. quelle déchéance de devoir être en quête d'un objectif de recherche provisoire. l'objectif se renouvelle de lui-même si le chercheur le souhaite. de toutes manières, il n'est pas seul dans son domaine intellectuel - domaine qui ne constitue qu'une partie infime de l'existence.

l'éros de la recherche a une composante endogène, et peut-être aussi une composante auto-érotique : c'est l'envie de s'auto-développer.

la composante endogène cherche un commanditaire qu'elle doit énoncer elle-même ; pour la composante exogène, la commande s'échappe et devient autonome de par l'*agir* de l'éros de la recherche.

ce vecteur de plaisir est déterminé par la palpation des potentiels et par l'abandon provisoire de toute prise de décision. la recherche combinée avec la découverte constitue la base du plaisir. l'objectif peut attendre.

selon la matière étudiée, l'atteinte de l'objectif peut se matérialiser en une formule indiscutable, définitive, ou par la description de variantes.

pour les sciences conventionnelles, l'idéal c'est d'arriver à une formule cohérente ; la recherche visuelle est à même de proposer en séries différentes solutions qui se valent parce qu'il n'existe pas seulement une vérité, ou ce qui pourrait s'en approcher. par-delà la série, une seule solution visuelle demeure. à la fin, il y a l'image / le film / le texte / la formule. les variantes, c'était avant : elles ont jalonné la traversée du jardin des délices

Partenaires

Le projet de recherche *Perception of Self and Nonself in Life*, développé par Regina Hübner en résidence à l'IMéRA (Université d'Aix-Marseille) en 2019 en partenariat avec le CIML - Centre d'Immunologie de Marseille-Luminy (AMU, CNRS, Inserm) a bénéficié du soutien de l'Université d'Aix-Marseille, du Conseil départemental des Bouches-du-Rhône et du RFIEA-Réseau français des instituts d'études avancées.

L'exposition *Dear Cell* de Regina Hübner dans le cadre de Manifesta 13 Les Parallèles du Sud (novembre 2020)* a été organisée par l'université d'Aix-Marseille et l'IMéRA - Institut d'études avancées de l'université d'Aix-Marseille, en partenariat avec le CIML - Centre d'Immunologie de Marseille-Luminy (AMU-CNRS-Inserm).

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Regina Hübner

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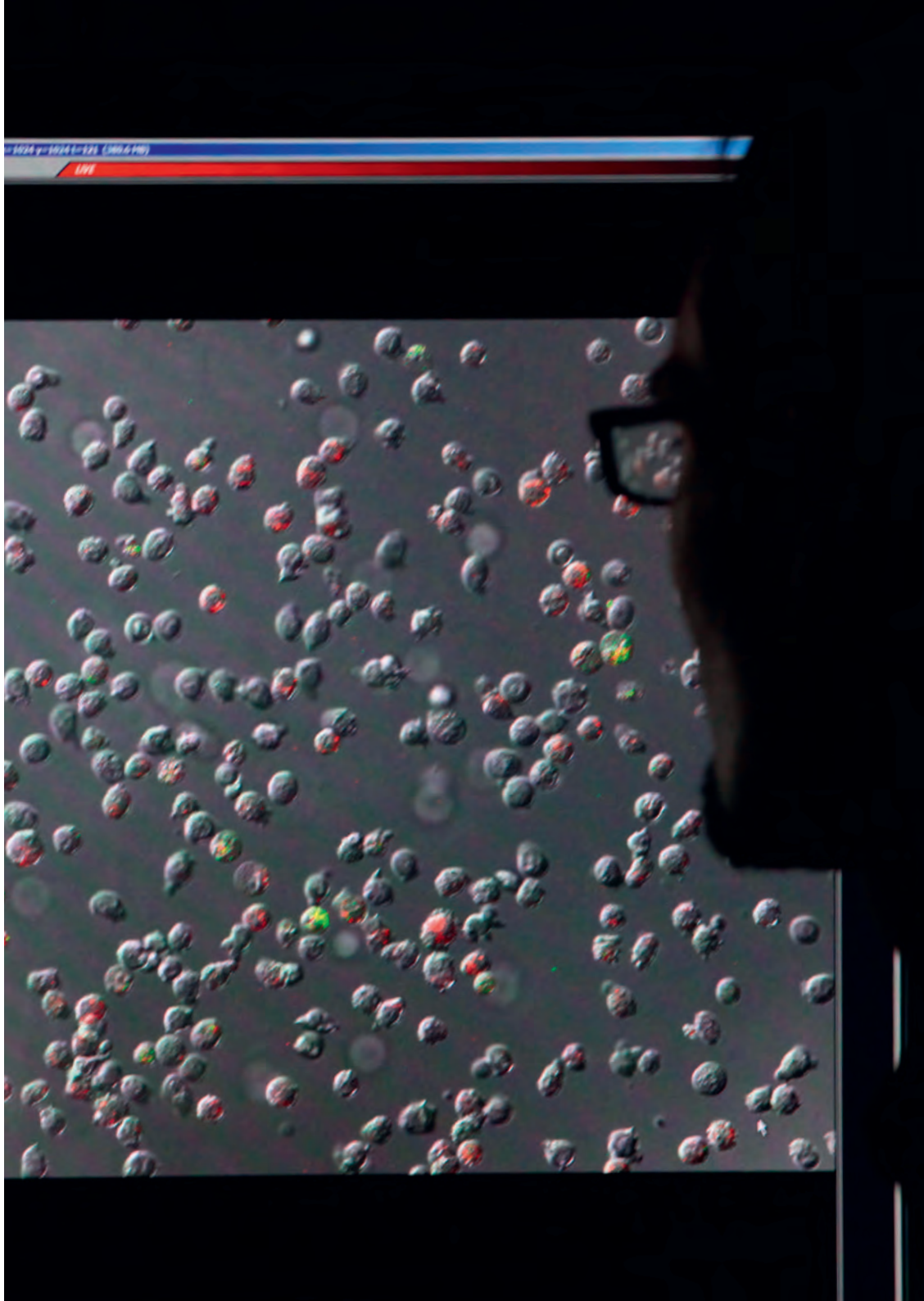

My inspiration was to invert the habitual relationship between researcher and object of research and to stimulate a new perception of the basic concept in immunology, the differentiation between self and non-self. Regina Hübner