Exploring the interface between biomedical sciences and the arts through the global sci/art network MEDinART

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Abstract
MEDinART (www.MEDinART.eu) is a continuously growing global sci/art network that connects biomedical sciences with technology and arts through the work of more than 170 artists from 30 countries who are influenced by aspects of biomedical sciences. MEDinART aims are to unite the artists who are influenced by biomedicine, to connect different countries and cultures through the universal language of sci/art, and to globalise the biomedical-inspired art movement. Inspired and created by the Author, Vasia Hatzi, MEDinART explores the interface between biomedicine with arts through talks, exhibitions and articles in events, conferences and journals around the world. Here we present the goals of MEDinART, its philosophy and the messages that it delivers to society through its activities.

Key words:*medical art; sci/art network.*

Introduction

Art holds an essential role in the biomedical sciences, starting with its contribution as a tool of education and science communication. The anatomical illustrations of Andreas Vesalius and Leonardo da Vinci, the botanical drawings of John Ruskin and the drawings of Ernst Haeckel are the most representative examples of visualization of scientific results in order to become more understandable. Today, art continues to play a key role in medical education. However, art should not be considered only as a tool of science communication but rather as a lens to confront science, the living world, and the surrounding through a different perspective and also as a vehicle to approach holistically the therapeutic processes in medicine (art therapy practices).

Since the late 1960s, alongside traditional medical illustration, artists began working with scientifically related concepts, and showed an increased interest in subjects emerging not only from the images but also from the discoveries, principles, ideas and technologies of the biomedical sciences. Artworks inspired by sciences have started to appear not only as illustrations in the medical handbooks and moulages in the medical museums but also became exhibits in museums, public premises, universities and hospitals in Eastern Europe, USA and Australia. Since the early 1990s, departments in distinguished educational and research institutions saw the collaboration between science and art as a method to enhance creativity and innovation, and created cross-disciplinary programs. Examples include the Media Lab at MIT, the Art/Sci Center and Lab at UCLA, Johns Hopkins University, Stanford University, University of Edinburgh, Oxford University. The Cleveland Clinic art program hosts artworks to improve the well-being of the patients and the visitors of the hospital. Wellcome Trust and other organizations, including US-NSF, EPSRC-UK, CERN, NASA and ALMA, give funds to science and art collaborations, and in STEAM educational programs artists and scientists join their forces for educational purposes.

However, until today, there was a lack of a free and easily accessible global community that would connect the worlds of biomedical sciences with the arts, and feature specifically the artists who are influenced by the aspects of the bio-medical world. From this necessity MEDinART was born.

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The global platform MEDinART

MEDinART (www.MEDinART.eu) is a global and continuously growing network that links bio-medical sciences, technology and arts and features the work of 173 artists, from 30 countries, who are inspired by aspects of biomedical sciences. It is an independent and self-funded project, free to the artists and the general public, that was launched at the main stage of TEDMEDLive Athens 2013 (1) (*Figure 1*).

Fig. 1. *MEDinART video screening at the main stage of TEDMEDLive Athens 2013, Onassis Cultural Center, Athens, Greece.*

At the very beginning artists were invited via e-mail to submit their work to it. Subsequently, as MEDinART has grown, it has received requests from artists who wished to submit their work. Such submissions are very much welcome, and they are encouraged through the website where there is a contact form. The artists are asked to confirm that the images of their work will not be distributed elsewhere without their consent and will not be used for commercial purposes. They are also encouraged to disseminate MEDinART to their colleagues and to anyone that might be interested in the intersection of medicine and art.

Unique in its content and nature, MEDinART intersects and harmonizes the unfamiliar territory of scientific images, concepts, practices and technologies of more than 25 biomedical fields with an extensive list of visual and performing art forms. Through the universal language of sci/art, MEDinART, explores the interface between biomedicine and the arts, unites the biomedical-influenced artists, increases public awareness of scientific issues through the arts and promotes interdisciplinarity, through exhibitions, talks, articles and interviews in international events, conferences and newspapers/journals in Europe (Belgium, Denmark, Greece, Switzerland), in Kazakhstan, as well as in Saint Louis and Atlanta, USA.

The artists of MEDinART

The artists of MEDinART approach the complex beauty and functions of the human body through several aesthetic points of view all equally valid: as a universe for art-exploration, a source of inspiration and a vehicle to deliver ideas and messages as a complex structure of interconnected symbols. MEDinART includes professional artists, and/or scientists who have collaborated with artists for scientific purpose and/or participated in sci/art exhibitions. Some of them have received awards and their work has been included in national galleries and museums, while others teach in universities and distinguished organisations and institutions around the world.

In the website of MEDinART (www.MEDinART.eu), which was developed by Vasia Hatzi in collaboration with Christina Dalla and Elina Vaki, every artist has a personal space/profile with details about the CV, works and inspirations of the artists. Sections of relevant museums, books, videos, links to social media, an informative blog, as well as a Google map of MEDinART with the global location of every artist, are also available to the visitors of the platform. Featuring more than 17,000 artworks that are selected in collaboration with the artist, respecting the rules of intellectual property, MEDinART stands as an on-line permanent art gallery and invites in its realm the creative minds around the globe that intersect biomedicine with art.

The philosophy and activities of MEDinART

Uniting people, nations and disciplines through a universal language

In the era of increased specialization, art, science and technology are perceived as distant disciplines. However, our intellectual exploration and innovation in any topic flourish when we combine various perspectives. Innovation and social progress can arise from those who are able to correlate different disciplines, from those who can find humanity in

technology, beauty in engineering, elegance in anatomy and poetry in biology; from those who can emotionalise science, rationalise art, and from those who have a rebellious sense of wonder that leads them to the beauty of both sciences and arts.

For MEDinART, art and science are not perceived as distant disciplines but as interconnected creative processes of humanity. MEDinART supports the idea that artists, scientists and technologists can work together, invent new languages of communication and new layers to read and approach the reality. Through the universal language of sci/art, MEDinART, unites creative individuals who combine biomedicine with art, different disciplines, but also different countries and cultures.

In this context, from 2013 to 2016, MEDinART collaborated with governmental bodies including the Belgian Embassies of Athens, Copenhagen and Kazakhstan to commemorate the legendary Flemish anatomist and artist Andreas Vesalius (1514-64) who died on Zakynthos, Greece. In collaboration with Theo Dirix, Vesalius scholar, author and at that time Consul at the Embassy of Belgium in Athens-Greece, BIOMAB (Biological and Medical Art in Belgium) (2) and the curators of the touring exhibition *Fabrica Vitae* (3): Pascale Pollier, Elanor Crook and Chantal Pollier, MEDinART has contributed in the realisation of events to celebrate the 500th Birthday of Vesalius. These events took place in Zakynthos, Greece (*Vesalius Continuum*) (4), Andreas Syggros Museum, Athens, Greece (5, 6), and the Medical University of Astana, Kazakhstan (2015) (*Figure 2*).

Fig. 2. *Theo Dirix, Chantal Pollier, Vasia Hatzi and Pascale Pollier during the "500th Birthday of Andreas Vesalius" event that took place in Andreas Syggros Museum, Athens, Greece (17/12/2014). Organizers: Embassy of Belgium in Athens, Andreas Syggros Museum, Fabrica Vitae, and MEDinART.*

In the same context, in 2017, an interactive group exhibition took place within the framework of the Athens Science Festival at Technopolis City of Athens (*Figure 3*) (7), hosting the work of the 12 Greek artists of the platform: Mania Efstathiou, Leontios Hadjileontiadis, Keti Haliori, Vasia Hatzi, Christiana Kazakou, Peggy Kliafa, Maria Lambropoulou, Konstantinos N. Patsios, Eleni Petridou, George Vardakis, Sofia Vini and FAME Lab. Curated and designed by Vasia Hatzi, this interactive exhibition has opened up a fruitful dialogue between scientists, artists and the general public (8).

Fig. 3. *Flyer of the interactive exhibition of MEDinART: "Where MEDicine and ART collide: the Greek Artists", Athens Science Festival 2017, Technopolis City of Athens, Greece.*

In 2019, MEDinART participated in the group exhibition "Beyond Science", curated by Nora Okka and organized by the Embassy of Cyprus in Greece (House of Cyprus) and the A.G. Leventis Foundation Scholars Association, Greece. In this exhibition a video with 222 artworks of 74 artists from MEDinART (2015) was screened (1) as well as selected artworks from the following artists of MEDinART: FAME Lab, Vasia Hatzi (LaB. Bio-conceptual Creations), Peggy Kliafa and Tolis Tatolas.

Willing to further enhance the voice of individual artists of MEDinART and share their vision with the scholars of the field and the general public, collaborations with distinguished sci/art magazines through interviews have been realised. These

interviews were presented in Interalia Magazine, UK (9), in collaboration with Richard Bright, editor of Interalia Magazine and founder and director of the Interalia Center. In two issues, entitled "Bio-Med-Art" (Issue June-July 2015) and "The Art in Heart" (Issue June 2016), a total number of 25 artists of MEDinART talked about their works and subjects of inspiration. Other presentations of the MEDinART have been published in Athens Voice newspaper-Greece, Science Views Magazine-Greece (10), Madame Figaro-Greece, SciArt Magazine-New York (11), E-squared Magazine USA (12) and Scientific Inquirer (13).

Bringing the scientific issues into public discussion through the arts

Biological scientists provide efficient solutions for a changing world. However, Western medicine and its practices are traditionally regarded around the world as an authoritative discipline and the public has little to no access to participate within its framework of meaning. The artists of MEDinART have entered the scientific laboratory, have collaborated with scientists – or they are scientists themselves – and by means of the images, concepts, discoveries and technologies of science, they pose many profound questions about the complexity, the abilities and limitations of the human body. The artists also highlight new scientific achievements, raise questions about the social role and purpose of science, and present different approaches of the research outcomes.

Bringing into public discussion artworks influenced by medical sciences, especially in spaces relevant to the medical fields (medical museums, hospitals, universities), can offer novel perspectives on health care professionals and medical students and can improve the well-being of patients and their families. It also invites a wide community of people (artists, physicians, medical students, patients and the general public), to confront illness not as a taboo, but as a sensitive subject, open to public discussion. By highlighting ethical, social, religious and political issues of scientific practices including organ transplantation, genetic modification, animal testing and pharmaceutical usage, the artists gain a strong voice in regulatory decision-making and policy, and thus affecting the socio-political realities. Moreover, exhibiting artworks with key medical issues enhances the deeper understanding of the role of science and elevates the work of scientists, whose significant work usually remains unknown. This serves as a kind of reward not only for the artists but also for the scientific community and its work.

Increasing awareness of medical issues through socially engaged art-practices

Medical knowledge and practice is primarily focused on diagnosing the disease and selecting the optimal methods of treatment and therapy, often underestimating the impact of the disease in the psychological state of the patient. Socially engaged art practices that include collaborations of artists, scientists and sometimes also the patients, can increase the awareness of key medical issues, including chronic diseases, heart diseases, STDs, mental health issues and organ transplantation.

Artworks that discuss key medical issues from the position of the patients, potentially improve the diagnostic and therapeutic skills of the medical students and enhance their ability to be aware of the emotions of the patient. MEDinART contributes to the rapidly developing field of the humanities in healthcare through articles and talks in organisations and educational institutions. A recent article published in the *Journal of the American College of Cardiology*, highlights how the socially-engaged artworks of Andrew Carnie, Peta Clancy, Helen Pynor, Alexa Wright and John Wynne – also members of the MEDinART community – may increase awareness in the life-changing process of heart transplantation and potentially contribute with significant results to the quality of the healthcare and the recovery of the patient (14).

Furthermore, focusing on the role of art in medicine and specifically in cardiology, invited talks have been performed by the creator of MEDinART in the frame of the following conferences:

1. CardioMED2016 conference, that took place in the National Hellenic Research Foundation, Athens, Greece, organised by Julia Grapsa, Editor-in-Chief of JACC Case Reports (15);
2. CNIC PhDay 2018 conference, organised by the Spanish National Center for Cardiovascular Research (CNIC) (16);
3. 15th Panhellenic Congress of Dermatology and Venereology 2019 in Thessaloniki, Greece. Through these talks, the significant role of art in medicine through specific examples from artworks from the MEDinART artists, was highlighted.

Creating new visual metaphors of expression through sci/art

Microscopy methods, molecular genetics, epigenetics, Google Brain, recreational cyborgs, holographic inputs, multi-functional radiology, artificial intelligence, all promise positive future implications not only for the scientists but also for the artists. These novel media of expression provide artists with new images of the living world, new concepts of inspiration and ideas for discussion, that are different from those conventionally encountered in fine arts. The narratives of MEDinART offer to the general public an access to non-visible living worlds, novel experiences, ideas and knowledge, and allow humans to perceive the human body beyond the senses. The introduction of new realities and interpretations of our world, alters the established views about our composition, broadens the visual and lingual limits of our world and stimulates the use of new metaphors of expression. A growing body of literature suggests that the metaphors have the power to shape the mind, structure our experiences and influence the way we perceive the world. The choice of the right metaphors in science and in everyday life, utilising those that better align with contemporary values and goals of the scientific community and society in general, are, therefore, crucial in thinking and communication abstract concepts, in the production of knowledge and in the development of human cognition.

Conclusion

Scientists and artists share a common goal: to perceive the world beyond the senses and to elucidate the profound mysteries of the human body, and the highly complex world we live in. The collaborative works between biomedical sciences and the arts, as they are presented through the constantly growing MEDinART platform, stimulate scientists, artists and the general public to confront the living world through a different perspective. These works can create new experiences, ideas, knowledge and a metaphorical language of expression that will eventually broaden the answers on the "what is Art" and "what is Science" arguments and will lead to a new understanding of life itself.

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