significantly (p<0.0001) higher in DM/PM (n=361, 17.3%) with respect to controls (n=1,018, 10.0%).
Concerning prognosis, ANA positivity in PM/DM was associated with a better prognosis for all cancers (OR 0.39 [95% 0.24-0.63], p=0.0001). For individual cancer types; thyroid cancer (OR 0.39 [95% 0.24-0.63], p=0.0001), gastric cancer (OR 0.40 [95% 0.25-0.64], p=0.0001), kidney cancer (OR 0.39 [95% 0.24-0. 62], p=0.0001), acute leukaemia (OR 0.40 [95% 0.25-0.65], p=0.0002), non-Hodgkin's lymphoma (OR 0.39 [95% 0.25-0.63], p=0.0001), but not for myelodysplastic syndrome.
The main cancers linked to PM/DM were thyroid cancer (OR 3.17 [95%CI 2.27-4.43]), gastric cancer (OR 5.96 [95%CI 4.24-8.38]), kidney cancer (OR 3.83 [95%CI 1.02-14.31], p=0.0462), and myelodysplastic syndrome (OR 2.01 [95%CI 1.17-3.46], p=0.0111). Regarding gastric cancer, positivity for anti-RNP (OR 5.68 [95%CI 3.02 to 10.71], p<0.0001), anti-SSA (OR 21.99 [95%CI 11.21 to 43.14], p<0.0001), and anti-Jo1 (OR 12.23 [95%CI 7.12 to 21.01], p<0.0001) was associated with a higher risk of cancer development.
Conclusion: ANA positivity is an independent predictor of favorable prognosis in PM/DM patients with cancer, possibly suggesting that cancer directed humoral autoimmunity may have some benefit. Therefore, humoral autoimmunity in SSc and PM/DM is a broad mechanism that confers a survival advantage and is relevant for disease understanding and elucidating optimal anti tumoural immunity in the current age of cancer immunotherapy.
References:
[1] Watad A, McGonagle D, Bragazzi NL, Tiosano S, Comaneshter D, Shoenfeld Y, Cohen AD, Amital H. Autoantibody status in systemic sclerosis patients defines both cancer risk and survival with ANA negativity in cases with concomitant cancer having a worse survival. Oncoimmunology. 2019 Mar 24;8(6):e1588084.
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OP0254 CHROMATIN CONFORMATION SIGNATURE ANALYSIS IN EARLY VS LATE SCLERODERMA PHENOTYPES

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Background: Systemic sclerosis (scleroderma, SSc) is a heterogeneous disease in which clinical outcomes vary widely. Predicting outcomes on an individual basis remains challenging despite progress made through autoantibody analysis and gene expression profiling. Effective targeted therapies are evolving and accurately predicting outcomes is important to enable patient stratification for therapy.
Chromatin Conformation Signature (CCS) profiling of peripheral blood for systemic epigenetic deregulations could be used for such a purpose. The EpiSwitch platform offering high throughput and resolution chromosome conformation (3C) capture detects significant regulatory changes in 3D genome architecture and maps long range interaction between distant genomic locations. This then reveals the spatial disposition and physical properties of the chromosome, such as chromatin loops and inter-chromosomal connections, which have a role in network organization and genetic epistasis controlling gene expression. EpiSwitch automated platform has been successfully utilised in patient stratification in RA, MS and other indications.
This methodology could be applied to patients with SSc to identify CCS associated with different phenotypes and may ultimately be used to stratify and identify patients into pathogenic subtypes.
Objectives: We aimed to determine significant CCSs associated with early and late phenotypes of SSc.
Methods: The EpiSwitch-based chromosome conformation capture (3C) method was applied to blood samples from early phenotype, and late phenotype SSc patients. Intact nuclei were isolated from peripheral blood mononuclear cells and subjected to formaldehyde fixation resulting in crosslinking between physically touching segments of the genome via contacts between their DNA bound proteins. For quantification of cross-linking frequencies, the cross linked DNA was digested and then subjected to ligation. Cross-linking was then reversed and individual ligation products detected and quantified by EpiSwitch custom oligo array annotated across the whole genome to the anchoring sites of 3D genome architecture.
Results: 7 significant CCSs were found over the HLA-C, HLA-B and TNF regions on Chromosome 6 in the early phenotype. The top 8 pathways for genetic locations associated to the CCSs are shown in Table 1.

Table 1. Top 8 pathways for genetic locations associated to significant CCS for the early phenotype.

	GeneSet
1	Natural Killer cell mediated cytotoxicity
2	Immunoregulatory interations between a lymphoid cell and a non-lymphoid cell
3	Antigen Processing & presentation
4	Phagosome
5	Graft versus host disease
6	Type 1 diabetes mellitus
7	Osteoclast differentiation
8	Class 1 MHC mediated antigen processing & presentation

2 significant CCSs were found centred around the IFNG region of chromosome 12 in the late phenotype. The top 8 pathways for genetic locations associated to significant CCSs are shown in Table 2.

Table 2. Top 8 pathways for genetic locations associated to significant CCS for the late phenotype.

	GeneSet
1	Surfactant metabolism
2	IL12 signalling mediated by STAT4
3	Protein digestion & absorption
4	Calcineruin regulated NFAT dependent transcription in lymphocytes
5	Transcriptional misregulation in cancer
6	Kaposi's sarcoma associated herpes virus infection
7	IL2 mediated signalling events
8	Inflammatory bowel disease

Conclusion: Significant CCSs, as part of 3D genomic regulatory control, and their associated pathways for the genetic locations, were identified in both late and early phenotypes. There were distinct CCSs in the early phenotype compared to the late suggesting the CCSs change as the disease progresses and varies between phenotypes. If CCSs could be linked to each clinically defined subgroup across a SSc cohort they could be used as a biomarker tool to predict outcome and progression in patients.
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PARE abstract session

OP0255-PARE USING AN EDUCATIONAL APPLICATION TO FACILITATE UNDERSTANDING OF THE ANATOMY AND FUNCTION OF THE BRAIN AND TO EXPLORE THE EFFECTS OF CLINICAL FATIGUE FROM A PATIENT PERSPECTIVE

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Background: Rheumatic and musculoskeletal diseases are a group of devastating autoimmune disorders that all commonly share the debilitating symptom of fatigue. Despite the fact that fatigue can often cause some of the greatest impairments to quality of life, it is frequently reported by patients as the least successfully managed symptom of these conditions.
Fatigue is routinely misunderstood within the general population, with many people using the word fatigue as a synonym for tired. Fatigue is not the same as tiredness, which is a normal state that is experienced by most of the population, therefore it is important to help the general public understand what fatigue actually is and how it imposes consequences and limitations on those who suffer from it. To aid this understanding an educational application has been created to reinforce the patient perspective of living with fatigue. Furthermore, this application will also aid the understanding of brain anatomy and function, using Augmented Reality (AR), as research has now shown that brain function may be altered in the state of fatigue. Currently, educational AR applications show great potential for increasing comprehension and understanding of complex concepts. AR expands user engagement by enhancing the learner's enjoyment and enriching their learning environment. We hope to utilise this technology in the education of fatigue.

Objectives: We aimed to create an AR application that has informative content designed to educate users on the topics of basic brain anatomy and function. Furthermore, we aimed to increase the users understanding of the complete impairment of fatigue by creating a short video that describes living with fatigue from the patient's perspective.
Methods: The application was created using medical scan dataset, a variety of 3D modelling software, and a game engine to create a functional and interactive augmented application. The short video regarding a patient's perspective on living with fatigue was developed in collaboration with the Glasgow Arthritis Involvement Network patient partners. In order to determine if the application met its primary objectives a pilot test was conducted on 14 participants. After consenting to taking part in the study, individuals were guided through a pre-application test, the use of the application itself and finally a post-application test.
Results: Initial results from the pilot test showed promise in the educational potential of the application. With regards to the questions pertaining to the brain anatomy, the percentage of questions answered correctly increased from 36% in the pre-test to 60% in the post-test. Furthermore, after using the application the participants reported a significant increase in their confidence for their answers. An additional six questions ascertained a participants perceptions of fatigue. From these questions, the answer that was most significantly changed after use of the application, was in relation to the impact that fatigue has on a patient's quality of life (t-Test p=0.02). After use of the application participants' opinions changed to reflect the fact that fatigue can completely impair a person's quality of life, showing an increase in their understanding of the debilitating nature of fatigue.
Conclusion: This research explored the development and effectiveness of an AR application that was centered around fatigue and basic neuroanatomy education within the general population. From the pilot test conducted we are able to report that the application was successful in delivering educational material about brain anatomy and was successful in increasing awareness about the impact that fatigue can have on an individual's quality of life.

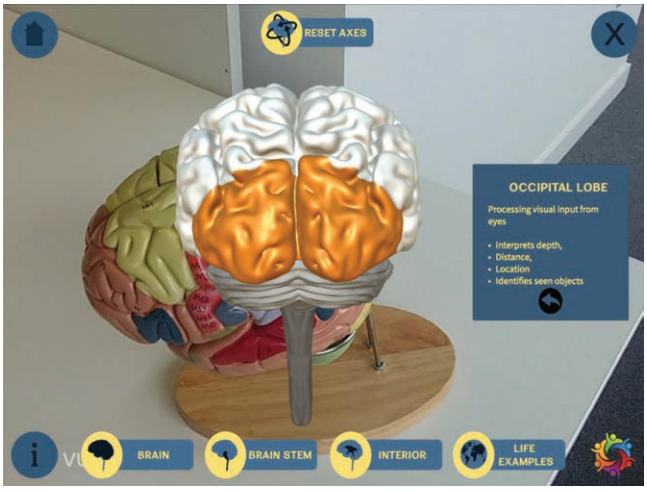

Figure 1. Augmented brain model scene using brain model as trigger

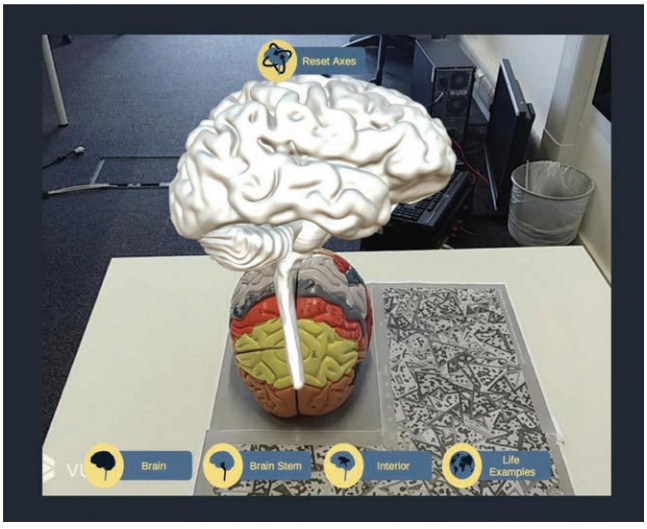

Figure 2. Example of material change upon selection of Occipital Lobe option

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OP0256-PARE

A PAW? YES, THANK YOU AN ANIMAL ASSISTED INTERVENTION (AAI) PILOT PROJECT FOR CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS (JIA)

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Background: Animal-Assisted Interventions (AAI) is the new way to indicate what was previously known as "Pet Therapy", as activities can be done either with the conventional "pets" (dogs, cats and rabbits) or with horses and donkeys. Children with JIA have several problems in terms of adherence both due to the atavistic fear of the needle and due to nausea and vomiting - the most important side effects of Methotrexate – often since the 2-3 days before the assumption to immediately after it.
Sure that animals can help children to forget this fear and to avoid the psycological conditions which enhance nausea, for the first time in Italy (and probably in Europe) it was designed a specific AAI program for these children.
Objectives: To promote a general state of psycho-physical well-being in children and families about:
manage of therapy; reduce discomfort and anxiety caused by entering hospital; improve self-esteem and the response to the stress generated by the execution of therapy and disease management; strengthen communication and socialization; stimulate the affective area through the activities of animal care.
Methods: Dogs and cats are part of the recreational activities once a week in an equipped area in the OIRM Hospital (no alternative gateway was needed).
Paediatric Rheumatologists selected two different groups of children: the first one (5 children in the pilot study) every 15 days; the second one (5 children) every month; the selection was made looking at the therapeutic scheme.
Every session, one hour, has 3 clearly distinct stages:
Welcome and organization: children say hello to dogs and cats, open the toolkits specifically designed for the intervention, express their state of mind and are encouraged to tell their own stories.
Therapy: parents prepare and inject the drug to their children under medical or Health Professional control without discontinuation of the activities with animals.
Play and socializing: children are involved in petting and other activities with animals; they are also involved in manipulative activities (design, puppets shows, modelling clay, animal care, ball retriving, etc). This step has the aim to relieve stress and discomfort due to medical procedures.
Visual Analogic Scales (VAS) were part of the toolkit, to let the researchers evaluate the effects of the activity directly from the children experience.
For the first time, we will control also the animal health status and wellness condition monitoring behavioural parameters and salivary cortisol level during each session.
Results: The pilot project started in October 2019 and nowaday we closed 12 meetings, 4 on October, 4 on November, 3 on December and 2 on January, with the participation of 2 dogs (Golden and Labrador Retriever) and 1 cat (Devon Rex) in each one.
All children love to play with animals, seek their closeness at the time of therapy and enjoy playing all together with the dogs; no one cry or refuse therapy and, since the third session, no one has nausea before, during or after the injection. Parents have reached a certain level of confidence: they stay quietly in the waiting room or go away to have a drink or to run an errand (it becomes a moment of relaxing for them too).
Animals remain in healthy and wellness conditions during the activity.
Conclusion: These preliminary data seem that AAI to be useful in helping patients in JIA to overcome some problems related to their pathology.
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