

**BIOCHEMICAL  
SOCIETY**



**Get Curious: Discover Science in our World**

27<sup>th</sup> October 2021

Manchester Museum of Science and Industry

**Dr Sarah Jones**



## Overview

The Cardiovascular Group at Manchester Metropolitan University (MMU) hosted an outreach event as part of **Get Curious: Discover Science in our World** at The Manchester Museum of Science and Industry. The event was held on 27<sup>th</sup> October (11am-3pm) during Half Term and was aimed at children age 5-16.

The aim of our event was to educate children (and their parents) about the cardiovascular system and cardiovascular disease, in particular the role of platelets and blood clotting.

We had a large area at the entrance of the museum next to 'Baby' a real working replica of the World's first ever programmable computer, giving us prime position to engage with the public visiting the museum. Throughout the day we had over 640 visitors specifically engaging with the activities within our exhibition, which was incredible!

Our event comprised of a series of activities, games, and demonstrations to explain the physiology of the cardiovascular system, how fatty plaques build up in arteries (atherosclerosis) and the impact of this in terms of platelets and arterial blood clots (thrombosis)- the major cause of heart attacks.

The activities were set up at individual stations and run by academics and PhD students from MMU Cardiovascular Group. Activities were designed to be hands and practical, whilst stimulating age-appropriate discussion about modifiable risk factors and lifestyle choices associated with cardiovascular disease.



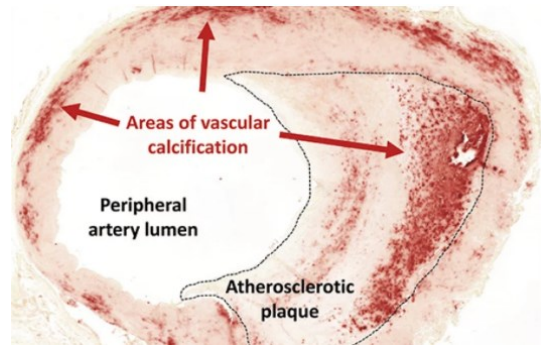
## Cardiovascular Physiology and Disease

To introduce visitors to the cardiovascular system, what it looks like and how disease effects our blood vessels, we had a range of models on display demonstrating healthy and diseased blood vessels, in addition to some of the consequences. These included a functional heart chamber model, demonstrating blood flow with and without



a blood vessel blockage (vascular occlusion) and a realistic model of a diabetic foot, which is always a favourite!

For older children and adults, we had a microscope and some histology slides showing health and diseased blood vessels including atherosclerosis, thrombosis, and vascular calcification, where blood vessels become rigid like bones.



## Sticky Cells:



To demonstrate that the blood vessel wall becomes more sticky (thrombogenic) when there is atherosclerosis we ran an activity comprising of a large poster with a 'healthy' blood vessel and a 'diseased' blood vessel, using Velcro to represent the 'sticky' surface of an atherosclerotic plaque. Ping-pong balls covered in Velcro were then used as platelets to demonstrate that 'platelets' do not stick to a healthy blood vessel wall, but when a vessel is diseased, they can

stick to the vessel wall, and each other to form a blood clot (thrombosis). With older children and adults, we used non-coated pin-pong balls to explain how aspirin stops platelet becoming



activated and 'sticky', which is why aspirin is used as an antithrombotic treatment to prevent heart attacks in people with cardiovascular disease.

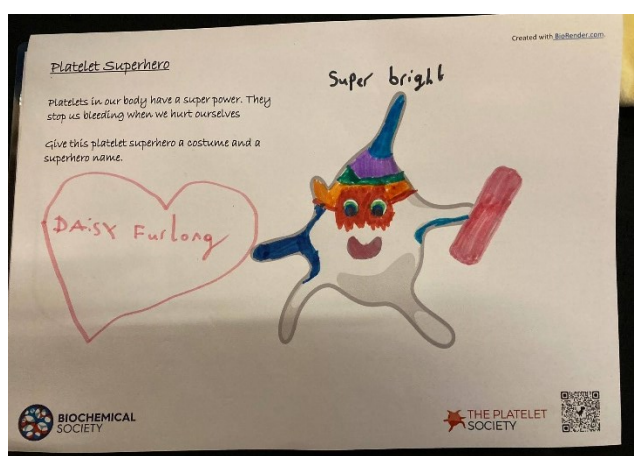
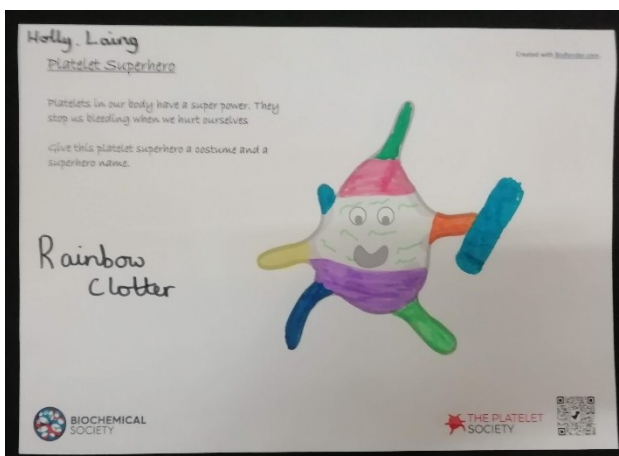
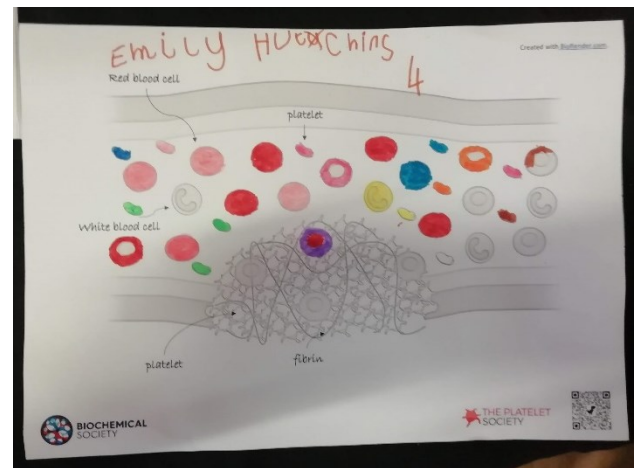
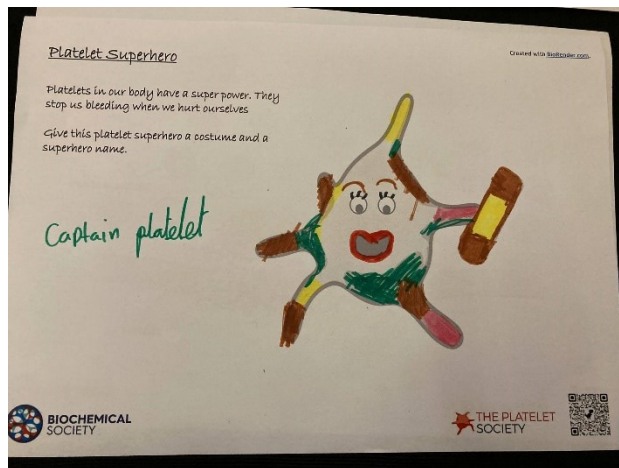
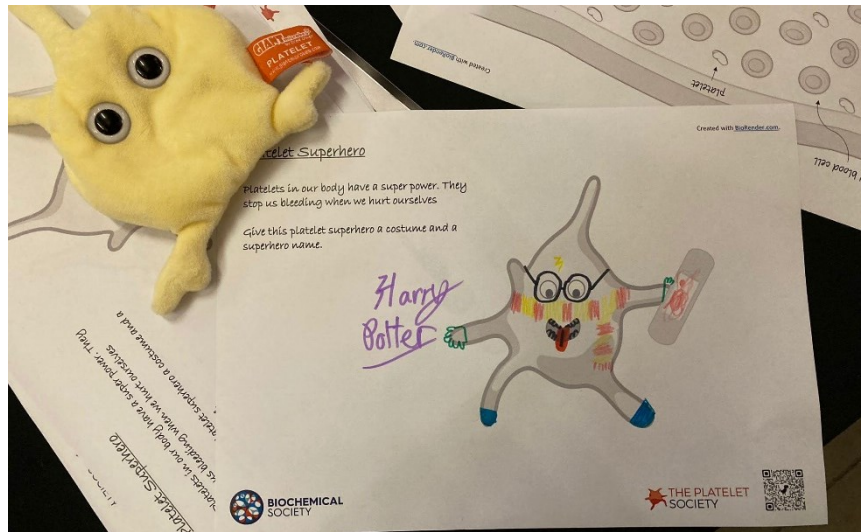
### Blood Clot Challenge:

Using different colour pompom balls (blood cells), red cups (blood vessels), and pipe cleaners (fibrin), we discussed with visitors the different blood cells and their role in the body (red blood cells- carry oxygen; white blood cells-fight infection and platelets – form blood clots to prevent bleeding). We then demonstrated how a blood clot forms when we injure ourselves. The visitors took some of the pompoms representing each of the blood cell types and put them in their cup. Bleeding was demonstrated by tipping the cup up and the blood (pompom balls) falling out. We then showed how a blood clot (scab for younger children) is made using the pipe cleaners poked through the holes in the cup, to make a fibrin mesh, which when the cup is tipped up, prevents bleeding (pompom balls falling out).



## Clot Colouring and Platelet Superheroes:

To emphasise the role of platelets in health (haemostasis) and disease (thrombosis), we had a colouring station set up with colouring sheets aimed at different ages. We had platelet superhero sheets for younger children, to highlight the 'superpower' of platelets to stop us bleeding when we injure ourselves. Children could design, colour and name their own platelet superheroes. There was also a more intricate clot images for older children to colour, with many tiny platelets forming a blood clot.





## Play-Doh Platelets:

At the Play-Doh station, which was very popular, visitors learnt about how platelets change shape when they form a blood clot and how blood clots are stabilised by fibrin, which forms a 'Spiderman' style web over the platelets, keeping them in place. Children enjoyed making the different shaped platelets and using the spaghetti maker, to make the fibrin.



## Blood Vessel Blockage:

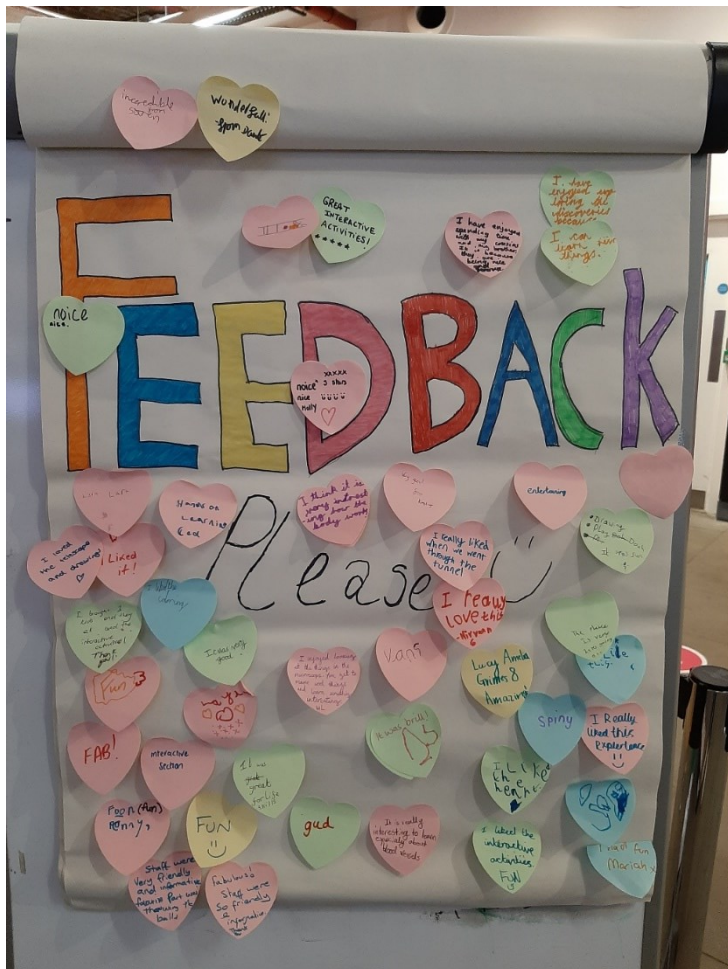
Blood vessel blockage was a game designed to demonstrate the detrimental effect of fatty build-ups in blood vessels and how this can lead to heart attacks. It was a hit with all ages.

We had a giant blood vessel (clear tunnel) with red blood cells (large red cushions) and children had to carry 'red blood cells' through the 'blood vessel' to the heart at the other end in a set time. This allowed age-appropriate discussion on what blood vessels were, what the heart does and the role of red blood cells carrying oxygen to tissue including the heart muscle.

We then discussed what happens when you eat too many 'treats' over time, and the children placed yellow cushions in the tunnel to mimic fatty plaques. Children then had to race to take the blood to the heart in the same amount of time, otherwise the heart would not get enough oxygen and stop working (heart attack). This facilitated discussion on the difficulty of blood getting through the 'fatty' blood vessel, what a heart attack was and what we can do to keep our blood vessels healthy.



## Evaluation:



Visitors were asked to leave feedback on heart shape sticky notes as they left the exhibition. All the feedback received was very positive. Comments included.

“fun 😊”

“It was brilliant!”

“I really love this”

“I think it is very interesting how the body works”

“It is really interesting to learn especially about blood vessels”

“I like the heart”

“I really liked this experience 😊”

“I enjoyed looking at things in the microscope. You get to make good things and learn something interesting”

“I have enjoyed exploring the discoveries because I can learn new things”

“Drawing, Play-Doh, it was fin”

“I had fun”

“It was great for life skills”

“Fabulous, staff were so friendly and informative. Favourite part was throwing balls”

“ I brought 3 kids and they all loves the interactive activities, Thank you”

“Nice, 5 stars”



### **Official feedback from the Museum:**

In addition to the feedback board for free text comments, staff from the Manchester Museum of Science and Industry asked visitors to complete feedback questionnaires as they were leaving the exhibition.

The full extensive feedback has not been fully analysed by the museum yet, however the key findings were as follows:

- Number of visitors that attended the exhibition was 640
- 78% of people surveyed said they were extremely like to recommend attending a future Get Curious event at the Science and Industry Museum to friends or relatives.
- 70% of the people surveyed said they strongly agreed the Get Curious event helped them learn new facts about science. This rose to 100% of those surveyed when including those who agreed.
- 57% of those surveyed said they strongly agreed the Get Curious event helped them better understand that STEM influences everything in their lives. This rose to 96% of those surveyed when including those who agreed.
- 90% of those surveyed agreed or strongly agreed that Get Curious helped them better understand what STEM professionals do
- 57% of the people surveyed said they strongly agreed the Get Curious event encouraged them to talk about STEM subjects. This rose to 100% of those surveyed when including those who agreed
- 86% of those surveyed agreed or strongly agreed that Get Curious inspired them to try a STEM activity at home