

## Why did it turn pink?



- The ice cubes are coloured using b'Lure – a 100% natural, gluten free, GMO free, chemical free extract from butterfly pea flowers.
- b'Lure dances from blues to purples and pinks depending on surrounding light and the acidity (pH) of the drink or food it is mixed with.
- The G&T with citrus is more acidic (lower pH) than the water in the ice cubes, and this causes the b'Lure to turn purple and pink.

## How is this related to cancer research?

- **All solid tumours** typically have a more **acidic microenvironment** than normal tissue.
- Detecting molecular markers that change their property with pH can help to characterise the tumour, since those with lower pH can be more aggressive.
- There are already methods to achieve this using **magnetic resonance imaging (MRI)** by injecting baking soda (harmless) into patients and watching it convert into carbon dioxide.

## Why did it “ping”?



- The **Photoacoustic Effect** is the conversion of light to sound.
- When the light hits the can it is absorbed and causes a small heating effect, which results in a pressure wave.
- This pressure wave is the sound (“ping”) that we hear.

## How is this related to cancer research?

- The Photoacoustic Effect is used in a new type of imaging called **Photoacoustic Imaging**.
- Exploiting the photoacoustic effect in photoacoustic imaging of **breast cancer** allows us to map the distribution of **blood vessels** in a tumour and therefore calculate how well we can **deliver chemotherapy** to the tumour.
- It can also help to monitor treatment response.

## Why did it glow?



- Almost all objects scatter light, which means they reflect light in all directions. If the objects around us reflected light perfectly without scattering they would appear like mirrors.
- There are several ways how scattering occurs: in milk light is scattered by the tiny fat droplets, and this causes the light beam to become a glowing ball.

## How is this related to cancer research?

- We are developing new endoscopy techniques based on light scattering to enable **early detection** of cancer in the gastrointestinal (GI) tract, in particularly the deadly disease **oesophageal cancer**.
- In the very earliest stages, the **microstructure** of the tissue (invisible to the naked eye) will start to change and we can use light scattering to detect this.

## Why are they invisible?



- The clear water pearls are super absorbent polymers that can hold up 300 times their original weight in water.
- When the clear water pearls absorb and fill with water they become invisible once submerged in water. This happens because the water filled pearls have the same index of refraction as the water itself.
- As you remove the pearls from the water, light refracts against the pearls making them visible.

## How is this related to cancer research?

- By performing imaging, our goal is to more precisely detect structure in the body that our eyes cannot see.
- This enables us to deliver targeted treatments to **all solid tumours** more effectively, minimising the risk of damage to surrounding healthy tissue (e.g. in proton beam therapy).