Dr Abigail Rickard Cardiovascular Podcast Transcript

Welcome to the University of Greenwich podcast series.
We hope you will enjoy our selection of podcasts,
which are linked to various interesting topics,
and A-Level syllabuses; and will hopefully
trigger thoughts and discussions around the various points
raised.

My name is Abigail Rickard, I am an Associate Professor
at the University of Greenwich and I have been studying,
researching and lecturing in Cardiovascular medicine for the
last 15 years. And I thought I'd take the opportunity today
to explain some of the more interesting things that I've
learnt about the heart over that period. But first I'd like
to start with just a quick recap for those of you who are
interested in Cardiovascular medicine and have just
done a little bit before about it or for those of you
that are completely new, this will be a very brief
introduction to the heart.
The mammalian heart lies in the centre of the chest
and comprises of 4 different chambers. There are
2 atria which are located at the top of the heart,
and 2 ventricles which lay at the bottom.
And the heart is responsible, ultimately, for getting
blood around the body and around the lungs
where it can be reoxygenated and carbon dioxide
removed, before returning it back to the body again.
All of this is carefully controlled by electrical waves.
The electrical system is what's driving all of these

different changes, and the pumping of the chambers of the heart
to enable this blood to be moved around the lungs
and around the body. And in fact the pacemaker
is 1 of the reasons and the pacemaker cells involved with
that, that I find the heart so fascinating. So your
heart will be beating for 24 hours a day, hopefully,
365 days of the year for maybe 100 and, or more, 120 years
of your life. And it doesn't really ever need, any kind of servicing
or replacement for, fortunately for the majority of us,
but we still don't yet build engines and have machines that
can actually replicate that and do themselves. So it's
1 of the reasons that I'm quite fascinated by it.
We're not entirely sure why the pacemaker cells
generate the electrical currents that they do, but we
do know it's associated with calcium oscillations
and scientists give the name of this currently, "IF" current
or the "funny current" as a result of us not truly
understanding the nature of those calcium oscillations.
So in your lifetime, you can expect your heart to
be beating, somewhere in the region of
3 billion times for the average adult human. And in
fact the heartbeat, those pacemaker cells, can actually
be identified to be beating from between the sort
of second or third week after conception. So before
you're even born the heart will have beat around 54 million times
and so it's an incredibly efficient, incredibly well-oiled, if you like,
engine that we are incredibly fortunate to have evolved
to develop. If you were to draw a graph of heartrate
against life expectancy, you could line up all of
the mammals, according to their size, so with

the shrew, something as small as that which may
only live for maybe a year and have an approximate
heartrate of around 1200bpm, right up to the blue
whale which maybe has a heartrate of around 8bpm
you can see that as size increases, of the animal,
the slower their heartrate and the longer their
life expectancy. But of course, human beings
are the only one which does not fit that
general trend, and the reason for that is because we
have medications and good healthcare. So we
actually live for far longer than we should
according to our body size and our heartrate.
So why do you die?
Well it can obviously be caused from a number of
different reasons. But the mostly likely cause
of death in the world is in fact death from cardiovascular diseases.
So you're twice as likely to die from cardiovascular disease
than you are from all of the other cancers put together.
And so it remains an important question and an
important topic for us to be studying. And to find
new treatments and new cures, and of course encouraging
people to look after their cardiovascular health whether
that's through diet and/or through exercise.
So when are you most likely to die from heart attack?
Well studies have suggested that actually it's
the first thing in the morning, so when you rise out
of bed that you're most likely to die. For the majority
of the year. Now this is associated with the fact that
when you're sleeping at night, you're laying down,
and then suddenly you are putting a great stress

through the heart as you stand up. The nature of the large stresses that occur in the heart, as you rise as you get out of bed in the morning come from the fact that, as you've been laying down, the pressures on the heart are very different to those you would experience as you then stand up. And if you are unable to respond to those changes in new demands and the pressures on the heart, you, potentially, can cause your heart to go into electrical problems, or pumping problems and this can cause heart attack and, unfortunately, you're therefore quite likely to die. Interestingly though, the most likely time to die from a heart attack, and a recent study conducted in Sweden, is actually at 10 o'clock (pm) on Christmas Eve which completely bucks the trend of the rest of the year. And the researchers are not entirely sure why, but it's potentially associated with the fact that you've spent a lot of time, potentially, gritting your teeth around family, over-indulging in food and in alcohol potentially and so the effect and the stresses of Christmas can have an effect on your heart where you're 37% more likely to die at 10 o'clock on Christmas Eve in Sweden and they extrapolate that to Christmas Day for those countries that celebrate Christmas Day on the 25th than you are the rest of the year. The second most likely time you're most likely to die is actually is on New Year's Day and again, we're probably thinking that that's associated with all of the partying that may have happened the night before and the over-indulgence. Another interesting

fact that I've come across is that, so if you survive Christmas
and you make it towards February, you may be
thinking about Valentine's Day and of course the
heart is used very often as a symbol for love and I really like that
fact although obviously the anatomy's slightly
different the way it's presented, but the reason
that I like it as a symbol of love, is because love
can affect us and affect our hearts. And one
of the reasons that I love the fact that the heart
is used as a symbol of love, is because love
affects the heart in so many different ways and
you will maybe have felt palpitations when you see
somebody that you love, and that's associated with
either a faster pumping of the heart, so an increase
in heartrate, or in the volume or the force of
heart is beating with and that's associated with
the stroke volume, the amount of blood
that's leaving the heart, each time it beats. And
collectively those 2 terms create something called the
Cardiac Output which is the amount of blood
that's leaving the heart each minute and
being pushed through that. And when you love
somebody that will change accordingly. But
unfortunately, you can also die of a broken heart.
It is possible for that to happen. It's relatively rare
although research in the area is suggesting that
perhaps it's more common than we're starting
to think and this is also known or is known in
the clinical world as Takotsubo syndrome or acute
stress-induced cardiomyopathy. And the reason

the syndrome is given the name Takotsubo
syndrome is after the Japanese octopus
fishing pot which has a particular shape that see
in the left ventricle when people develop this
syndrome. So it's long, it's elongated and
it's rather large so it's dilated, and this affects
the left ventricle's ability to pump efficiently.
Now the reasons for that are not entirely
Well understood and about 7% of patients
that are brought in with heart failure, that
don't have any coronary artery issues, and
the most common reason for you to have
to have a heart attack is blockages in your coronary
arteries, but for these patients, the change in
their ventricle has been brought on by a sudden
very often the sudden deliverance of very bad news.
So what you may find where a couple have been,
maybe been together for a very, very long time
the husband may die and then within a few
weeks or a few months later, the wife may die
and this is associated, very often, well at least
7% of the cases we think with this change in the
shape of the ventricle which is this kind of
broken heart syndrome that we talk about.
Now for any students amongst you that are
listening, how can you break your heart?
Well theirs a number of different ways that you
can do it. Some of you may be interested in
going out and drinking cast quantities
of drinks that may be vodka Red Bull© or

may be espresso Martinis© where you're
combining the effects of caffieine, which is
a stimulant with that of alcohol which is
a depressant. Now putting these 2 opposing
(what's the word?) putting these 2 opposing
Nervous system drives can cause the heart to
Be conflicted. So just as an engine, you may be
putting your foot on the accelerator and
on the brake at the same time, you're going
to cause a problem within that engine. And in
doing so, what you're actually doing is increasing
the sympathetic drive as well as the parasympathetic drive
to the heart. Now the heart is myogenic and if you remember
at the beginning, of the podcast, I was talking about
the fact that the pacemaker cells will just beat
and they will beat on their own and they don't
require any external stimulus, but 1 of the ways
that you can change what the heart is doing
is by nervous stimulation The parasympathetic system
will try to reduce the cardiac output and reduce
outrate and the sympathetic nervous system trying
to increase heartrate and potentially
stroke volume as well. Now if you're putting those
2 systems together at the same time, you
can have a scenario where the heart becomes
confused and it's known as autonomic conflict,
and what it can result in is rhythmias and sudden death.
So for those students amongst you, hold back
on the vodka Red Bull© and also on the espresso Martinis©