

A letter for a ray of sunshine,

14 years ago, I wanted to become a princess and have magical fairy powers. My favourite time of the year was Christmas. I would help mummy make the mince pies, wrap up the presents and place the Christmas stockings next to the fireplace. Even now, I still feel a sizzling sensation whenever it's Christmas time. Little had I known then that in 14 years' time I would have the opportunity to study something more magical than Christmas. The field of drug research is constantly evolving. In 14 years from now, you could share this excitement!



Studying pharmacology at university would be truly rewarding. You could build upon the foundation created by pioneer scientists. Edward Jenner, a scientist that revolutionised the world of vaccines discovered a method for treating small pox (a type of disease). People with small pox have big spots all over their body. The vaccine he discovered saved millions of lives. He even created a new way of fighting disease called "immunology". This is when we make our body think we have a disease, when in fact we don't. We then make lots of proteins called "antibodies" and store special cells called "memory cells" that protect us when we actually have the disease. Another scientist, Alexander Fleming found a medicine that kills bacteria. This medicine, "penicillin" saved thousands of people dying from infections (when bacteria enters the body). Their discoveries are like the candy that makes the candy floss. These scientists have created the



platform that future scientists like you can build on. The future of medicine research is going to be magical...more magical than a fairy wand!

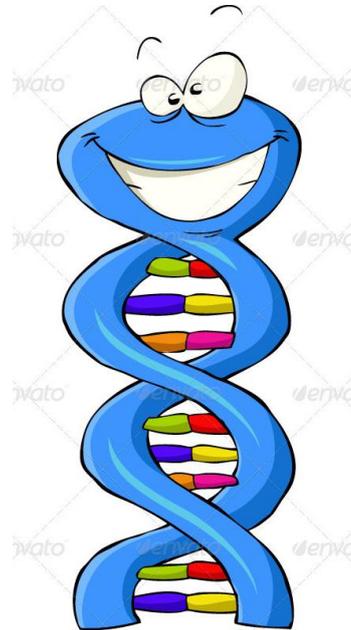
Study into diabetes is one of the pillars that hold the magical future. People with diabetes have trouble taking energy from food and delivering it to the trillions of cells in the body. Unlocking the secret locket of a diabetes drug we use called "metformin" will in the future allow us to learn more about its possible uses as a future medicine for cancer. Another medicine of the future is super tiny particles called nanoparticles. We are looking into ways they can help to target horrible diseases like cancer. In years to come, they can be used to deliver medicines to the body. Nanocarriers in medicines would be like tiny elves delivering presents (medicines) on Christmas day (to our body). You could also join the special team of



musketees that are fighting super bugs like MRSA. These bugs are powerful bacteria that don't die, even when we use medicines like penicillin. Bacteria busting virus (bacteriophage) and new types of antibiotics are exciting solutions you could study when you are older.

Not only can you discover new ways of fighting diseases, you can also change the lives of future children like you. How will you do this? By fighting genetic diseases... We are made of trillions of cells. You have over 2.5 billion cells in your hand but they are very, very tiny. They are so tiny that we can't see them (except using special microscopes). Different cells in our body have different jobs, some help us hear, see and smell. In fact, we have 200 different types of cells. Every cell in your body as a special type of chemical called DNA. DNA is as special to cells as Santa is to Christmas. It has all the instructions that tell the cell what its job is. It is even

written in 4 secret codes (Shhh!). special that it has a special we call a double helix. The rung most important part. Each of they would prefer to be called by and T, C and G are best friends. together. However, there might secret codes in DNA. The special This can cause genetic diseases CF - when people have problem leads to breathing and lungs example is Huntington's disease - are don't work properly. People with their memory, thinking and



A, T, C and G. It is so curved ladder shape of the DNA is the them have a name but their secret codes. A Each pair like to stay be mistakes in the word is a "mutation". like Cystic fibrosis or with their mucus. It problems. Another this is when brain cells with it have problems mood (usually at old

age). In fact, there are over 6000 of these diseases! So there are enough options for you to focus your future research work upon. Unfortunately these special types of diseases can be passed down to children, grandchildren, great-grandchildren and beyond. Scientists want to make new methods to solve this problem. In 14 years' time, you could be one of the special scientists that develop complicated methods like gene therapy, genetic engineering and genome editing to change the bad parts of DNA that causes the diseases.

There is a magical world of medicine waiting for you to discover it. With your research, children can live to enjoy many Christmases and birthdays. Your contribution will help everyone stay healthy, live longer and live happier.