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the last 100 years has been most beneficial for people in your country? Use specific reasons and examples to support your choice.

The Microbial World Penicillin: the story of an antibiotic The antibacterial effect of penicillin was discovered by Alexander Fleming in 1929. He noted that a fungal colony had grown as a contaminant on an agar plate streaked with the bacterium *Staphylococcus aureus*, and that the bacterial colonies around the fungus were transparent, because their cells were lysing. Fleming had devoted much of his career to finding methods for treating wound infections, and immediately recognised the importance of a fungal metabolite that might be used to control bacteria. The substance was named penicillin, because the fungal contaminant was identified as *Penicillium notatum*. Fleming found that it was effective against many Gram positive bacteria in laboratory conditions, and he even used locally applied, crude preparations of this substance, from culture filtrates, to control eye infections. However, he could not purify this compound because of its instability, and it was not until the period of the Second World War (1939-1945) that two other British scientists, Florey and Chain, working in the USA, managed to produce the antibiotic on an industrial scale for widespread use. All three scientists shared the Nobel Prize for this work, and rightly so - penicillin rapidly became the "wonder drug" which saved literally

millions of lives. It is still a "front line" antibiotic, in common use for some bacterial infections although the development of penicillin-resistance in several pathogenic bacteria now limits its effectiveness (see later). The action of penicillin is seen in Figure A. This shows an overlay plate, in which a central colony of the fungus *Penicillium notatum* was allowed to grow on agar for 5-6 days, then the plate was overlaid with a thin film of molten agar containing cells of the yellow bacterium, *Micrococcus luteus*. The production of penicillin by the fungus has created a zone of growth inhibition of the bacterium. This demonstration parallels what Alexander Fleming would have observed originally, although he saw inhibition and cellular lysis of the bacterium *Staphylococcus aureus*.

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