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PINE CONES COULD BE THE ANSWER TO MRSA THREAT: NEW RESEARCH

British Pharmaceutical Conference, Manchester. Pine cones may form a new line of attack against methicillin-resistant *Staphylococcus aureus* (MRSA) infection, the British Pharmaceutical Conference heard this week.

Researchers at the School of Pharmacy, University of London, have found that immature pine cones contain antibacterial agents that are active against MRSA and other staphylococcal infections. The work could lead to new drugs to treat MRSA, a serious infection that has become an increasing problem in both hospitals and the community.

The new research involves cones of *Chamaecyparis lawsoniana*, a tree grown widely in the UK. Dr Simon Gibbons, who leads the research team, explained how it works: "Plants need some protection against bacteria in their environment and there is an ecological rationale for protective compounds to be synthesised in a part of the plant essential for its reproduction, i.e. the cones. There is no reason to assume that any plant antibacterial compounds will be active against human pathogens," he said, "but we felt that it was worth investigation."

"The level of activity against MRSA and MDR strains found in the compounds we isolated from the pine cones is a good starting point for new anti-staphylococcal drugs," Dr Gibbons concluded.

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Before any such compound – or synthetic derivatives – could be taken by a patient, extensive efficacy and toxicity testing will be needed. In the shorter-term, the compounds are more likely to be investigated for use as antiseptics, for example as additives to soaps, as part of a hospital's infection control strategy.

The work was conducted and reported to the Conference by Ms Eileen Smith, a final year PhD student in the research group of Dr Gibbons.

Ends

For further information please contact the press office on:

- **0161 832 1050, 0161 839 9163 or 0161 839 9161 (27 – 29 September)**
- **020 7572 2335/6 (pre and post conference)**
- **07971 022297 or 07958 547727 (available at all times)**

Notes to editors

Active compounds extracted from the cones were identified using NMR spectrometry. The compounds – sesquiterpenes and diterpenes – were then tested against several strains of *S aureus* and some were found to be active against MRSA.

The MRSA resistance mechanism involves alteration to the bacterial cell wall so that bacteria are no longer susceptible to methicillin and other penicillins. Another resistance mechanism is the over-expression of 'multidrug efflux pumps' which actively pump drugs out of the bacterial cell so they are not able to exert their therapeutic effect. One diterpene identified in the pine cones had good activity against staphylococcal strains with this multidrug resistance (so-called MDR strains). The minimum inhibitory concentration [the lowest concentration that inhibits growth of the bacteria] was 4-8mcg/ml. This compares with MICs of 32 or 128mcg/ml for some standard antibiotics against the MDR strains.

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Another strand to this research is to investigate whether, as well as being antibacterial themselves, the pine cone compounds might also block the multidrug efflux pump. This would mean that they could potentiate the activity of an antibiotic against a resistant strain. There are no definitive data yet, but from early work the researchers are optimistic that this will be the case and that the compounds could have resistance modifying activity.

BPC

BPC 2004 is being held at Manchester International Convention Centre between Monday 27 and Wednesday 29 September. The conference theme this year is 'Medicines: from cell to society'. The science and technology that underpins the design of today's medicines is developing fast. At the same time, the demands of patients are increasing and the priorities of the health service are changing. BPC 2004 will examine all of these issues, alongside sessions drawing on the experience of leading edge good practice and the latest in continuing professional development.