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## Media Information

### Royal Gold Medals for outstanding achievement

The achievements of two individuals whose work has brought about benefits on an international scale have received Royal recognition. Royal Medals were presented by The Royal Society of Edinburgh's President, Professor Sir Michael Atiyah to Global Pharmaceutical drug pioneer, Sir David Jack CBE FRS FRSE and to one of the World's leading Mathematicians, Professor Sir John Ball FRS FRSE at a ceremony held in The Royal Society of Edinburgh (RSE) last night, Monday 3 July 2006. The Medallists have been approved by the RSE's Patron, Her Majesty The Queen and were recommended by the RSE's Council, in recognition of intellectual endeavour which has had a profound influence on people's lives, world-wide. Prestigious gold medals, designed and produced in Scotland, were presented to the Medallists.

President of The Royal Society of Edinburgh, Sir Michael Atiyah said:

*In their respective fields of Mathematics and Pharmaceutical Research and Development, the Royal Medallists have excelled. Sir David Jack is one of the world's most successful inventors of significant new medicines that have saved or transformed many lives. One of the world's most prominent mathematicians, Sir John Ball's theories and methods are playing an important role in the interdisciplinary endeavour to understand matter at many different scales. Recognising and celebrating excellence for public benefit, The Royal Medals capture the spirit of the RSE's Royal Charter of 1783, 'to promote the advancement of learning and useful knowledge'. To Sir John and Sir David, I offer my sincere congratulations.*

#### **The Royal Medallists:**

**Professor Sir John Ball FRS FRSE**, Mathematical Institute, University of Oxford, for his outstanding contributions to applied mathematics and his public service to the international mathematics community.

Sir John is widely regarded as one of the most prominent mathematicians in the world in the broad area of nonlinear analysis and mechanics. Sir John's scientific work is distinguished by highly original and profound contributions to calculus of variations, nonlinear partial differential equations, nonlinear elasticity and material sciences.

In 1969 Sir John Ball received an Honours degree in Mathematics from the University of Cambridge and followed this with a PhD in Mechanical Engineering from the University of Sussex. He started lecturing in mathematics at Heriot-Watt University in Edinburgh in 1972

and worked his way up the academic ladder to Professor of Applied Analysis at Heriot-Watt University in 1982. He is now an Honorary Professor at Heriot-Watt and is based at the University of Oxford where he is Sedleian Professor of Natural Philosophy and Fellow of The Queen's College.

Nonlinear elasticity is the central model for the behaviour of solid objects such as engineering structures or the response of thin films to various forces. In 1977 Professor Ball developed a rich set of tools and concepts for studying these models. This pioneering research has had a huge influence not only on nonlinear elasticity, but also nonlinear partial differential equations and the calculus of variations.

The behaviour of materials is often determined by a microscopic structure which is invisible to the naked eye. Understanding and controlling this microstructure is at the heart of designing new materials (smart materials). Professor Ball proposed a new theory for this based on minimization of an ill-posed problem. Although the mathematical difficulties were formidable, he was able to overcome them by using sophisticated techniques (weak convergence, Young measures, quasiconvexity) for passing from microscales to macroscales. The predicted microstructure morphology made by his theory is in excellent agreement with experiment. His theory and methods are now playing an important role in the interdisciplinary endeavour to understand matter at many different scales.

Sir John's achievements and reputation at Heriot-Watt University helped him attract top quality international researchers to that institution, even when the mathematics department was in its infancy. He has established strong mathematical schools at both Heriot-Watt and Oxford Universities. Sir John has also received Visiting Professorships in a wide range of international institutions, for example, at the University of California, Université Pierre et Marie Curie in Paris, University of Minnesota, the Institute for Advanced Studies at Princeton, the University of Crete, the Tata Institute for Fundamental Research Bangalore and the Université Montpellier II. Through his time spent at these institutions he has been an enthusiastic ambassador for UK mathematics, particularly applied mathematics.

Sir John's scientific work is only part of his professional activities, his other role is in organising, managing and promoting mathematics. He was one of the founders of the International Centre for Mathematical Sciences (ICMS) in Edinburgh in 1990. His organisational and motivational skills are of world renown and he serves as manager and consultant to many international organisations. He is currently President of the International Mathematical Union, the controlling body of world mathematics. In 2005 Professor Ball's work was recognised when he received a knighthood.

It is for Sir John's outstanding contribution to mathematics, and in particular for raising the international profile of UK mathematics, that he is awarded a Royal Society of Edinburgh Royal Medal.

**Sir David Jack CBE FRS FRSE**, formerly Research and Development Director, Glaxo Holdings London, for his outstanding contribution to the pharmaceutical industry and his untiring work and contributions to scientific organisations concerned with drug design and development.

Sir David is one of the world's most successful inventors of significant new medicines.

Sir David graduated from Glasgow University in 1948, a Bachelor of Science with first class honours in Pharmacy and Pharmacology. For one year he was an assistant lecturer in pharmacology in the Materia Medica Department of the Medical School, after which he was required to attend a period of National Service for two years. He then abandoned experimental pharmacology and worked for two years as a pharmacist in the Glaxo

Research Division in Greenford. He learned much that would be useful in his subsequent years but the work was dull and repetitive. He therefore moved to Smith Kline and French Ltd where he was responsible for chemistry and pharmacy. In 1960, he successfully submitted a PhD Thesis in Chemistry to London University.

In 1961, Sir David's work then turned to drug discovery as Research Director of Allen & Hanbury Ltd, a subsidiary of Glaxo Group. He started in Ware with 130 laboratory staff. When he retired in 1987, he was Director of Research and Development of Glaxo Holdings Plc with a world wide staff of 3,000. Glaxo had become one of the pharmaceutical giants.

The first major invention of the Ware team was salbutamol, the first highly selective B<sub>2</sub>-adrenoceptor stimulant which is very much more active on bronchial muscle than on heart muscle. It is the active ingredient of Ventolin Inhaler which delivers 100 microgramme doses. One or two puffs provide near-maximal bronchodilatation for about 3 to 4 hours with minimal side effects. Ventolin Inhaler, soon the most prescribed bronchodilator in the world, gained a Queen's Award for Technological Achievement in 1973.

Sir David's team went on to win another Queen's Award in 1975 for the Becotide Inhaler which contains beclomethasone dipropionate, a potent topical anti-inflammatory steroid. This inhaler used in conjunction with salbutamol was an important step forward in the treatment of asthma.

The Glaxo Allenbury's team went on to win three more Queen's Awards. In 1985 they received the award for ranitidine ("Zantac"), a potent inhibitor of gastric secretion which is used to prevent and heal peptic ulcers. By 1991 Zantac was the best selling pharmaceutical product in the world.

In 1994, Ondansetron ("Zofran"), a new kind of 5-hydroxytryptamine antagonist used to control vomiting during cancer chemotherapy was also the subject of a Queen's Award.

Another Queen's Award followed in 1996 for sumatriptan ("Imigran") which controls attacks of migraine by mimicking the action of 5-hydroxytryptamine on cerebral blood vessels.

David Jack's efforts were largely instrumental in converting Glaxo into one of the most successful pharmaceutical companies in the world. The immense competence, drive and enthusiasm of one scientist together with his ability to acquire a sound team of assistants has led to the production of seven new and successful medicines (salbutamol, salmeterol, beclomethasone dipropionate, fluticasone propionate, ranitidine, ondansetron and sumatriptan) is outstanding and unique. Sir David's work has improved the quality of life and in some cases saved the lives of millions of people throughout the world. It is for this outstanding achievement that he is being awarded a Royal Society of Edinburgh Royal Medal.

### **The Royal Society of Edinburgh**

The Royal Society of Edinburgh (RSE) is an educational charity, registered in Scotland. Independent and non-party-political, we are working to provide Public benefit throughout Scotland and by means of a growing international Programme. The RSE has a peer-elected, multidisciplinary Fellowship of 1400 Men and women who are experts within their fields. We seek to provide public benefit in today's Scotland by:

- ◆ Organising lectures, debates and conferences on topical issues of lasting importance
- ◆ Conducting independent inquiries on matters of national and international

importance

- ◆ Providing educational activities for primary and secondary school students throughout Scotland
- ◆ Distributing over £1.7 million to top researchers and entrepreneurs working in Scotland
- ◆ Showcasing the best of Scotland's research and development capabilities to the rest of the World
- ◆ Facilitating Scotland's international collaboration in research and enterprise
- ◆ Awarding prizes and medals

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