International Association for Dental Research (British Division)
Management Committee, 1994-1997 and 1998 to 2004
Assistant Secretary, 1998 to 2004
Mineralised Tissue Research Group, Secretary, 1993-2000
Mineralised Tissue Research Prize Committee, Chair, 1994-2000
BSDR Junior Colgate Prize Committee, member, 1994
BSDR Senior Colgate Prize Committee, member, 2007
BSDR Poster Prize Committee, member, 1999-2000

UK Forum for Oral & Dental Research – Committee member 2003-2004

Biochemical Society, member

British Society for Matrix Biology, member

British Society for Oral Pathology & Medicine, member

Organisme Europeen de Recherche sur la Carie (ORCA), senior member

Association of Basic Science Teachers in Dentistry, Committee member, 1994-2001
President 2002-2005, Past-President 2005-2008

UK Government OST representative to the Management Committee of the European COST Action B23 on Orofacial Development & Regeneration, and joint co-ordinator for Work Group 4 on Tissue Engineering in this Action (concluded 2009).

Member of UK Department of Health Dental Research Strategy Working Party, 2007-2010

Editorial / Review Activities

Journal of Dental Research, Editor-in-Chief, 2004-2010; Editor *Emeritus* 2010 to date

Archives of Oral Biology, member of editorial board, 2002 to date

Journal of Marmara University Dental Faculty, member of editorial board, 1995 - 2010

Chinese Journal of Conservative Dentistry, member of editorial board, 2001 - 2010

Dental Forum, member of editorial board 2010 - 2015

Reviewer for Journal of Dental Research, Biochemical Journal, Archives of Oral Biology, Caries Research, European Journal of Oral Sciences, Journal of Oral Pathology & Medicine, British Dental Journal, Histochemical Journal, Journal of Dentistry, Journal of Anatomy, Developmental Dynamics, Journal of Biomedical Materials Research and various other journals.

Member of Expert Review Group for Technology Transfer Awards – Wellcome Trust
Grant reviewer for MRC, BBSRC, the Wellcome Trust and various UK-based and international research funding bodies

Current Research Interests

I have a long established programme of research on the biology and pathology of the odontogenic tissues and in particular, the dentine-pulp complex. This derives from my early research interests on the extracellular matrix of dentine at the compositional level. These interests have evolved into study of the molecular and cellular behaviour of the dentine-pulp complex, particularly after injury and the subsequent tissue responses. In particular, these studies have been directed towards identifying to what extent the molecular and cellular processes during tissue repair and regeneration mimic developmental events. Importantly, a mechanistic approach has been adopted to characterise these processes for repair. Developmental studies have identified

the role of growth factors, especially of the TGF-β super-family, as mediators in the induction of odontoblast cytodifferentiation. Similar molecular mediators have since been shown to be important to both the reactionary and reparative dentinogenic pulpal responses for repair after dental tissue injury. Our development of a tooth slice organ culture model has been instrumental in taking forward mechanistic studies in this area. Characterisation of the role of cell-matrix interactions and also, the extracellular matrix more generally has highlighted their importance in both tooth development and tissue repair in the mature tooth. This has formed the basis for our studies to exploit the application of growth factors to develop new biological approaches to dental tissue repair in which the regenerative capacity of the pulp can be harnessed. Investigation of a number of aspects of the clinical restoration of injured teeth has allowed study of the interplay between pulpal responses and treatment outcomes to better understand the processes taking place. Analysis of gene expression profiles during pulpal inflammation is allowing characterisation of possible inflammatory mediators as targets for novel treatment modalities. Study of the pulpal cell populations is directed at identification of possible stem cell pools, and currently such cell populations are being examined and characterised in the context of use for regenerative and tissue engineering therapies. Some of my more significant contributions in this area include :

- Identification of a number of extracellular matrix molecules in dentine, including growth factors
- Comparative studies on the molecular and cellular processes during development and repair of the dentine-pulp complex
- Characterisation of the biological mechanisms for reparative processes in the dentine-pulp complex and their development for new treatment modalities
- Development of a tooth slice organ culture model for study of tissue formation and repair in the dentine-pulp complex
- Characterisation of the effects of various aspects of the clinical restoration of injured teeth on pulp responses and repair
- Investigation of gene expression profiles in the dentine-pulp complex and changes during tissue injury
- Isolation and characterisation of dental pulp stem cell populations and investigation of their potentialities, especially in an odontogenic context together with investigation of stem cell niches within the pulp
- Generally, trying to relate our understanding of the basic science of pulp biology to the clinical situation and how it may be harnessed to improve treatment modalities for development of novel therapies and outcomes

Two related areas of research have also been pursued. Studies on tooth wear, and particularly dental erosion and abrasion, are directed at mechanistic studies on the aetio-pathogenesis of tooth tissue loss. The latter can be a major contributor to reactionary dentinogenic responses by the pulp and will provide a basis for understanding the interplay between the two. Studies on the pathogenesis of odontogenic cysts have identified the importance of extracellular matrix and other molecules in the development of these lesions.

Grants Currently Funded / Completed (1997-2015)

1. "A novel alginate-growth factor hydrogel for dental tissue wound healing" – P.I. : AJ Smith. Engineering and Physical Sciences Research Council (EPSRC), UK, £73,377, 1997-99.

2. "Dental pulp repair : angiogenesis and growth factors" – P.I. : AJ Smith. Medical Research Council (MRC), UK, £59,997, 1997-99.

3. "The influence of fluoride on extracellular matrix and mineral components in the dentine-pulp complex during health and disease" – Co-P.I. : AJ Smith. The Wellcome Trust, UK, £72,239, 1998-2000.

4. "New biological approaches to dental tissue repair : growth factors as key mediators of cellular and molecular processes" – P.I. : AJ Smith. The Wellcome Trust, UK, £115,886, 1999-2001.

5. "Induction and stimulation of dentinogenesis in response to molecules of the TGF-β family" – Co-P.I. : AJ Smith. The British Council Franco-Bristish Alliance Joint Research Programme, £3,200, 1997-99.

6. "Studies on the dissolution of dental enamel" – P.I. : AJ Smith. SmithKline Beecham, UK, £64,470, 1999-2001.

7. "Influence of mineral waters and drinks on dental enamel" – Co-P.I. AJ Smith. Perrier-Vittel Water Institute, France, £33,818, 1998-99.