

Molecular Pathology 2002;55:367-373
© 2002 [Journal of Clinical Pathology](#)

ORIGINAL ARTICLE

Glutathione in gingival crevicular fluid and its relation to local antioxidant capacity in periodontal health and disease

I L C Chapple¹, G Brock¹, C Eftimiadi² and J B Matthews³

¹ Unit of Periodontology, School of Dentistry, The University of Birmingham, St Chads Queensway, Birmingham B4 6NN, UK

² Forsyth Research Centre, 140 The Fenway, Boston, Massachusetts, USA

³ Unit of Oral Pathology and Biology, School of Dentistry, The University of Birmingham

Correspondence to:

Professor I L C Chapple, Unit of Periodontology, School of Dentistry, The University of Birmingham, St Chad's Queensway, Birmingham B4 6NN, UK;

I.L.C.Chapple@bham.ac.uk

Aims: To determine possible changes in gingival crevicular fluid (GCF) antioxidant defence in chronic adult periodontal disease and to investigate the nature of the local radical scavenging mechanisms, with particular reference to glutathione.

Methods: GCF and plasma were collected from patients with chronic periodontitis and age and sex matched control subjects (n = 10). Polymorphonuclear leucocytes (PMNLs) were prepared and gingival epithelial cells (GECs) were collected by conventional methods from periodontally healthy subjects. PMNL were stimulated with F-Met-Leu-Phe after cytochalasin B treatment. Enhanced chemiluminescence was used to determine the total antioxidant capacity and to investigate the activity of cell fractions and reducing agents. GCF concentrations of reduced (GSH) and oxidised (GSSG) glutathione were determined by high performance liquid chromatography.

Results: Plasma and GCF from patients contained lower mean (SD) total antioxidant capacity (501.8 (123) μ M Teq/litre and 658.3 (392) μ M Teq/litre, respectively) compared

- ▶ [Full Text of this Article](#)
- ▶ [Reprint \(PDF\) Version of this Article](#)
- ▶ [Email this link to a friend](#)
- ▶ **eLetters:** [Submit a response to this article](#)
- ▶ Similar articles found in:
[Molecular Pathology Online](#)
- ▶ [PubMed](#)
- ▶ [PubMed Citation](#)
- ▶ Search Medline for articles by:
[Chapple, I L C](#) || [Matthews, J B](#)
- ▶ Alert me when:
[new articles cite this article](#)
- ▶ [Download to Citation Manager](#)

▶ Collections under which this article appears:
[Microbiology](#)
[Dentistry and Oral Medicine](#)

with controls (577.9 (99.8) and 1351.5 (861) μM Teq/litre, respectively). Antioxidant light recovery profiles for GCF demonstrated a stepped response, not seen in plasma, which was inhibited by *N*-ethylmaleimide. This response was also detected in the cytosolic fraction of GEC and anaerobically stimulated PMNL. Similar antioxidant profiles, inhibitable by *N*-ethylmaleimide, were obtained with cysteamine, cysteine, and GSH. Control GCF contained high mean (SD) concentrations of glutathione (GSH, 1899.8 (494.4) μM ; GSSG, 256.8 (152.4) μM). GCF from patients with periodontitis contained significantly lower amounts of GSH (mean, 1183.1; SD, 580.3 μM) and GSSG (mean, 150.1; SD, 44.9 μM).

Conclusions: GSH values and total antioxidant capacity are reduced in chronic periodontal disease. The high concentrations of GSH present in GCF in health are similar to those found extracellularly in the lung and may represent an important antioxidant and anti-inflammatory defence strategy common to exposed epithelial surfaces.

Abbreviations: ELF, alveolar epithelial lining fluid ; ECL, enhanced chemiluminescent ; FMLP, F-Met-Leu-Phe ; GCF, gingival crevicular fluid ; GEC, gingival epithelial cell ; GSH, reduced glutathione ; GSSG, oxidised glutathione ; HPLC, high performance liquid chromatography ; NF- κ B, nuclear factor κ B ; PBS, phosphate buffered saline ; PMNL, polymorphonuclear leucocyte ; ROS, reactive oxygen species

| | | | | | | |
|----------------------|----------------------|--------------------------|-------------------------------|-------------------------|------------------------|-----------------------------------|
| HOME | HELP | FEEDBACK | SUBSCRIPTIONS | ARCHIVE | SEARCH | TABLE OF CONTENTS |
|----------------------|----------------------|--------------------------|-------------------------------|-------------------------|------------------------|-----------------------------------|

Molecular Pathology

Journal of Clinical Pathology

[Copyright © 2002 by the BMJ Publishing Group & Association of Clinical Pathologists.](#)