

## C-RC-6

### Differential Expression of Manganese Superoxide Dismutase and Catalase in Lung Cancer

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**Introduction:** Reactive oxygen species (ROS), which have been implicated in initiation and promotion of cells to neoplastic growth, are present in high levels within human airway. Antioxidants increase in response to oxidative stress and minimize ROS-induced injury in experimental systems. Little is known about the antioxidant expressions in human lung cancer tissues, which may determine whether ROS can initiate lung carcinogenesis. Hypothesis: Antioxidants would be decreased in lung carcinoma cells as compared to tumour-free adjacent lung tissues.

**Methods:** Human lung cancer and cancer-free tissues were collected and homogenized for protein and mRNA extractions. Activity of major antioxidants (catalase, superoxide dismutase [SOD], glutathione peroxidase [GPx], total glutathione [GSH]) in protein extracts was measured by chemical kinetic reactions spectrophotometrically. Western blot and Northern blot analyses were performed for specific antioxidant protein and mRNA expressions in the lung samples. Comparisons were made between cancer and cancer-free tissues.

**Results:** Sixteen lung cancer and 21 cancer-free lung tissues were collected from 24 individuals with surgically resectable non-small cell lung cancer (NSCLC) between 1993-2001. Total SOD activity was increased ( $p=0.035$ ), catalase activity decreased ( $p=0.002$ ), and glutathione and GPx similar in tumours compared with tumour-free lung tissues. Western blot analysis showed a significant increase in manganese (Mn) SOD and decrease in catalase protein expressions in tumours. Northern blot analysis confirmed the corresponding increase in Mn SOD and decrease in catalase mRNA expressions in tumours which might account for the alterations of antioxidant activities in lung tumours as compared with tumour-free tissues.

**Conclusion:** Up-regulation of Mn SOD and down-regulation of catalase at transcriptional level were found in NSCLC tumours which may be important in lung carcinogenesis.

## C-RC-7

### Exhaled Nitric Oxide Predicts Lung Function but not Quality of Life in Subjects with Non-Small Cell Lung Cancer

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**Introduction:** Nitric oxide (NO) has been implicated in the pathogenesis of various neoplastic and inflammatory diseases. However, little is known about the relationship between exhaled nitric oxide and clinical, immunological, and quality of life parameters in subjects with non-small cell lung cancer (NSCLC).

**Methods:** Subjects with histologically or cytologically confirmed NSCLC were recruited from the Department of Medicine in the Queen Mary Hospital. Clinical parameters, baseline blood tests, serum immunoglobulins (Ig), and quality of life (QoL) parameters (EORTC, Rottadam, HADS) were collected. Exhaled NO was measured by using an automatic chemiluminescence analyzer at steady expiration.

**Results:** There were 68 subjects (45 males, aged  $58 \pm 11$  yrs) recruited with 39 adenocarcinomas, 15 squamous cell carcinomas, and 14 undifferentiated NSCLC. They were predominantly in advanced TNM staging with 2, 28, and 38 in stage 3A, 3B, and 4 respectively. Four subjects had previous lung resections, 50 had chemotherapy, and 33 had radiotherapy. The serum IgA levels were significantly higher in undifferentiated NSCLC ( $1888 \pm 280$  mg/dl) compared with squamous cell carcinomas ( $1512 \pm 129$  mg/dl) and adenocarcinomas ( $1389 \pm 54$  mg/dl) [ $p=0.029$ ]. Performance status (Karnovsky scale) was significantly correlated with haemoglobin ( $r=0.354$ ,  $p=0.003$ ), total white cell count ( $r=-0.398$ ,  $p=0.001$ ), and neutrophil count ( $r=-0.427$ ,  $p<0.001$ ). Multiple regression model identified haemoglobin as the only independent predictor of performance status ( $p=0.032$ ). Lung function index  $FEV_1/FVC$  was significantly negatively correlated with exhaled NO in the whole group ( $r=-0.389$ ,  $p=0.001$ ), in adenocarcinomas ( $r=-0.377$ ,  $p=0.022$ ), in males ( $r=-0.436$ ,  $p=0.003$ ), in well differentiated carcinomas ( $r=-0.491$ ,  $p=0.013$ ), and in stage 4 disease ( $r=-0.367$ ,  $p=0.028$ ). Exhaled NO was only correlated with neuropathy score ( $p=0.028$ ) but no relation to the overall QoL score.

**Conclusion:** Increased exhaled NO was associated with airflow obstruction but not predictive of overall QoL in subjects with NSCLC.