Objective 1: To review present knowledge of tobacco and smoking-related biomarkers of exposure and effect, and to document these in meeting minutes, CORESTA reports and scientific publications where appropriate.

Objective 2: To undertake ring trials / proficiency tests for selected biomarkers as agreed by SC.

Objective 3: To source and develop reference materials to support biomarker analysis for those biomarkers selected for ring trials / proficiency tests.
Recent Meetings

- October 11, 2014: Quebec City, Canada
  - 25 delegates attended the meeting
- May 7, 2015: Zurich, Switzerland
  - 30 delegates attended the meeting
  - The Sub-Group meeting was hosted by Celerion
  - Biomarkers SG and Tobacco Smoking Behaviour SG typically hold joint meetings
    - TSB SG (morning)
    - BMK SG (afternoon)
Objective 1

Investigation of changes in the levels of biomarkers of exposure in adult Japanese smokers who switched to a non-combustion inhaler type of tobacco product – Dai Yuki

- A 29 day clinical study with three cohorts: non-smokers, smokers and smokers who were switched to “zerostyle mint” non-combustion inhaler
- Higher levels of urinary nicotine equivalents in the switcher group relative to non-smokers, but lower than smoker group
- Lower levels of biomarkers of exposure reported in the switcher group
Objective 1 (continued)

- Biomarkers of the smoke-related exposure to polycyclic aromatic hydrocarbons (PAH) – Max Scherer
  - Several biomarkers of PAH exposure from smoking investigated
  - 1-OH appears to be the most robust biomarker for the smoking-related exposure
  - Further work is required on potential biomarkers for the exposure to benzo[a]pyrene

- Comparative analysis of biomarkers of effect on multiple platforms – Kirk Newland
  - Biomarker analysis, fit-for-purpose assay development and validation
Objective 2

- Discussion on NNAL Proficiency Testing (PT)
  - Several concerns regarding the processes used for NNAL PT through G-EQUAS were discussed
    - Insufficient replicates and concentration ranges
    - Samples shipped at room temperature
- Other potential candidate markers for PT
  - Nic+10
Objective 3

Reference Standards: Science vs Regulations – Frank Deschamps (Aptochem)

- Discussion on whether a guideline on tobacco industry standards for reference materials could be developed and presented to CORESTA
- Frank agreed to provide more information at the next SG meeting
- Members generally recognized that a common global standard does not exist, and felt the need for additional discussion
Additional Discussion

- Consideration on data standards on bioanalytical data
  - Along the lines of pharma model. Benefits include:
    - standardized submissions to regulatory agencies
    - common nomenclature
    - simplified data reporting by bioanalytical labs

- Inclusion of biomarkers of effect in the SG scope
  - In progress – presentations and evaluation of analytical methods
Additional Discussion (continued)

- Inclusion of biomarkers of e-cigarette exposure in the SG scope
- Determination of the interest of the member companies to consider prospective biomarker evaluation in smokers who quit smoking
  - An opportunity for industry wide collaboration
  - Delegates to discuss this possibility with their management
Objective 1: The following presentations on analytical methods and biomarker discovery were given:

- An Improved Analytical Method of Hydroxy Polycyclic Aromatic Hydrocarbons in Human Urine – Wang Sheng
  - Reliable and simple method for simultaneous determination of urinary OH-PAHs
  - Baseline resolution of 5 isomers of OH-Phenanthrene was accomplished

- Alterations in the sputum proteome and transcriptome in smokers and early-stage COPD patients – Florian Martin
  - Sputum protein signature suggests that the trends observed in smokers and non-smokers were amplified in COPD vs smokers
  - Blood gene expression signature that discriminates smokers and non-smokers was identified
Objective 1 (continued)

- A Discussion on Biomarkers of Effect – Claire Martin
  - Focusing on a few established markers- cytokines and eicosanoids
  - Concept of an industry consortium

- Overview of literature on Eicosanoids and Bioanalytical approaches – Kirk Newland
  - Analytical approaches used for measurement of eicosanoids
  - Potential to conduct method evaluation with other labs, under objective 2
Objective 2

NNAL PT: Lots of discussion on resolving issues

- Basic question – how do we conduct PTs and which mechanism is better suited for PT
- A pilot room temperature stability test will be performed by ABF to address the issues of shipping at room temperature
- Member lab delegates to check with their management on whether to conduct a more thorough PT
Zurich meeting (2015 May)

Objective 3

- A presentation “Reference Standards: Science vs Regulations” – Frank Deschamps (Aptochem)
  - The SG agreed to constitute a writing committee to recommend guidelines for reference materials used in bioanalysis of tobacco-related biomarkers
Additional discussion

- Members agreed that the idea of conducting a collaborative cessation biomarker study is ambitious
  - A smaller project with more defined scope would be more feasible
  - A ring trial on biomarkers of effect involving eicosanoids was proposed
- There was some discussion on arriving at common data standards for bioanalysis
- Members were encouraged to explore defined opportunities for collaborative biomarker research projects
We sincerely thank the members of the Biomarkers and Tobacco Smoking Behavior Sub-Groups