

WP 5: DNP technical quality control and adjustments of bio-probes

Background: The DNP technology for human and large animal studies is a new technical modality where a number of technical quality control parameters have to be monitored and adjusted. This is primarily taken care of by the DNP inventor (Ardenkjaer-Larsen) in cooperation with the GE HealthCare which is the system vendor. One of these quality parameters is optimization of the efficiency of polarization with a high percentage of the ^{13}C atoms aligning to the magnet field. Additionally, DNP relies on a continued development of process specific bio-probes. For the initial human studies [^{1-13}C] pyruvate is the main probe, which will be provided by Cambridge University to European centres. Among the partners in the WP is the expertise and facilities to produce new bio-probes to in vivo trace specific metabolic fluxes. Especially, the included research groups from both AU and DTU possess a very high level of expertise in chemical synthesis.

Objectives: →To secure constant data quality level in the system performance. Additionally, to run pre-studies to set DNP parameters within each of the study activities enumerate in the WPs. →To enhance the DNP technology further for human studies; to establish organizational and facility fundament for preparing and documenting new experimental probes for human use [3]; → To optimize bio-probes in terms of effectiveness in polarization and to monitor toxicology and sterilization processes in the production of new bio-probes.

Method: Maintaining data quality will be done in accordance with the prescribed quality check parameters for the DNP and scanner system. The development of new bio-probes will be going at DTU and AU using their nano-scale technology.

Outcome: A stable methodology with controlled data quality; securing that activities are in accordance with authorization from relevant supervisory bodies; design, development and testing of new bio-probes for animal use and preparing for coming human use.

Coordinators: H. Stødkilde-Jørgensen (AU-MR Centre); J. Ardenkjaer-Larsen (DTU), Steffen Ringgard (AU-MR Centre) and S. Petersson (GE HealthCare).