adverse effect of occupational exposure. Research have suggested carcinogenic potential of some forms of CNTs (MWCNT-7 Mitsui) and asbestos-like pathogenesis. Studying epigenetic alterations (*e.g.* DNA methylation) could provide important additional evidence to determine CNT toxicity and disease progression.

Methods To understand epigenetic effects of CNT (SWCNT and MWCNT), we designed a translational study incorporating *in vitro* and *in vivo* experiments. The changes were compared to results of asbestos exposure study. Changes in DNA methylation were studied at global (LC/MS-MS), genome wide (illumina 450 K), sequence specific levels (bisulfite pyrosequenceing). Changes in gene expression were studied using RNA-Seq. Finally, signatures obtained from these studies were validated in 23 workers exposed to MWCNT.

Result *In vitro*, CNTs and asbestos induced gene specific DNA methylation changes. Asbestos exposure induced alterations in genes associated with Rho mediated signal transduction, HOX genes, WNT genes. Methylation and transcriptomic profiles of CNT exposed cells revealed alterations in DNA damage repair, tp53, cell cycle, protein phosphorylation pathways. Additionally, CNTs induced sequence specific changes in promoter region of several key genes including DNMT1, HDAC4, ATM, MAP3K10, PIK3R2 and MYO1C. Some of the genes, specifically ATM was also differentially methylated by SWCNTs and MWCNTs in the *in vivo* study. Based on these result, we studied some of these markers in MWCNT exposed workers, where we observed significant changes in sequence specific methylation for DNMT1, ATM, SKI and HDAC4 promoter CpGs.

Conclusion Epigenetic cell responses provides important insights in potential health risks and underlying mechanisms. Hence, many of these genes have been associated with occupational asbestos and smoking induced diseases and cancer. Further research needs to confirm whether methylation alterations in this set of genes can be used in monitoring changes associated CNT exposure and effect.

514 FACTORS ASSOCIATED TO RETURN TO WORK AFTER SICKNESS ABSENCE DUE TO MENTAL DISORDERS AMONG BRAZILIAN WORKERS

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Introduction Mental disorders are the third leading cause for grant sickness social security benefit in Brazil. Those workers have longer time to return to work (RTW) comparing to other disabilities. This study aims to analyse factors associated to RTW after an episode of sickness absence due to mental disorders (MD).

Methods A longitudinal study was conducted in the city of São Paulo, Brazil, from 2014–2016. Included 204 workers requiring sickness social security benefit due to MD. At baseline, participants fill questionnaires about sociodemographic, health risk behaviours, work characteristics, health conditions and social security history. They were followed for 365 days after the first day of sickness absence. Survival analysis (Kaplan-Meier curve and Cox regression) were performed to identify factors influencing the first RTW.

Result The group was composed mostly by women (71.1%), people aged under 40 (67.6%) education equal or higher 12 years (80.4%) and diagnosed as depressed (52.9%). Many worked in customer service jobs (44.1%), reported effort-reward imbalance at work (57.4%) and high overcommitment (74.2%). The average time for return to work was approximately six months among the 63.0% who tried to resume their work activities. Factors associated to return to work within one year after sick leave were: aged between 30–39 years (HR 1.76; 95% CI: 1.08 to 2.79), 12 or more years of education (HR 1.87; 95% CI: 1.10 to 3.17), low alcohol intake (HR 2.65; 95% CI: 1.75 to 4.02) and low level of anxiety symptoms at baseline (HR 0.17; 95% CI: 0.04 to 0.74) – when analysis were adjusted by sex and job title.

Discussion Sociodemographic characteristics, risk health behaviours and medical conditions at baseline were associated to RTW after sick leave due to MD. Further studies, with larger sample, are needed to improve estimates and discussion focused in interventions to early RTW in public and private sectors. Acknowledgments: CNPq grant nº442051/2014–0.

543 RELATIONSHIP BETWEEN SHIFT WORK AND THE ONSET OF RHEUMATOID ARTHRITIS; RESULTS FROM THE SWEDISH EIRA CASE-CONTROL STUDY

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Introduction Shift work has previously been associated with increased RA risk in females. The aim of this study was to investigate the potential association between permanent night shift work, rotating shift work, and day oriented shift work, and risk of developing anti- citrullinated peptide antibodies (ACPA) positive and ACPA negative RA.

Methods The present report is based on a Swedish population-based, case-control study with incident cases of RA (1951 cases, 2225 matched controls). Using logistic regression, occurrence of RA among subjects who have been exposed to different kinds of shift work was compared with that among those who have never been exposed, by calculating the odds ratio (OR) with a 95% confidence interval (CI).

Result Rotating shift work and day oriented shift work were associated with a 30% increased risk of developing ACPA positive RA, but not ACPA negative RA. There was an inverse association between permanent night shift work and risk of both ACPA positive RA (OR 0.7, 95% CI: 0.6 to 0.9) and APCA negative RA (OR 0.8, 95% CI: 0.6 to 1.0). For both subsets of RA, significant trends showed a lower risk of developing RA with increasing duration of permanent night shift work.

Discussion Sleep restriction as a consequence of shift work is associated with several biological effects among which changes in melatonin production may be involved. The present epidemiological findings of a complex relationship between sleep patterns and different forms of RA may be of importance for increasing the understanding of the pathophysiology of RA.