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## Comparative study of water quality of two tube wells of Jammu city, J&K

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A comparative study was undertaken to assess the groundwater quality for drinking purposes. One tube well selected was situated near a sewer while there was no sewer in the vicinity of the other tube well. The water samples were collected and analyzed for physico-chemical viz., temperature, turbidity, pH, EC,  $\text{FCO}_2$ , DO, B.O.D., C.O.D.,  $\text{CO}_3^{2-}$ ,  $\text{HCO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ , TH,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{SO}_4^{2-}$ ,  $\text{SiO}_3^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ , Fe, Cu, Cr, Zn and Pb and bacteriological characteristics i.e., MPN index/100 ml. for a period of two years on monthly basis. The study has revealed some alterations in physico-chemical parameters and MPN of water in the first case, while in the second case, the water quality was within permissible limits. On the basis of microbial count analysis, the water quality of first tube well (IIIM/RRL, Jammu) comes under the category of unsatisfactory (MPN >10/100ml.) due to effect of sewage drain. Qualitatively, *E. coli* and *Klebsiella* / *Klebsiella* and *Citrobacter* recorded their perennial presence in the first/second i.e., Coffee house (Jammu Press Club) tube well, respectively, during both the years. Quantitatively, the MPN index/100 ml. ranged between 7 and 18/6 and 17 in the water samples of first tube well and 1 and 2 / 1 and 2 in the second tube well during the first/second year of study. MPN count recorded summer and monsoon increase and winter decrease. According to standards recommended by British Ministry of Health (1957), the water quality comes under the category of unsatisfactory (MPN >10/100 ml.) in case of first and satisfactory for the second tube well.

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## Non invasive and invasive technologies for translational medicine applications

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In preclinical studies the feasibility of non-invasive analysis of brain activities is studied in the attempt to overcome the major limitation of actual in vivo methodologies i.e., invasiveness. Near-infrared spectroscopy (NIRS) is a non-invasive technique that can be used to monitor changes in oxygenation of hemoglobin (Hb). Importantly, the absorption spectra of near-infrared light differ for the oxygenation-deoxygenation states of Hb ( $\text{O}_2\text{Hb}$  vs.  $\text{HHb}$ , respectively) so that the two compounds can be directly monitored. The sum of  $\text{HHb} + \text{O}_2\text{Hb}$  is considered=blood volume and a recent work has demonstrated the feasibility of using NIRS to monitor these three parameters in the rat brain. Briefly, the effectiveness of such non-invasive methodology in preclinical studies has been tested via physiologic (i.e., with exogenous oxygen ( $\text{O}_2$ ) or carbon dioxide ( $\text{CO}_2$ ) inflated orally) or pharmacologic (i.e., with drugs of abuse such as cocaine or nicotine) experiments. Furthermore, coupling NIRS with a well established although invasive in vivo method such as electrophysiology allowing concomitant analysis of cerebral cell firing in discrete brain areas, was confirming the putative correlation between blood levels, brain metabolism and neuronal activities in rat CNS. Finally, the possibility that changes in brain metabolism as measured by NIRS might be a useful index of brain penetration of chemical entities has been investigated using different compounds from different chemical classes that were selected on the basis of their known brain penetration and overall pharmacokinetic profile. It appeared that in vivo non-invasive NIRS might contribute to assess brain penetration of chemicals, i.e., significant changes in NIRS signals could be related to brain exposure, or vice versa the lack of significant changes in relevant NIRS parameters could be indicative of low brain exposure. These data were supported by concomitant standard pharmacokinetic studies of brain penetration. Further improvement of NIRS hardware and software will allow shaping also the distribution of penetrating drugs within discrete brain areas and this could be potentially used to study neurobiological processes and psychiatric diseases in preclinical but also in a translational strategy from preclinical to clinical investigations.

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