Low Level Radiation Research Section
(LLRRS, Mumbai and LLRRL, Kollam, Kerala)

Objectives/Mandates:

- Biological and Health effect of chronic low dose/ low dose rate ionizing radiation on human population living in high level natural background radiation areas of Kerala coast in South west India.
- Understanding the molecular effect of low dose /low dose rate ionizing radiation in human cells.
- Effect of acute low dose ionizing radiation in human cells.

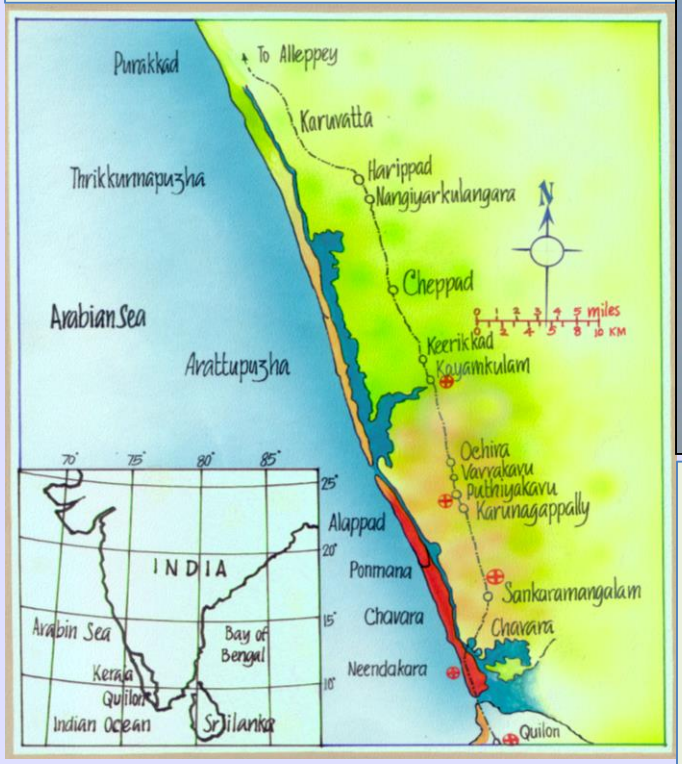
Highlights: **So far, Our results do not reveal any significant differences in any of the parameters in HLNRA as compared to NLNRA.**

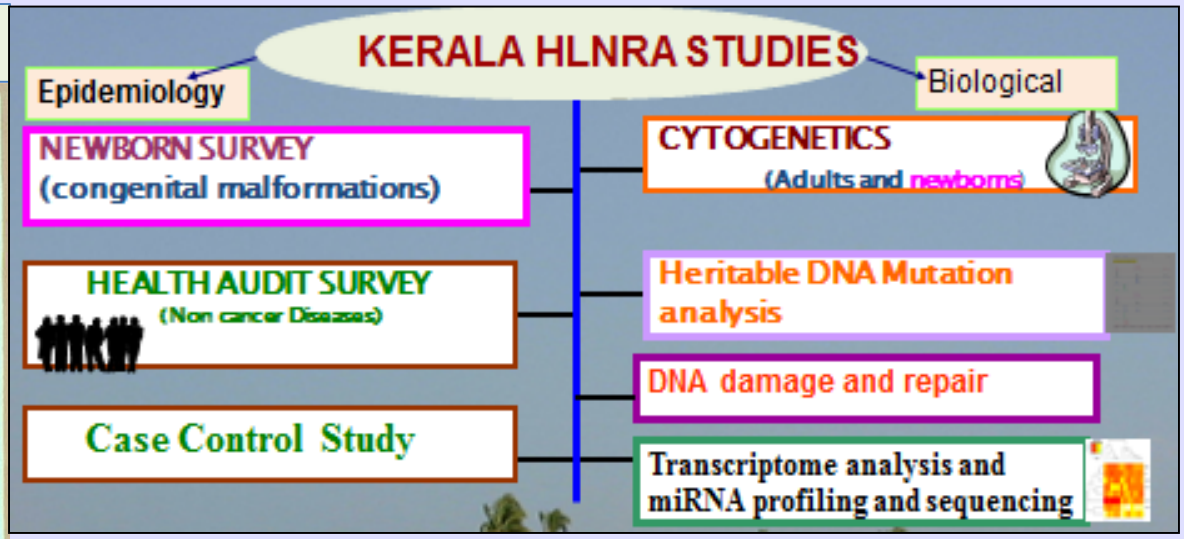
High Level Natural Background Radiation has no effect on:

- Congenital malformations (birth defects), Still Birth , Karyotype anomalies.
- Chromosome aberrations, micronuclei, heritable DNA Mutation rate, Telomere length and DNA Strand Breaks.
- Interestingly, gene expression analysis (transcriptome) revealed background dose dependent increase in number of differentially expressed genes in HLNRA and majority of these genes are involved in DNA repair, methylation and chromatin modification.

HIGH LEVEL NATURAL RADIATION AREAS OF KERALA COAST

Study Area

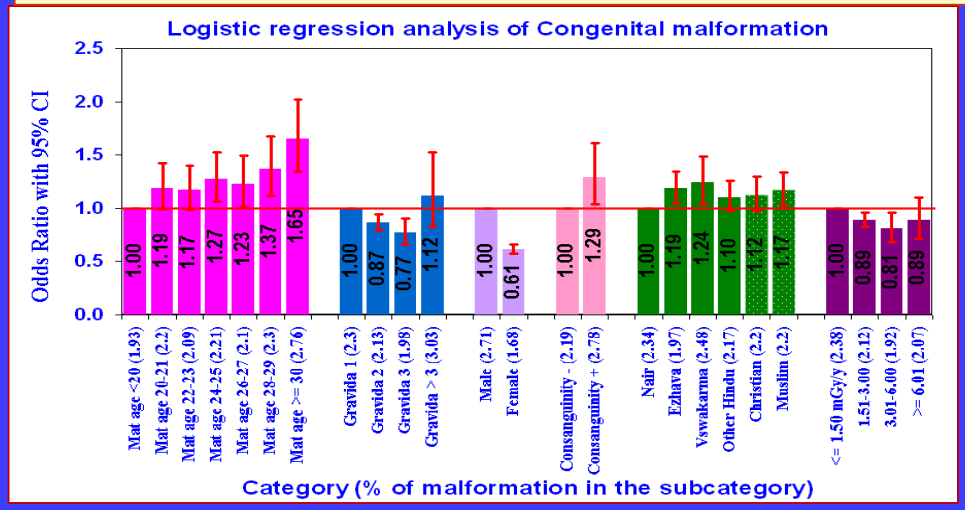


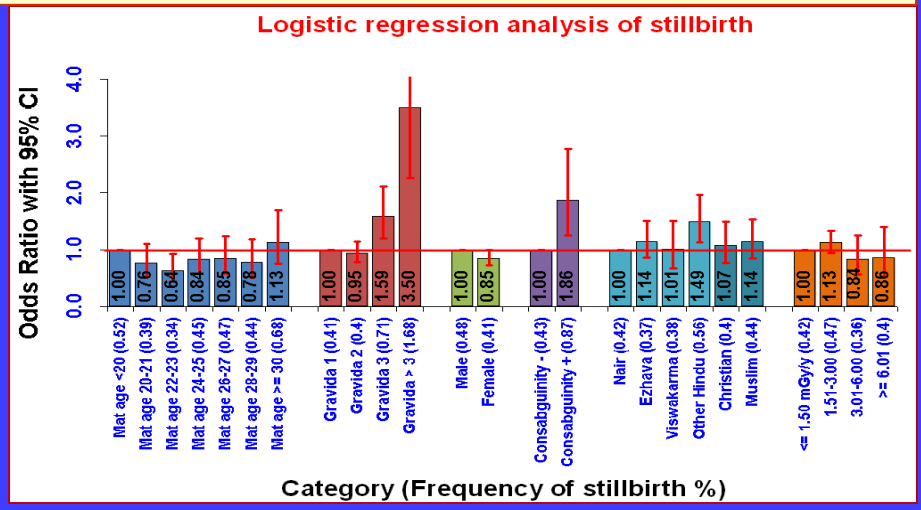


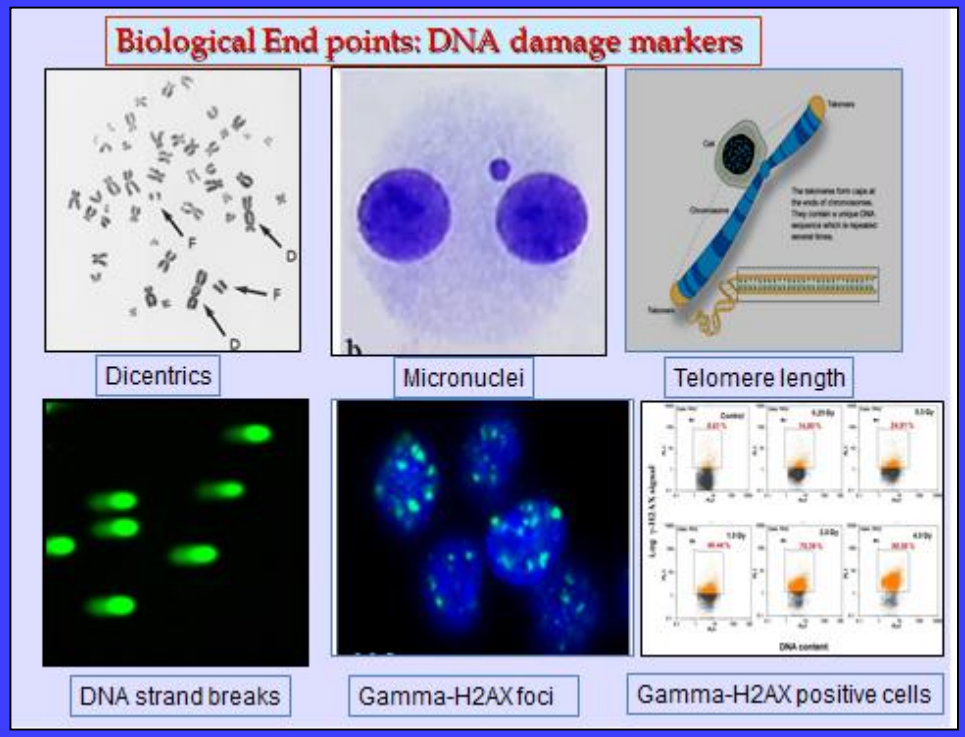
- Approx. 55×0.5 sq km strip along the south-west coast of India.
- Thickly populated (~400,000 population)
- Inhabited for generations.
- study the effects of radiation directly on humans.
- Ideal for dose-response studies.

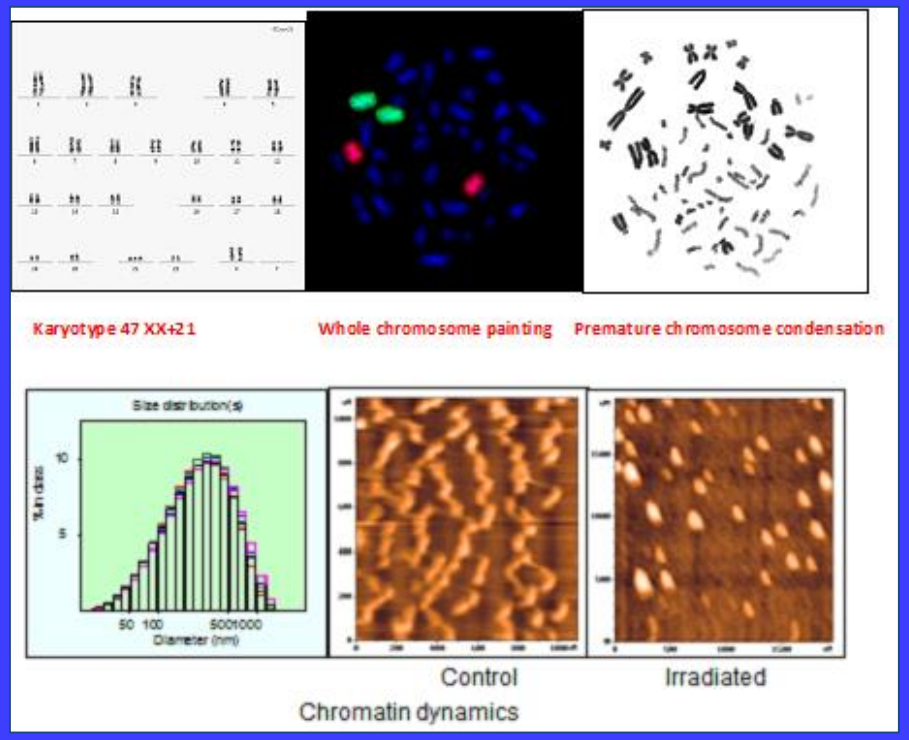
- Radiation source - Thorium (and its decay products) containing monazite sand.
- Radiation dose rates ranges from < 1 to 45 mGy /yr
- NLNRA: Normal Level Natural Radiation Area (≤ 1.5 mGy/year)
- HLNRA: High Level Natural Radiation Area (> 1.5 mGy/year

HIGH LEVEL NATURAL RADIATION AREAS OF KERALA COAST









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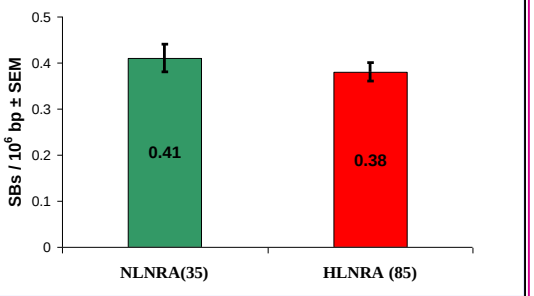
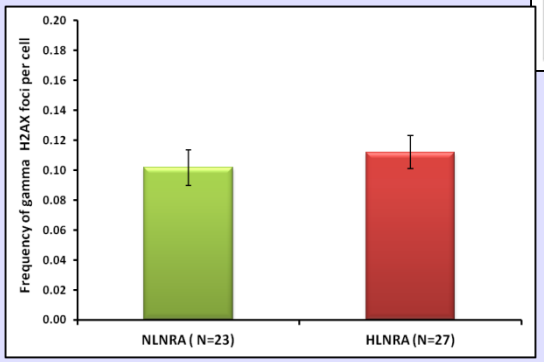


No significant difference in DNA strand breaks between HLNRA and NLNRA individuals.



No significant difference in DNA Double Strand Breaks between HLNRA and NLNRA individuals.