AbstractID: 7795 Title: Introduction

Advances in technology and in computing have given us computer-controlled linear accelerators equipped with multileaf collimators and wonderful 3D graphics workstations to perform treatment planning; additionally we have conceptual advances such as stereotaxy (cranial and extra-cranial) intensity modulation (IMRT), helical tomotherapy and protons. But the bottom line in radiotherapy is radiobiology, radiobiology, radiobiology. If we don't know how to convert 'physics', i.e. dose distributions, into estimates of clinical outcome then these wonderful technological advances will remain 'toys' for physicists to play with.

Radiobiology has traditionally concerned itself with determining surviving fraction vs. (uniform) dose curves for human tumour cell lines. However, in the 3D era we need models which connect dose *distributions* (and fractionation regimens) in tumours and normal tissues (generally in the form of dose-volume histograms) with the probabilities of tumour (local) control – TCP - and of complications – NTCP. Such models now exist and their active use in treatment planning ushers in the era of *Conformal Radiobiology.*

Educational Objectives:
1. Appreciate the limitations of technology-driven dose-based radiotherapy
2. Appreciate the limitations of 'classical' radiobiology in the conformal era
3. Understand what is meant by 'Conformal Radiobiology'