INFOBIOMED

FIRST INFOBIOMED TRAINING CHALLENGE

PARTICIPANT DOSSIER – CASE STUDY INFORMATION

Dear participant,

We are very pleased to know that you will be joining the First INFOBIOMED Training Challenge in September.

In this document you will find IMPORTANT additional information to the Participant dossier 1.0 sent to you recently. Please, read it carefully, since it contains information on the case study that has been assigned to your group and on the work you should prepare before coming to Barcelona.

If you have any questions, please contact Marc Weeber, the academic coordinator of the Training Challenge (m.weeber@erasmusmc.nl).

INFOBIOMED Training Challenge Organizing Committee

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Work group information

During the Training Challenge week, you will be working together in a team of 5 participants that have different backgrounds relevant to Biomedical Informatics. Before the Training Challenge week (12 to16 of September) the work to be done is individual. You will know and meet your work group members on the first day of the Training Challenge.

Case study information

Your group has been assigned the following case study:

CASE STUDY 2

TITLE:

TARGETING EGFR SIGNAL TRANSDUCTION PATHWAY BY ANTICANCER DRUGS

DESCRIPTION:

Cancer chemotherapy has entered a new era of molecularly targeted therapeutics which is highly selective and not associated with the serious toxicities of conventional cytotoxic drugs. The first group of these novel anticancer drugs is that of targeting mutant or aberrantly expressed oncogenic growth factor receptors. HER family is a four-member family of closely related growth factor receptors, including EGFR or HER-1 (erb-B1); HER-2 (erb-B2); HER-3 (erb-B3) and HER-4 (erb-B4). EGFR receptors are essential mediators of cell proliferation and differentiation in the developing embryo and in adult tissues, and their inappropriate activation is associated with the development and severity of many cancers including breast, colon and prostate cancer. This family of receptors is involved in cell-to-cell and cell-to-stroma communication primarily through a process known as signal transduction.

The three best characterized signaling pathways induced through ErbBs are Ras-MAPK, PI3K-PKB/Akt, and PLC-PKC pathways. Ligand binding to the extracellular domain induces the formation of homo- and heterodimers of different members of the EGFR family followed by stimulation of PTK (protein tyrosine kinase) by transauto-phosphorylation. As a result, the transcription of various genes is infected. Two strategies for blocking the action of these proteins include antibodies directed against the ectodomain and drugs that inhibit protein-tyrosine kinase activity. Thus, biochemical, medical, and biological data as well as computational tools are required in order to target this complex pathway by efficiently designed drugs, based on the 3D structure of the proteins involved in the EGFR pathway, their physicochemical properties and their conformational changes during protein-protein and protein-DNA interactions.

Synergetic approaches from researchers of Medical Informatics, Bioinformatics, Chemoinformatics, Toxicology and Epidemiology are required in order to elucidate the pathology and physiology of severe diseases, such as cancer and to further achieve a joint progress in prognosis, diagnosis and treatment of these abnormalities.

This is all the information you will receive about the case study. We assume that you will look for further information in the literature, specifically in your own domain of expertise.

Preliminary work

Participants are asked to prepare two presentations for the opening day of the Training Challenge:

1) A 5 minute presentation about yourselves. This will be presented at the opening session in Barcelona.

2) A 20 minute presentation about the case study from your perspective and how can you contribute to tackle it. This will be presented only to your work group in the afternoon of the first day in Viladrau.