

“Orthopaedic Tissue Engineering & Rehabilitation”

Action Plan on (i) to resolve the issues & concerns raised and (ii) implementation of the recommendation made in the Review Meeting

KEY ISSUES/ CONCERN RAISED BY THE EXPERT COMMITTEE

1. Comment : ‘Animal house is the area of concern’

Response: We agree that animal testing is one of the important aspects of high end tissue engineering research. The animal tests are performed as preclinical trial usually at later stage of the project. Keeping this in mind, the Institute has already constituted Institute Animal Ethical Committee (please see the attached document) and has taken initiative to set up an in-house animal testing facility which is expected to be ready by March, 2015. However, it is important to mention that there is a growing concern worldwide about animal testing and many regulatory measures have been implemented to reduce the frequency of animal experiments in biological research. One of the major objectives of tissue engineering research is to develop suitable in vitro tissue models that can be used as an alternative of animal subjects in experimental biology and biotechnology. Tissue engineering research group at NIT Rourkela is seriously committed to the ethics of animal experimentation. Therefore, effort has been given to develop suitable *in vitro* model that can suffice, at least partially, the need of animal experiments.

2. ‘Problems may be too complex in totality, as projected over a 15-20 years span’

Response: Orthopaedic Tissue Engineering and Rehabilitation program at NIT Rourkela is a translational research venture. The prime goal of this program is to develop affordable orthopaedic and rehabilitation solution for the patient within a reasonable time period. As orthopaedic and rehabilitation problems are complex in nature involving the issues of biomaterials, tissue engineered scaffold fabrication, biomechanics, stem cell technology, biology, long term preservation strategy etc. it needs a systematic research and development effort in multi-disciplinary aspects. Keeping that perspective in mind, NIT Rourkela, under the Orthopaedic Tissue Engineering and Rehabilitation program, scientists with different background are working in the above mentioned domains. However, all the developments are focused to accomplish the main goal of this program.

3. ‘Multiple large group already researching each elements’

Response: As it is mentioned that tissue engineering is an emerging field and application of multidisciplinary engineering principles, biology and medicine are required to develop this field. The orthopaedic and rehabilitation problems e.g. bone defects, osteochondral defects etc are complex in nature involving the issues like biomaterial, tissue engineered scaffold fabrication, biomechanics, stem cell technology, biology, long term preservation strategy etc. The requirement of a systematic and integrated approach of research and development in these multi-disciplinary aspects is of prime importance for the success of developing this new technique. Keeping this in mind, scientists particularly young scientists with different fields of engineering, biology and medicine (doctors) have joined together to carry out research in different aspects of orthopaedic tissue engineering and the ultimate goal is to provide tissue engineering products and solutions related to orthopaedic diseases and defects of the patients.

RECOMMENDATIONS: Focused Research – Take-up more discrete parts/ elements of program separately tackle one at a time or may lose focus and impact

Action Plan on the basis of Recommendation:

On the basis of the recommendation of the review committee, the action plan has been revised as follows-

Set up of animal House

To set up an animal house which has already been initiated by the institute will be completed on priority basis

Research activity

The research & Development shall focus on the following specific orthopaedic tissue engineering aspects-

- Development of load bearing orthopedic implants including knee & hip joints
- Development of neovascularised Bone Tissue Construct
- Strategy for Long term preservation of the developed tissue constructs
- Development of orthotic solution for patients having abnormal Gait pattern

In later stage, efforts may also be given to take up research on the most complex problem involving Osteochondral Tissue defects or diseases