DISCIPLIN	RESEARCH CORNERSTONE	DESCRIPTION	SCIENCE TARGET	POTENTIAL APPLICATION
PHYSIOLOGY	Integrated Physiology	Use the extreme conditions of Space to study the impact of gravity and stress on vegetative regulation.	Study cardiovascular control e.g. blood pressure regulation under microgravity. Investigate the influence of sensory-motor and proprioceptive inputs on cardiovascular control. Study the dependence of energy uptake on exercise and load.	Develop miniaturised, automated devices for medical diagnostics. Improve techniques and devices for medical applications e.g. sports medicine. Improve protocols for post-traumatic rehabilitation. Improve treatment of stress-related disease.
	Muscle and Bone Physiology	Use absence of or reduced gravity to study the effect of load on the human musculo-skeleton.	Study the effect of change in load on muscle atrophy and plasticity. Understand and quantify bone mass turn-over as a function of e.g. local blood perfusion and mechanical stress.	Develop improved approaches for treatment of neurological diseases involving impaired cognition, control of posture and locomotion (e.g. cerebellar impairment).
	Neuroscience	Understand the effect of gravity on the control of posture, locomotion and cognition.	Investigate the interaction of the vestibular system with other inputs relevant to locomotion and posture(e.g. vision, proprioception). Understand cognitive strategies in the absence of gravity.	Design pharmacological substances relevant for animal and human applications relevant in the human development. Develop techniques and pharmacological substances for cell and tissue regeneration e.g. neuronal repair.
ASTRO/EXOBIOLOGY, PLANETARY EXPLORATION	Origin, Evolution and Distribution of Life	Study the survivability of organisms under extreme conditions on Earth (e.g.extremophiles) and in Space.	Investigate the contribution of Space conditions including radiation to the formation of prebiotic molecules. Identify the conditions for survivability of microorganisms from and in Space including planetary surfaces. Identify markers and tools to search for extinct and extant life.	Identify novel enzymes and bacteria from extreme physical and chemical environments with industrial applications e.g. bio-catalysis.
	Preparation of Human Planetary Exploration	Study novel aspects og human planetary expeditions.	Quantify radiation risk for human beings and understand the specific biological action of Space radiation. Study the effect of isolation in high-stress environments. Quantify need for consumables during mission. Perform simulation tests on in-situ resource utilisation potential.	Develop advanced radiation sensors and countermeasure devices. Develop devices for telemedicine/telesurgery in remote areas. Develop protocols for handling stress effects. Develop methods for in-situ resource utilisation. Develop life-support systems for use in Space and other isolated environments. Develop technology for the identification and utilisation of in-situ resources.