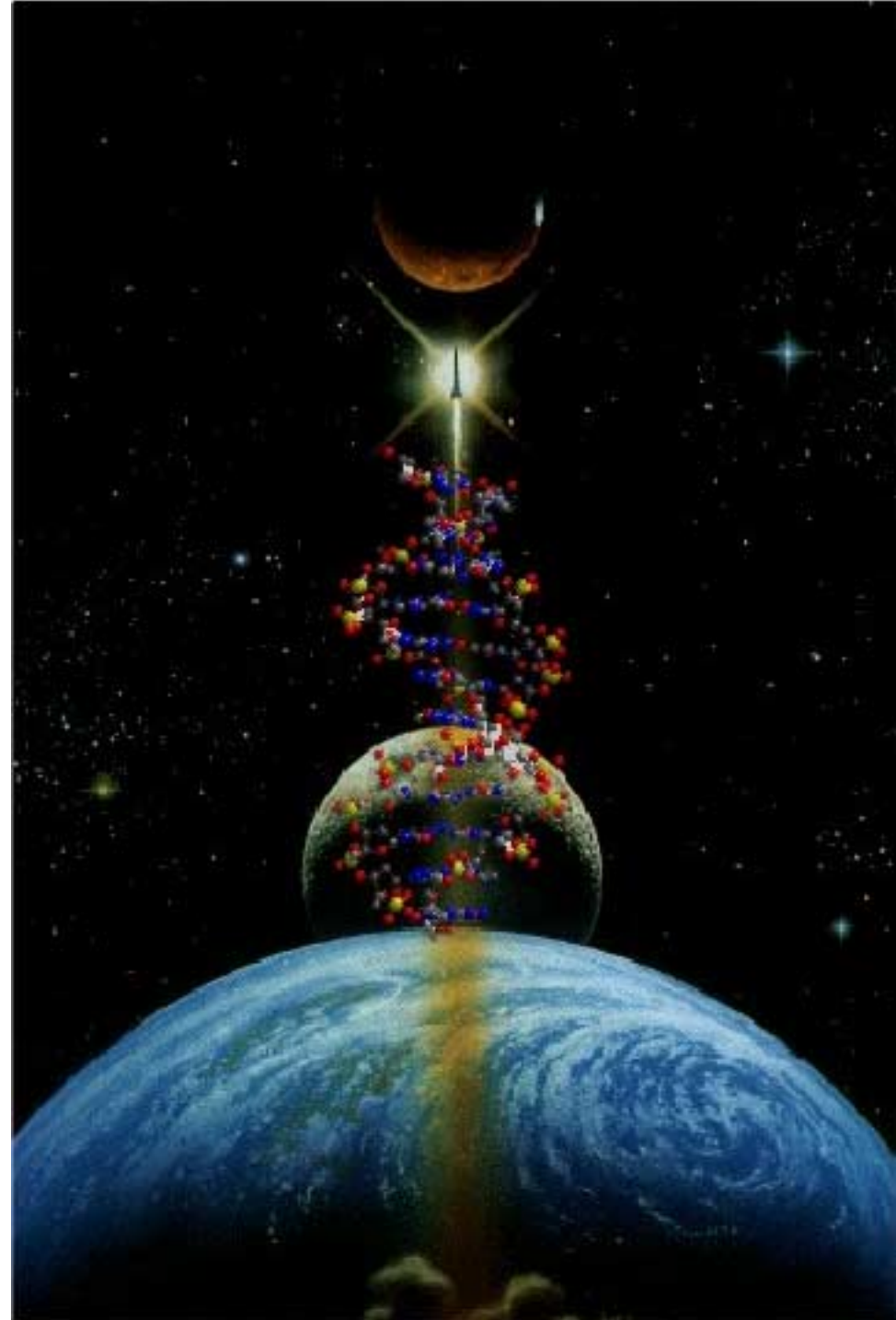
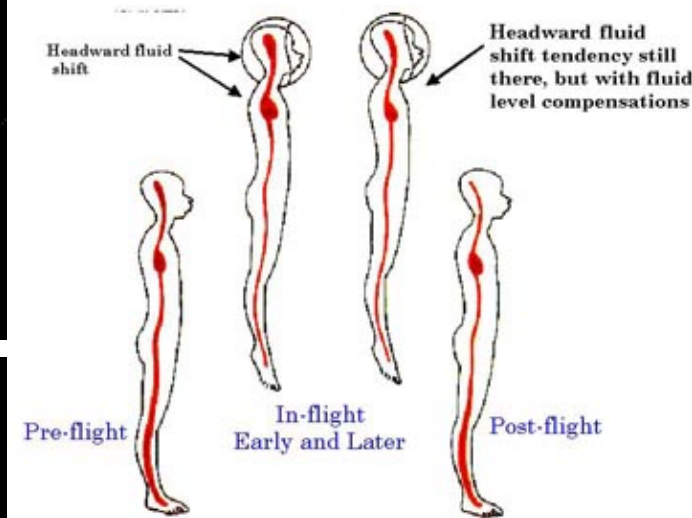
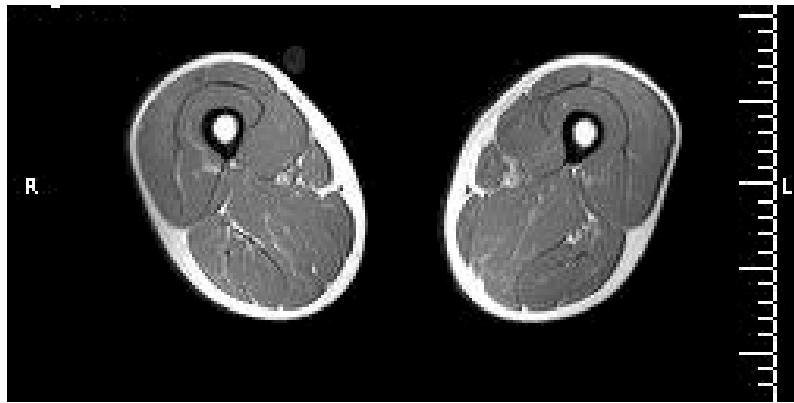
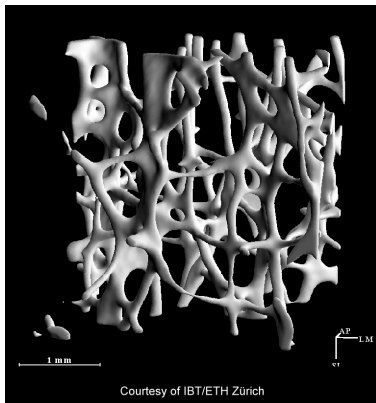
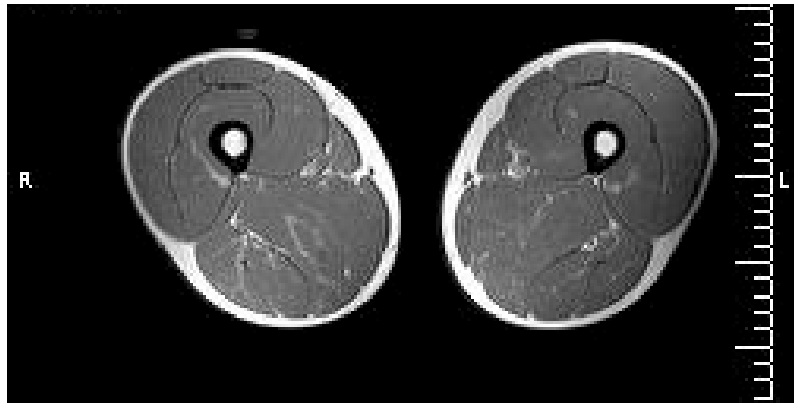
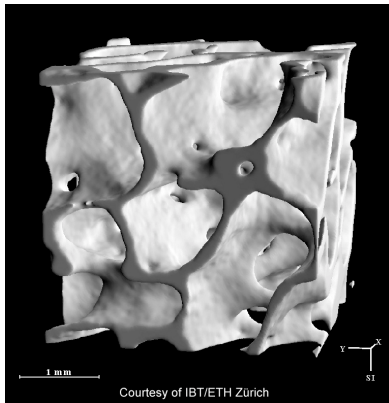


# Medicine for Mars

Oliver Angerer, ESA  
Club of Amsterdam, 28.5.03





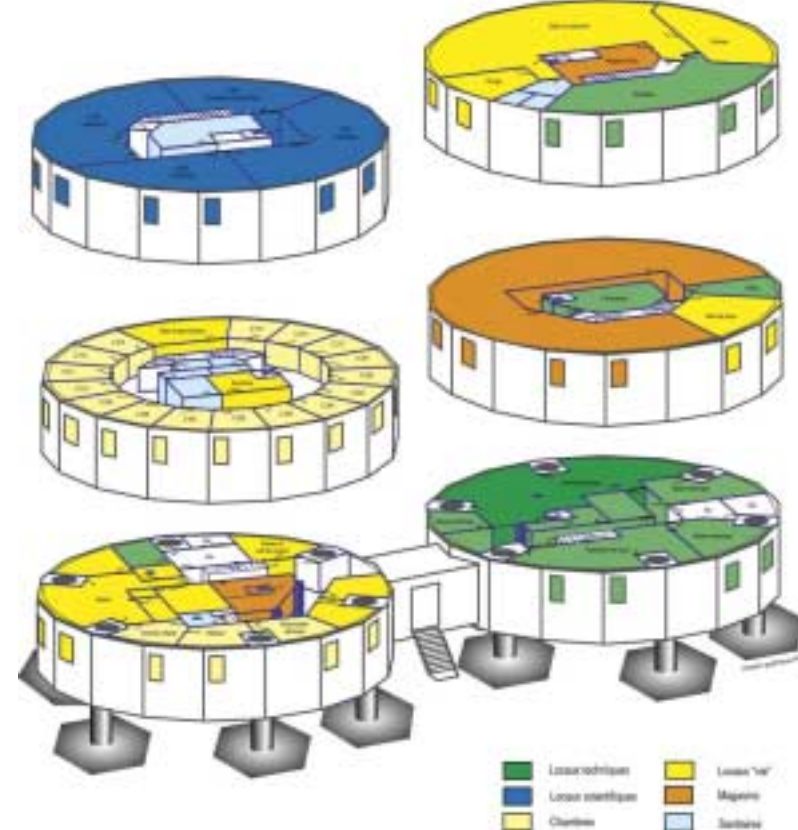
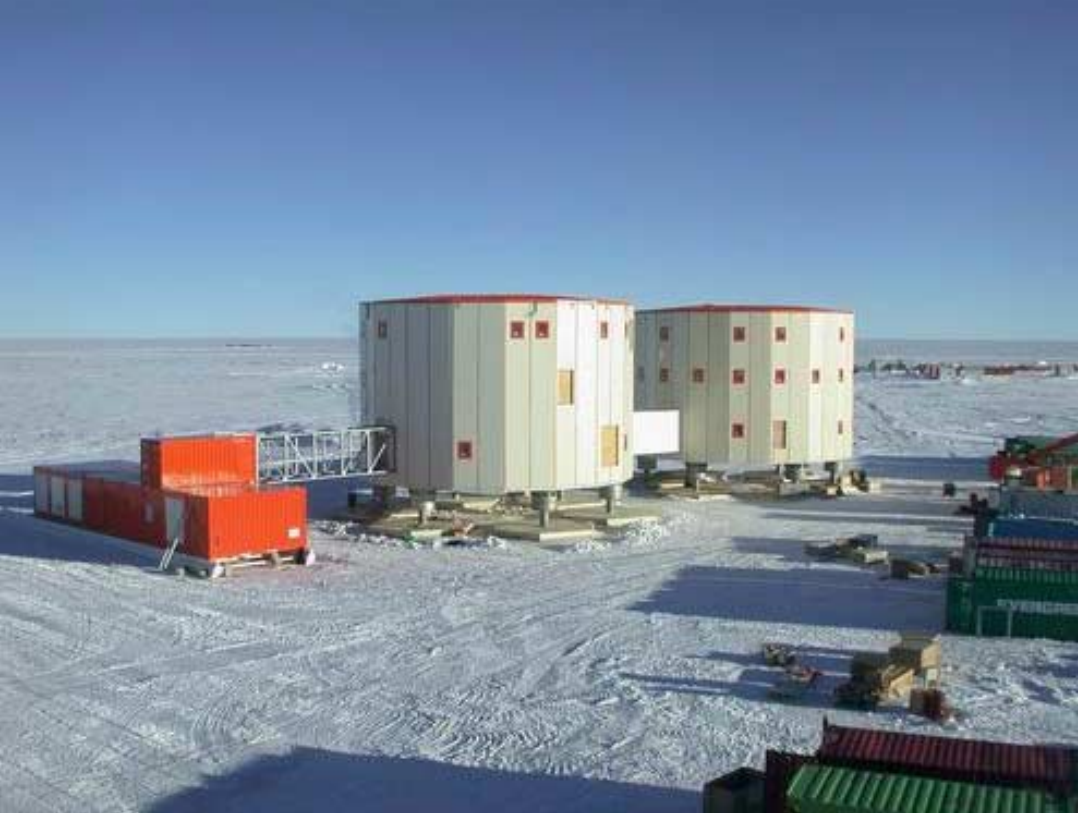


	Station in LEO (MIR, ISS)	Lunar Mission	Mars Mission
Duration	<b>4-6 months</b>	<b>6 months</b>	<i>16-36 months</i>
Crew Size	<b>3-6</b>	<b>4</b>	<b>6 (4/2)</b>
Isolation/Social Monotony	<b>moderate</b>	<i>high</i>	<i>extremely high</i>
Crew Autonomy	<b>low</b>	<b>medium</b>	<i>extremely high</i>
Evacuation Opportunities	<b>yes</b>	<b>yes</b>	<i>no</i>
In-Flight Support Measures			
• ground-based monitoring	<b>yes</b>	<b>yes</b>	<i>very restricted</i>
• audio/video transmission	<b>yes</b>	<b>yes</b>	<i>very restricted</i>
• e-mail up-/downlink	<b>yes</b>	<b>yes</b>	<b>yes</b>
• internet access	<b>yes</b>	<b>yes</b>	<i>no</i>
• onboard entertainment	<b>yes</b>	<b>yes</b>	<b>yes</b>
• re-supply flights	<b>yes</b>	<i>no</i>	<i>no</i>
• visiting crews	<b>yes</b>	<i>no</i>	<i>no</i>
Visual Link to Earth	<b>yes</b>	<b>yes</b>	<i>no</i>









Naturally hostile environment

Altitude 3200 m (equiv. to 3800 m at sl)

→ hypobaric, hypoxic conditions

Temperatures: summer average  $-30^{\circ}$ , winter average  $-60^{\circ}$

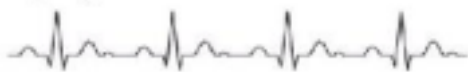
Access period: November- March



# LTMS parameters

Subject:	03005	Session:	002
Gender:	M	Time :	08:15
Age:	35y	Date:	14/11/03

## ECC (average)



RR: 1039 ms  
ST shift: -0.05ms  
QT: 468 ms  
Heart rate: 63/min

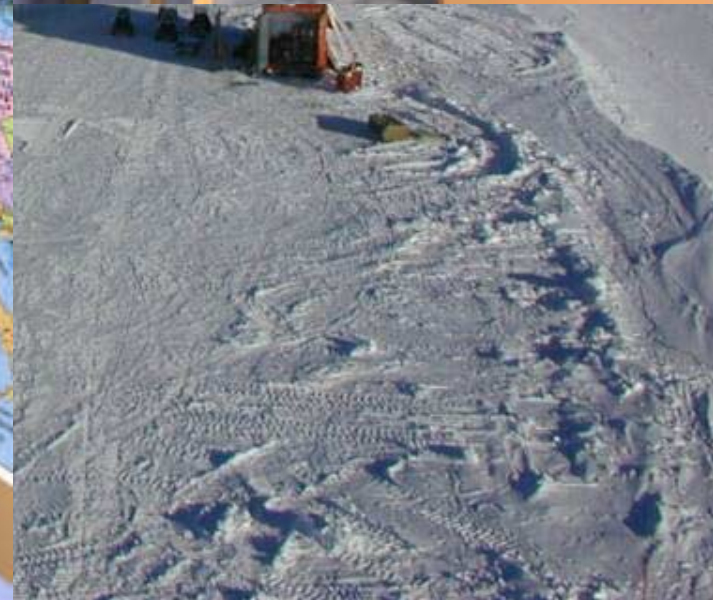
## Blood pressure (week/month)

Systolic: 120 Diastolic: 80 Mean: 87

BP over past week: Down [prior session MAX BP: 92]  
BP over past month: Down [prior month MAX BP: 94]

Breath rate: 12/min SaO2: 98 %

Body temperature: 37.2 °C



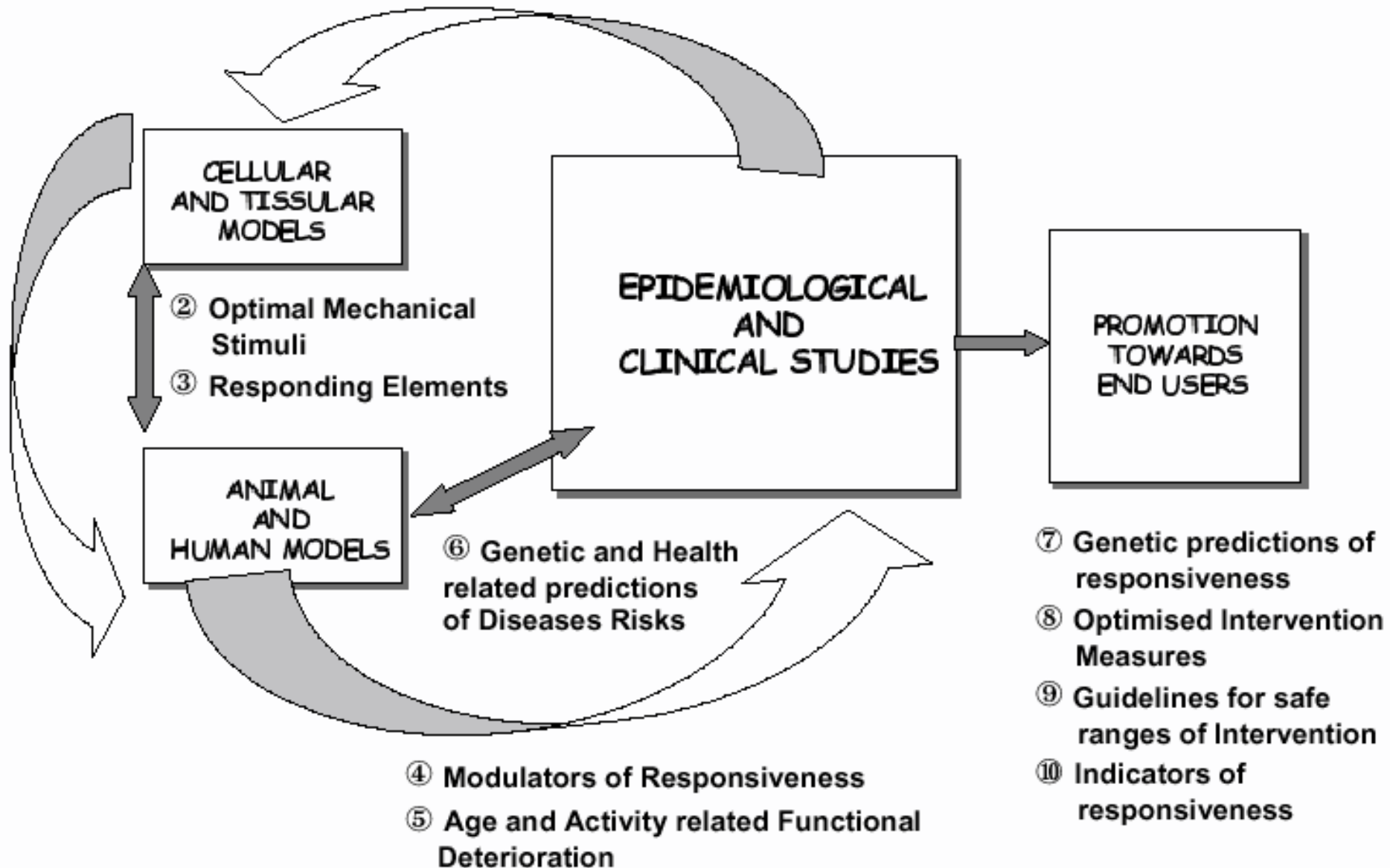


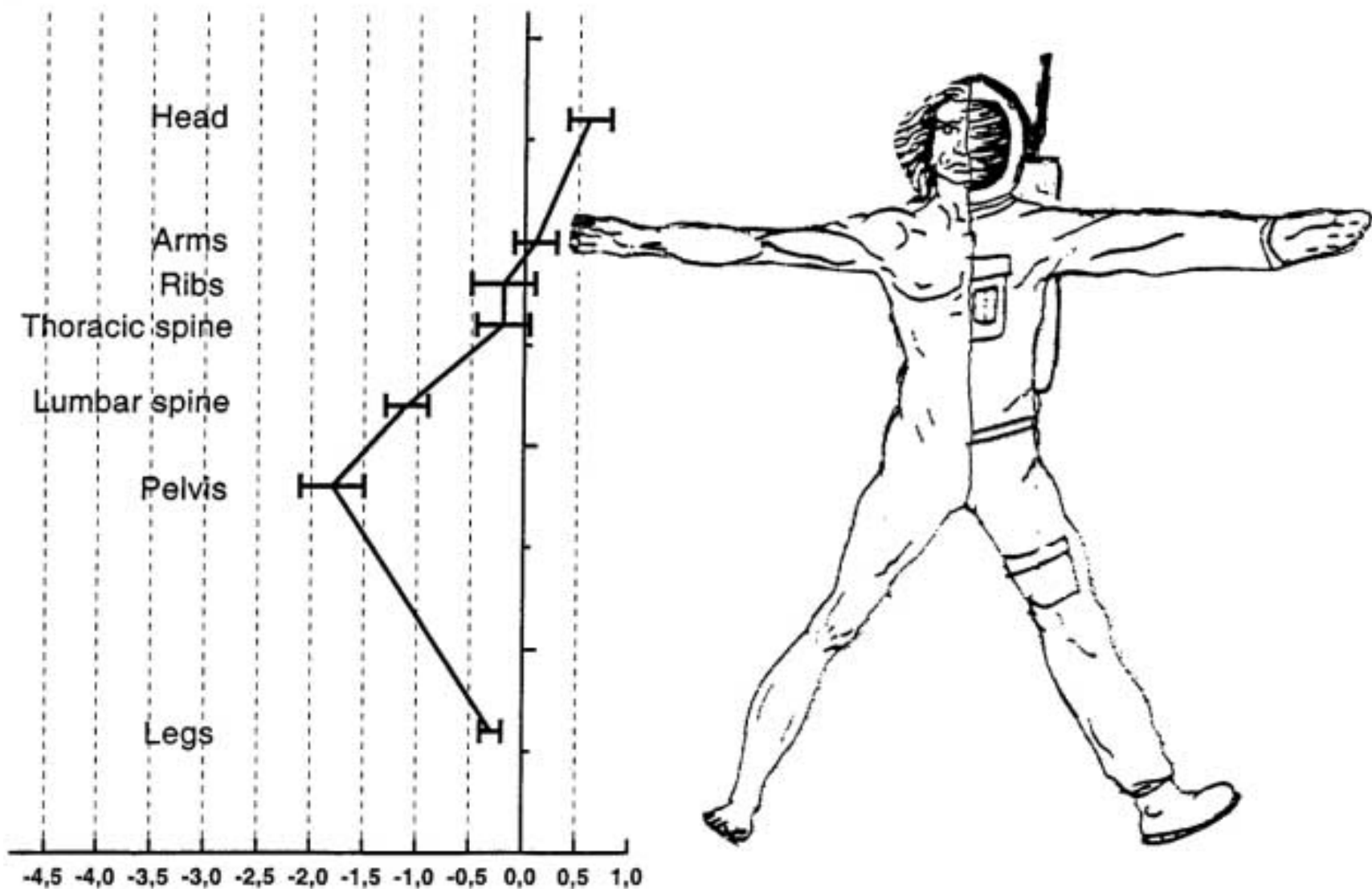


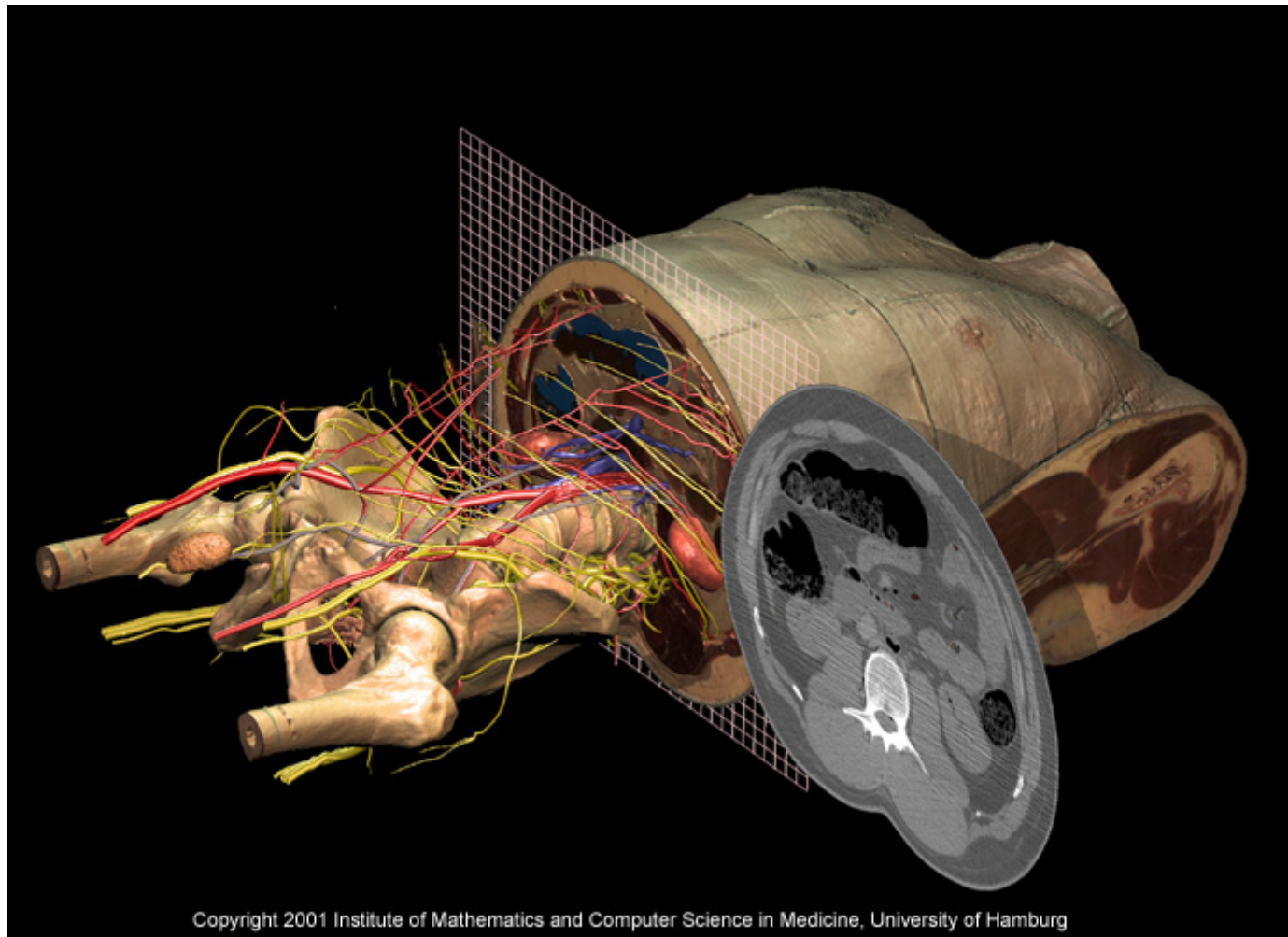


# HEALTHY Proposal

## Physical Activity For Healthy Living And Healthy Ageing







<http://www.uke.uni-hamburg.de/institute/imdm/idv/gallery/index.en.html>





# Summary Of Core Points

- **Monitoring:** Individual monitoring of specific parameters in selected populations
- **Telemedicine:** Support of treatment (on various levels) in selected populations
- **(functional) Genomics:** individual risk prediction, effective prevention and treatment
- **Imaging:** Virtual bodies to track disease processes

