Realities to face

• Life is only posible within its limits
• Life units (cells, organisms) are not equal.
  – “All animals are equal, but some animals are more equal than others” from Animal Farm, by George Orwell
44.1C – 6hr + 19hr restore

Presumably alive
Mechanisms of Cell Death

Apoptosis

Necrosis
Apoptosis Signaling

Death by design

Death ligand (FasL)
Death receptor (CD95)
Adaptor (FADD)
Initiator caspase zymogen (caspase-8)
Initiator caspase

Death by neglect

Apoptotic stimulus (growth factor withdrawal)
Inactive adaptor (ApaF-1)
Pro-apoptotic Bcl-2 family member (Bim)
Anti-apoptotic Bcl-2 family member (Bcl-xL)

Effector caspase zymogen (caspase-3)
Effector caspase

Apoptosis
Apoptosis zone

Necrosis zone
Event inevitable

• To prepare
• To minimize consequences

• Sport medicine
• Military medicine
Event happened

- To calculate consequences
- To predict compensational approaches
- To evaluate strategies (worthy or not)
- Emergency
- Intensive care
Economical death

- Minimal treatment – maximal effect
- Sensibilization for other treatment (combined therapy)
- Cancer treatment
- Cosmetics
- Pest control
Mobile phone use

Absorption of energy in brain tissue (SARs up to 1.6 W/kg) → Physiological effects

Protein unfolding

Heat shock (stress) response

Heat shock proteins induced: Hsp27, Hsp40, Hsp70, Hsp90, Hsp110 → Protein refolding

Repeated mobile phone use

Chronic expression of heat shock proteins

- Induction of cancer
- Increased metastasis
- Inhibition of apoptosis
- Resistance to anti-cancer drugs