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**Portable dedvices for cryosurgery and therapy**

Cryosurgery is a surgical technique that employs freezing to destroy undesirable tissue. Although the prefix "cryo" (from the Greek word "kruos" for cold) usually refers to temperatures below 120K, cryosurgery deals with temperatures below the freezing temperature of tissue, i.e. about 273K.

**Key words:** Cryosurgery, appliance, malignant tissue.

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И.В. Петрусенко, В.В. Шафранов**Портативные приборы для криохирургии и терапии**

Криохирургия и принцип хирургической техники направлен на заморозку и уничтожение нежелательных тканей живых организмов. Хотя префикс «крио» (от греческого слова «kruos» для холодной) обычно относится к температуре ниже 120 К, для криохирургии с температурой ниже температуры замерзания ткани, т.е. о 273 К.

**Ключевые слова:** криохирургия, прибор, злокачественные ткани.

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И.В. Петрусенко, В.В. Шафранов**Криохирургияға және терапияға арналған портативті құралдар**

Криохирургия және хирургиялық техниканың принципі тірі организмдердің қалаусыз ұлпаларын жоюға және мұздатуға бағытталған. «Крио» қосымшасы (гректің «kruos» суық үшін сөзінен) әдетте 120K төмен температураға қатысты болады, криохирургия үшін ұлпаның қату температурасынан төмен, яғни 273K жуық болады.

**Түйін сөздер:** криохирургия, құрал, қатерлі ұлпалар.

Cryosurgery is a surgical technique that employs freezing to destroy undesirable tissue. Although the prefix «cryo» (from the Greek word «kruos» for cold) usually refers to temperatures below 120K, cryosurgery deals with temperatures below the freezing temperature of tissue, i.e. about 273K. The history of cryosurgery is relatively short and is closely intertwined with developments in low temperature physics, engineering and instrumentation that were made during the last century. Thus, cryosurgery appears to advance in jumps triggered by immediately preceding technological advances and now it is a fast growing minimally invasive surgical technique. Low temperature damage in cells can be divided into damage produced by three effects: low temperature;

direct effects of freezing; and indirect effects of freezing. The study of life at low temperatures and the study of life at low water contents have some features in common. This is because, in environmental freezing, one of the major causes of damage is freezing induced dehydration.

Introduction of the cryogenic methods of treatment into the practice of municipal outpatient clinics in our countries restrains lack of simple and reliable portable cryoinstruments. In this regard a series of original portable apparatus for different application in cryosurgery and cryotherapy was designed in the ISSP RAS in close cooperation with the surgical clinicians. The series includes contact cryodestructors with the changeable active finger

cooling with liquid nitrogen, which is storing in a special can, simple cryoapplicators with active metal tips cooled preliminary in liquid nitrogen, nitrogen cryosprays. According to the recommendation of the Ministry of Health RF any prototypes of this devices were transferred for approbation to clinics of Moscow and Moscow region. The report includes some results of the test examinations in

model surroundings including biological objects as well as of the approbation in real conditions of a few Moscow clinics.

Cryosurgery, sometimes referred to as cryotherapy or cryoablation, is a surgical technique in which freezing is used to destroy undesirable tissues. A review of the history of the field will show that.