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ALL-UNION CONFERENCE ON EXPERIMENTAL
MORPHOLOGY OF THE HEART
AND VESSELS

By N. A. Dzhavakhishvili,
K. I. Kul'chitskiy and Ye. P. Mel'man

-USSR-

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ALL-UNION CONFERENCE ON EXPERIMENTAL
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Following is the translation of an article entitled "Vsesoyuznaya Konferentsiya po Eksperimental'noy Morfologii Serdtsa i Sosudov" (English version above) by N. A. Dzhavakhishvili, K. I. Kul'chitskiy and Ye. P. Mel'man in Arkhiv Anatomii, Gistologii i Embrilogii (Archives of Anatomy, Histology and Embryology), Vol 38, No 6, Moscow, June 1960, pages 117-122.

The All-Union conference on thematic called together by the All-Union Society of AGE (Anatomiya, Gistologiya Embrilogiya -- Anatomy, Histology and Embryology) and by the Institute of Experimental Morphology im. A. N. Natishvili, Academy of Sciences Georgian SSR, took place 9-13 October 1959. The conference dealt with problems of experimental morphology of the blood and lymphatic vessels of the heart. More than 250 specialists, representatives of 15 cities of the Soviet Union took part in the work of the conference. The participation of pathologists, surgeons, physiologists, pathophysiologicals, and representatives of other branches of science in the conference, delivering speeches as well as taking part in the debates, favored the multilateral exchange of opinions and closer contact of morphological research with the investigations of practical medicine.

The conference showed that together with the descriptive and historical methods of analysis, experimentation is playing an ever growing part in the work of morphologists. This creates a broader theoretical basis for a deeper understanding of the pathogenesis of different diseases, and indicates the way to combat them. The reports presented at the conference threw light on the problems of regeneration, reaction,

and plasticity of the heart's vascular system in normal and pathological cases. Parallel with the experimental reproduction of various diseases, an ever-growing emphasis has been put on the study of changes in the structure of the heart and the blood and lymphatic vessels in different pathological conditions, which also contributes to a closer contact between morphology and clinical medicine.

The conference was convened by Prof D. A. Zhdanov, Chairman of the VNOAGE (Vsesoyuznoye nauchnoye obshchestvo anatomii, gistologii i embriologii -- All-Union Scientific Society of Anatomy, Histology and Embryology) and a corresponding member of the Academy of Medical Sciences USSR, who pointed out in his introduction the importance of the conference inasmuch as the diseases of the heart's vascular system play a most important role in pathology and treatment, and constitute one of the main problems of contemporary medicine.

The first report was given by Prof S. I. Shchelkunov, corresponding member of the AMN SSSR, who discussed questions concerning the regeneration of the vascular wall and the endocardium.

According to the data given by the author, the endocardium and the vessels come from the mesenchyme, which differentiates itself giving first the endothelium. This process is considerably conditioned by the blood flow. The injury of the latter in the course of an experimental or pathological case causes a series of transformations of the endothelium and the elements under it, which leads to a new growth in the connective tissue. The regeneration of the wall of the blood channel depends greatly on the character and degree of the injury. In the case of injury of only the inner wall of the vessels and the surface of the endocardium, we note a complete regeneration which comes about faster in the vessels than in the endocardium. The source of regeneration is the viable part immediately adjacent to the injured region, which, as a result of dedifferentiation, generates a reticular connective tissue regenerate. Then, under the effect of the blood flow, this is differentiated into the endothelium and the subendothelial elements. In the case of a greater injury, when both the inner wall and the organ of muscular elasticity are in a traumatic state the regeneration takes place slowly from the side of the inner membrane,

which confirms once more the all-important role of the blood flow in this process. In large elastic vessels, in the case of damage of this kind there is no total restoration of the structure of the wall.

Prof B. A. Dolgo-Saburov, corresponding member of the AMN SSSR gave a report "On Morphological Analysis of the Restoration of Blood Circulation" in which he explained in detail the different aspects of the problem of plasticity of vessels and their compensatory adaptability in the case of a significant damage to the blood flow in arteries and veins. Even the simultaneous application of dozens of ligatures on large vessels in dogs was satisfactorily endured by the animals, which was established through testing of their locomotional capabilities in the treadmill. The author threw light on the problems of the effect of gradual contraction and dilatation of vessels on the trophics of membranes under several disease states, of the change of direction of the blood flow for the stimulation of the collaterals and others. Further questions were raised about experimental analysis of the plasticity of vessels in a relatively anatomical and tissue-ecological plane, for a more thorough study of the mechanism of development of these vessels in the process of evolution, and a successful fight against vascular inadequacy in the human body.

Professor M. G. Prives gave a report on "The Significance of the Method of Radioactive Tracers for the Study of the Arterial System of the Bone". The use of radioactive isotopes, which have not yet found an application in anatomy, shows that arteries of all parts of tubular bones, including the separately ossified ones, (diaphysis and epiphysis) are directly connected among themselves beginning at a very early age. Several authors deny the theory that those ligaments pass even through the metaepiphyseal cartilage. There is a definite dynamic of aging of the changes of these ligaments according to the growth and sinusization of the bone. The method of radioactive tracers allows one to determine in the case of a living organism the distribution of radioactive isotopes in the blood system, and on this basis, to evaluate the blood supply of the organs.

Professor N. A. Dzhavakhishvili gave a report on "The viability of a vascular substitute". The actuality of the question raised is enhanced by the ever increasing importance of the plastics of blood vessels

in surgery. The author made a study of the problems of autotransplantation of vessels. Using Gudov's machine on dogs, a jugular vein was sewn in place of the carotid artery; or a femoral vein in place of the femoral artery. The size of the transferred vessel is 6 to 8 centimeters. The decisive role in the functioning of the transferred vein is played by the blood flow.

Under the influence of the blood pressure and the pulse wave, after only a few weeks, a series of transformations occurs in the transplanted vein; the flow thickens and the character of the vascularization changes to resemble the artery. Even in the case of obliteration of the transplanted vein the replacement of the arterial segment by a vein can be considered identical since the collaterals succeed in developing and the recanalization of the obliterated transplanted section itself is significant in terms of the blood supply. At the same time the polyvinyl-alcohol plastic tubes have been introduced in the same arteries. The period of observation was 190 days. Although this operation is easier from the technical point of view, the results are less satisfactory than in the case of the autotransplantation of vessels.

Participating in the discussion of the reports, V. P. Mikhaylov (Leningrad) pointed out the interesting experiments performed by S. I. Shchelkunov who indicated the possibility of regeneration of the endocardium in large areas. He gave a positive evaluation of the report of M. G. Prives and added that in the growing epiphysis there are many young elements of cartilage and bone tissue with an elevated metabolism; thus the great accumulation of radioactive isotopes in those parts of the bones can be explained by this very fact with which M. G. Prives agreed.

P. M. Mazhuga (Kiev), in his speech on the report of S. I. Shchelkunov, stressed the fact that the quality of the regenerated section, taking aside the modelling role of the blood flow, is obviously influenced by other factors as well. Like B. A. Dolgo-Saburov, he did not observe any spasm in the collaterals during the ligation of the main vessel.

N. Bakradze, dwelling on the same report, indicated that in the process of regeneration of the vascular wall and of the endocardium certain nervous elements are more important than the action of the blood flow.

K. D. Eristavi (surgeon, Tbilisi), after having stressed the importance for practical medicine of B. A. Dolgo-Saburov's investigations, analysed in detail the problems of transplantation of vessels (referring to the report of N. A. Dzhavakhishvili) and explained that this problem is solved to a greater advantage by way of an alloplastic operation.

D. G. Ioseliani (surgeon, Tbilisi) pointed out the importance of the research of V. N. Shevkunenko's school concerning the problem of collateral blood circulation. He expressed doubts as to the possibility of an interruption of all the vessels going to the epiphysis of the bone (referring to the report of M. G. Prives).

S. I. Shchelkunov, discussing N. A. Dzhavakhishvili's report stressed the importance of the transplanted sections as a basis on which the cells settle, and thus in the practical sense the selection of such a structure on the basis of which this settling will take place in the most favorable way is a very important problem.

K. P. Chikovani (neuro-surgeon, Tbilisi) dwelled on the practical clinical importance of the data given by B. A. Dolgo-Saburov and S. I. Shchelkunov. Evaluating N. A. Dzhavakhishvili's report, he indicated that after the observation of the vessels during six months he found that the nervous trunks were preserved in their wall.

N. A. Dzhavakhishvili, S. I. Shchelkunov, and M. G. Prives made the final speeches. The latter, answering S. G. Ioseliani, explained that his doubts on the possibility of the interruption of all epiphyseal vessels was based on a fallacious understanding of that term. Epiphyseal vessels are only the ones which enter the epiphysis from the outside, and they can easily be cut by way of a circular slit of the articular capsule. The presence of vessels entering the epiphysis from the inside of the bone, from the metaphysis to the epiphysis through the metaphyseal cartilage, has been precisely proven by the method of radioactive tracers.

Evaluating the reports presented at the first meeting, the acting chairman, D. A. Zhdanov, noted that experimental-anatomic research demonstrated in the reports of S. I. Shchelkunov, B. A. Dolgo-Saburov and N. A. Dzhavakhishvili represents a prospective direction, which is fruitful for the subsequent de-

velopment of medicine. He also stressed the fact that anatomical research has been broadened by means of a new arsenal of methods of investigation; among them we must note the method of radioactive tracers used by M. G. Prives who successfully combined the data of physics and anatomy. All of the reports bring morphology in direct contact with the determining of certain regularities which can be employed in practical medicine.

The second meeting, devoted to the development of secondary blood circulation in the organs, took place under the chairmanship of Prof B. A. Dolgo-Soburov, corresponding member of the AMN SSSR. The following reports were read: Ye. P. Mel'man (Stanislav) "Collateral paths and the dynamics of balancing of functional shifts in the internal organs in instances of disrupted blood circulation".

The author and his group of associates, having employed the combination of anatomophysiological and biochemical methods of research, had obtained a number of new facts pertaining to the character of compensatory rebuilding of the blood-vessel channels of certain internal organs (heart, stomach, bladder, uterus) and pertaining to the dynamics of their functional indexes in cases of experimental disruption of their blood supply. Certain connections between anatomical and functional sufficiency of the collaterals were established; connections which determine the character of balancing of observed functional shifts in the organs; the developing secondary paths of the blood stream were also studied.

M. A. Sreseli and O. P. Bol'shakov (Leningrad) "The peculiarities of the structure of the cavernous sinus and its role in the regulation of the cerebral blood circulation". The authors had conducted detailed research on the structure of the cavernous sinus and its interrelationship with the internal carotid artery. Experimental research (recording of the flow of blood in the sinus with the aid of the electronic plethysmograph) have shown that the cavernous venous sinus and the loop of the internal carotid artery represent one anatomical-physiological complex, which has an active influence on the blood circulation within the skull.

L. N. Pushkarev (Sverdlovsk) "On morphological changes and some functional changes in the organism of animals in instances of interruption by transection of

the interior vena cava at its various levels". The author came to the conclusion that the interruption of the interior vena cava at points below the veins of the kidneys or between the liver and the right vein situated above the liver calls forth lesser functional changes than does the transection of the vena cava immediately above the veins of the kidney or between the veins above the kidney.

A. G. Federova (Leningrad) "on the changes of the blood-vessel channels and of the nervous apparatus of the collaterals, following the transection of the main stream veins in the extremities of dogs and monkeys".

Interesting findings on the condition of the secondary blood-carrying channels following the transection of the main stream veins in the extremities were presented in this report. The re-establishment of blood flow occurs not only at the expense of the development of secondary paths outside the organs, but also at the expense of the network of blood-vessels within the organs. The veins of the fat lining under the skin, fasciae, muscles, nerves, large arterial stems, tendons, periosteum and bone become considerably expanded. Expansion of arteries and of the lymphatic network is observed as well as reactive and destructive changes of a part of the nerve fibres and of receptor endings.

F. V. Sudzilovskiy (Leningrad) "On the peculiarities of secondary blood circulation when the flow of blood in the system of the venal cavae is disrupted". Serving as a criterion of the re-establishing of blood circulation in the kidneys was not only the degree of morphological transformations of the collaterals, but also laboratory analysis of the urine. The author conducted various forms of intervention (patching of the vein walls, ligation, multiple transections of the venae cavae) and determined the principal paths of the collateral return; those paths developed considerably later, after the functional indexes had been re-established.

N. V. Krylova (Moscow) "On the investigation of the blood-vessels in instances of experimental sarcoma-45 in rats." The author had determined the avenues of the influx and return of blood, as well as the connection between the vessels of the experimental sarcoma-45 and the blood-vessels of other organs. The histotopographical relationship between the tumor tissue and its blood vessels was clarified. The net-

work of arteries and veins in the periphery of the tumor in the zone of active growth attracts attention as do the altered blood-vessels, especially the arteries in the center of the tumor: patches without blood-vessels are clearly perceived in areas of necrosis.

Speaking on the subject of Ye. P. Mel'man's report, T. F. Lavrova (Voronezh) pointed out the importance of the nervous system in the development of the collateral blood circulation of the stomach. K. D. Filatova (Dniepropetrovsk), touching upon the same report, noted its clinico-physiological orientation and reported on the results of research conducted at the university section headed by her, on the system of blood vessels.

M. G. Prives offered a characterization of all the reports that had been read and noted their value, making a number of comments based on his own research. N. A. Dzhavakhishvili, G. Bokeriya, G. Mchedlishvili, K. A. Bakradze (Tbilisi) spoke on various reports and shared their experiences.

E. A. Dolgo-Saburov summed up the reports and made the concluding statement, stressing the great importance of the employment of complex morphological and functional methods of research for the further development of anatomy; methods which allow a more profound penetration into the essence of observed phenomena and make it possible to come closer to the needs of practical health protection.

The third meeting took place under the chairmanship of M. G. Prives (Leningrad).

D. A. Zhdanov (Moscow) gave the first report "The sum-results and prospects of experimental-anatomical research on the lymphatic system". The main problem of functional morphology with regard to the roots of the lymphatic system in organs lies in the relationship between the lymphatic capillaries and the functional-morphological elements of the organ structure on one hand, and blood-carrying capillaries on the other. The lymphatic capillaries have closed endothelial walls. In his experiments on the study of the absorption of liquid containing soluble substances or substances suspended in it (in particular, chicken erythrocytes) the author conclusively demonstrated that their penetration occurs through the whole of the cytoplasm of the endothelium in the wall of the lymphatic capillary. He subjected the changes in the lymphatic

capillaries and vessels to functional-morphological analysis; changes which occur in animals under the conditions of experimental pathology, as well as in man in cases of inflammatory processes and in instances of the development of malignant tumorous new tissue formations. The remaining reports were devoted to the blood carrying system.

M. E. Komakhidze (Tbilisi) "On the Relative Value of Extracoronary Blood supply of the Myocardium". Using a sketch of the blood-vessels under the conditions of the experiment on dogs, the author gave a comparative evaluation of the three methods of revascularization of the heart: 1) Stitching onto it a loop of the lower intestine, 2) of the lung and 3) the powdering of the epicardium with finely ground bone. The inosculation between the heart and the grafted organ or between the heart and the pericardium developed in all of the experiments. Small blood vessels entered the myocardium through the scar at the point of the inosculation and secured the nourishment of the myocardium. All of the three methods prevent cicatricial transformation of the myocardium, but the powdering of the epicardium with finely ground bone represents the best method, which is simple and economical. The author did not share the opinion about the subsequent narrowing of the blood vessels which had grown through the scar, as a result of the shrinkage of the scar.

K. I. Kul'chitskiy (Kiev-Leningrad) "On the blood supply and the innervation of the heart under conditions of experimental pathology". The author spoke in detail about the morphological changes in the heart, its blood vessels and its nervous elements in instances of the experimental infarction of the myocardium, stenosis of the pulmonary artery, and coarctation of the aorta. The experimental model of the infarctation of the myocardium, worked out jointly with the physiologist V. V. Frolik and consisting of ligation of the lower section of the left coronary artery and in the disruption of the higher nervous activity (combination of local and general phenomena in the development of coronary deficiency and in the infarctation of the myocardium) deserves attention. Certain regularities were established in the character of reaction of heart structures in response to an inadequate irritant (changes in geodynamics and cumulative oxygen starvation).

A. G. Knorre (Leningrad) in his report "On the histogenesis of the heart muscle in normal individual development, in cases of regeneration and transplantation" generalized and summarized the results of research conducted at the pediatric Medical Institute. In cases of normal histogenesis of the heart muscle, the most functionally significant moments of crisis coincide with the transformation of the cell structure of the myoepicardial disc into semiplastic, as well as with the growing of preganglionic nervous fibres and neuroblasts into the heart. The regenerative histogenesis of the heart muscle, studied by P. P. Rumyantsev, recapitulates to a great extent the processes of embryonic histogenesis, with the exception of its initial stages. Under the conditions of subcutaneous transplantation (experiments by Ch'en Ti) there occur in the heart-muscle tissue clearly pronounced regenerative phenomena in the course of several days after the start of the experiment. Then destructive processes become ever more prevalent.

M. G. Shevchuk (Stanislav) "On the peculiarities of distribution and functional adequacy of coronary arteries of the heart in dogs". Sufficiently pronounced anastomoses were discovered in the hearts of dogs within the limits of the blood-vessel coronary sinuses of one as well as in both coronary arteries. Areas of the most prominently pronounced and permanent anastomoses were determined. The functional adequacy of these anastomoses and the dynamics of ECG changes in cases of the ligation of the branches of the coronary blood vessels in the state of relative rest and at a heightened physical load patterned in dosages.

B. L. Yemil'yanov (Voronezh) "On the Problem of the Deep Revascularization of the Myocardium". In his experiments with dogs the author modified the Weinberg operation (the fixation of a patch of soft tissues containing the mammary artery to the epicardium in the area of the left auricular appendage for the revascularization of the heart. Forty days or later after the operation, anastomoses of the blood vessels developed to a degree anatomically sufficient to fill the coronary arteries with liquid introduced through the internal mammary artery.

N. Ye. Yaryagin and G. M. Nikolayev (Yaroslavl) "Pathomorphology of the Blood Vessels of the Heart, the Aorta and the Jugular Arteries in Instances of Experimental Disease Induced by Irradiation". The

authors studied morphological changes in the blood vessels in cases of experimental disease in dogs induced by irradiation, i.e. brought about by a single total-body exposure to X-rays of a 600r. dose. The dystrophic changes in the nervous apparatus of the blood vessels were discovered by the authors and are of considerable interest. They appear earlier and appear later there than in other tissue structures of the walls of the blood-vessels in the course of disease induced by radiation. In the opinion of the authors, this points toward the significance of nervous mechanisms in the appearance of vessel disruptions in instances of such disease and facilitates the explanation of certain aspects of the pathogenesis of this affliction.

A. G. Beglaryan (Moscow) "On the blood-vascular System of the Heart in Cases of Experimental Autosensitization". In his experiments with rabbits the author had shown that under the conditions of autosensitization by means of a mixture of anti-rabbit serum and a streptococcal vaccine the system of the connective tissue and the blood vessels becomes disrupted.

In the course of the discussion, V. N. Zhedenov (Odessa) talked about the changes suffered by the auricle and the appendages in ontogenesis and stressed a number of distinguishing peculiarities in the process of individual development. V. P. Mikhailov (Leningrad), having noted the great theoretical and practical importance of D. A. Zhdanov's report, at the same time expressed his doubts about the possibility of the penetration by coarse particles contained in the liquid through the endothelial cells in the walls of the lymphatic capillaries. Apparently those particles penetrate through the cementing substance which connects the endothelial cells. He also spoke about the interesting report submitted by M. Ye. Yarygin and G. M. Nikolayev, pointing out that in the description of the changes on the part of the receptors the treatment of the substrata innervated by the latter should have been more detailed.

R. D. Yachvili (Tbilisi) acquainted the members of the conference with his research on the specifications of the zones of the blood supply for the wall of the heart.

Ye. P. Mel'man (Stanislav) stressed that the interesting data presented by K. I. Kul'chitskiy represent a logical continuation of works previously sub-

mitted and published by that author. The painstaking experimental investigations by M. E. Komakhidze are quite significant, in as much as they supply an anatomical basis for various methods of cardiac revascularization.

In critical evaluation of the functional importance of the thinnest blood-vessels which grow into the myocardium from the organ stitched onto the latter, it is necessary to take into consideration the higher blood pressure in the coronary blood paths, as well as the fact that the improvement in the condition of the patients following the revascularization of the heart occurs usually long before the development of these vessels takes place.

N. Putkaradze (Tbilisi) noted the similarity between the data obtained in the research by K. I. Kul'chitskiy through experiments and the results of research by R. V. Kapanadze, obtained upon the sectional material taken from bodies of people who had died as a result of the infarction of the myocardium.

M. Ye. Yarygin stressed the thoroughness of the morphological investigations of K. I. Kul'chitskiy under the conditions of experimental pathology and pointed out that receptors with a limited character of branching may in a number of cases be confused with neuroma of an injured nervous conductor. Acting Chairman M. G. Prives made an analysis of both these reports and the discussions, and pointed out their merits as well as their shortcomings. In particular, he noted that the report by D. A. Zhdanov represented a successful example of combining of data pertaining to morphology, physiology, and pathology.

Other reports, as well as all of the session as a whole, demonstrated the fruitfulness of a many-sided discussion of various aspects of one problem by a representative of different branches of theoretical and practical medicine. M. G. Prives also emphasized the fact that successful experimental models of certain afflictions had been presented at the conference. All of this testifies to great prospects offered by the complex study and discussion of the most important problem of modern medicine -- the pathology of the blood-vessels of the heart.

The fourth meeting took place under the chairmanship of Prof N. A. Dzhavakhishvili. The following reports were read.

A. I. Strukov and V. V. Serov (Moscow) "On the blood vessel path of the kidneys in cases of experimental glomerulonephritis." Experimenting with 30 rabbits the authors studied the blood vessel system of the kidneys in instances of glomerulonephritis induced experimentally through the methods of Lindeman-Mazugi and Knetter. Their research has shown that great importance is borne by the disorders in the blood circulation within the kidneys in the pathogenesis of glomerulonephritis; a disorder which represents a resultant effect of immunological reactions of the blood-vessel channel of the glomerulus.

N. Ya. Tatishvili (Tbilisi) "On the subject of the interrelationship of the urinary blood-vessel systems within the kidneys". The author had conducted injections of the kidneys from the urinary tract and had traced the paths of expansion of introduced liquid through the method of preparation, roentgenographically and on histological sections. The contrast substance of urinary tract spreads through the excretional system of the kidney, penetrates into the urinary channels, and from them -- into the internal, venous system of the kidney and further on into the venal vein upward into the interior vena cava, and retrogressively into the veins of the liver. When the injection is made through the venal vein, the whole internal vein system of the kidney becomes filled, but the injected mass does not penetrate into the urinary channels.

G. I. Nchedlishvili (Tbilisi) "Research on the cerebral blood-vessels and on the blood circulation with the aid of tissue fixation in living organisms." In this, in the capacity of fixating liquid, he used 20% formaline in spirits, injected in some cases into the blood-vessels, while in other cases it was applied to the surface of the tissue and of the blood-vessels. His experiments had detected that in cases of a differing intensity of cerebral blood circulation, the quantity of functioning capillaries fluctuates markedly, but it is always much lower than in cases where the blood-vessels are injected with contrasting masses or in cases of impregnation with silver.

T. A. Gibradze (Tbilisi) "Bronchio-vascular system of the lungs and its changes when the blood circulation in the lesser circulation is disrupted". The author studied extra- and intra-organic branching out of the bronchial tree, of the arteries of the lung, and of its veins in the human organism through the methods

of dissection, roentgen-vasography and corrosion. In each lung the author brings out four zones and nine segments. The experiment describes in detail the morphological changes in the lungs when the arteries and veins of the lungs are ligated. The ligation of those blood-vessels leads to an expansion of the bronchial vessels, of the arteries, and of the veins.

A. V. Krayev (Stalinabad) "On the condition of the sinusoids of the liver following the ligation of the hepatic artery in dogs." The author had studied the structure of the blood-vessels in canine liver, of the sinusoids and of the gallbladder cells both in the normal and in experiments following the ligation of the hepatic artery. The disruption of the arterial blood circulation in the liver calls forth stasis of venous blood in the sinusoids and facilitates the development of inflammation followed by colleagenosis.

N. M. Mamporiya (Tbilisi) "Microvascularization of the liver Both in the Normal and in Experiment". The author studied the microangiarchitectonics of the human liver at various ages. He also conducted experiments on dogs, in which he ligated the hepatic artery, thus narrowing the portal and the caudal venae cavae veins.

I. Ye. Etingen (Stalinabad) "On the experimental study of the dynamics of the blood-vessels within the ovaries of rabbits." Data on the structure of the blood-vessel system of the rabbit ovaries in the interconnection with the histostructure of this organ were represented. Changes in the blood carrying vessels of the corpus luteum were studied. The high degree of elasticity of the blood vessel path bed of rabbit ovaries is, in its general features, similar to the cyclic changes of the blood vessel bed within the ovaries of the human female.

N. K. Chichinadze (Tbilisi) read a report "On the Changes in the Microvascularization of Spermal Glands in Experiments." The author had severed the seminal duct in 20 dogs, he did the same with the inner seminal artery itself as well as in combination with the venous network, and also with the artery and the vein of the seminal duct both separately and in combination. The histological changes which take place in the apparatus of the duct were studied. Various changes in the capillary networks of the spermal glands were established.

T. B. Zhuravleva (Leningrad) "On the Changes in the Mammalian Artery in the Process of Experimental

Cancerogenesis". Abnormal changes in the fluctuations of the hormonal balance lead to the alteration of the functions of the mammalian glands. Changes in the blood-vessel system in the course of the process of experimental cancerogenesis occur synchronously with the morphological changes of the stroma and parenchyma of the organ. In cases of protracted introduction of hormones, a fibrosis of the stroma develops.

Microscopic investigation had shown that in the nest-sections with a developed network of blood-vessels there would come into existence focal points of atypical proliferation and multiple embryonic beginnings of cancer of the mammalian glands.

A. V. Porisov (Leningrad) "On the Experimental-Morphological Analysis of Lymphatic Vessels of Abdominal Junctions". The author came to the conclusion that the lymphatic capillaries and vessels of abdominal bonds can change the direction of the lymphatic return from organs of the abdominal cavity, participate in the resorption of the liquid of the cavity, and facilitate the spreading of infection and neoplasms from one organ of the abdominal cavity to another.

V. N. Balashov (Leningrad) "On the Changes in the Lymphatic System Within the Stomach of the Rabbit in Instances of a Radiation-induced Disease, following the Introduction into the Wall of the Organ of Coal Tar." In radiation-induced disease in rabbits he had observed a lowering of the quantity of lymphatic capillaries and a heightening of their penetrability with regard to the injected mass. One hundred and twenty days after irradiation, the penetrability of these capillaries returned to normal.

In the stomachs of rabbits in which anthracite dust was introduced, a significant structural reshaping of the lymphatic capillaries is observed, and multi-layer network of lymphatic capillaries is formed. A great number of the lymphatic vessels has its beginning from this lymphatic barrier.

V. N. Zhedenov (Odessa), speaking on the report by T. A. Gibradze, noted that the principal index of the development and the structure of the lungs is represented by their sectional structure, which suffers a number of regular transformations by means of the sequence of the developmental phases in the course of ontogenesis. A division of the lung into four zones and nine segments is acceptable.

A. Y. Gzirichvili (urologist, Tbilisi) accentuated attention on the report by A. I. Strukov and B. B. Serov, by pointing out that the histological material presented by them makes it possible to decipher a number of links in the pathogenetic chain of this affliction. Research by M. Ya. Tatishvili may serve as an indicator of close ties between diseases of the liver and of the kidneys.

D. A. Zhdanov (Moscow) brought forth a detailed analysis of the above mentioned report and threw additional light on a number of aspects of the pathogenesis of glomerulonephritis. Investigation of the blood-carrying and lymphatic channels expands our conceptions about the course of the disease and explains the convertibility of the process. He also spoke about the report by M. Ya. Tatishvili and T. A. Gibradze. The conception of a four-zonal structure of the lung does not offer anything substantial. It is more important to determine what is meant by segment and to make its construction more precise. Works of A. V. Borisov and V. N. Balashov have a great importance from the viewpoint of the establishment of the interrelationship with lymphatic vessels and the structure of connecting tissual base.

K. D. Filatova (Dnepropetrovsk), having stressed the significance for practical surgery of the report by T. A. Gibradze, spoke in detail about the problems of the branching of the bronchial tree and about the various forms of its changeability. Sh. A. Gurtskaya (Sukhumi) noted that in the scars following the resection of the intestine, no lymphatic vessels have ever been discovered by her; those vessels are usually situated within the perimeter of the scar, in a considerable amount at that. V. P. Mikhaylov (Leningrad) emphasized the fact that T. B. Zhuravleva's research is correct in method because it combines study of the blood-vessel system with the analysis of changes taking place in the glandular tissue. V. V. Serov (Moscow) said that findings of N. M. Mamporiya testify to the development of atherosclerosis and dystrophy, so that therefore it is more correct to say that a model of sclerosis rather than of cirrhosis of the liver had been obtained.

M. A. Sreseli (Leningrad) spoke about the report by M. Ya. Tatishvili, pointing out that his investigations offer a comprehension of the mechanism of serious complications on the part of the liver in cases of afflictions of the kidney and in cases of surgical inter-

vention within the latter.

M. G. Prives talked about the interesting research by A. I. Strukov and V. V. Serov, which has great practical significance, and he also supplied an analysis of almost all of the reports that had been read.

M. A. Dzhavakhishvili gave with a broad summarization of all reports.

Participants in the conference noted the significant work carried out by the group of associates of the A. N. Natishvili Institute of Experimental Morphology of the Academy of Sciences of the Georgian SSR on the task of organization and conduct of the conference.

The conference adopted a broad resolution aimed at determining the subsequent further tasks of experimental morphological research.