

# CLASSIFICATION OF BRAIN TUMOURS

REPORT OF THE INTERNATIONAL SYMPOSIUM  
AT COLOGNE 30th AUGUST — 1st SEPTEMBER 1961

SPONSORED BY  
THE MAX-PLANCK-GESELLSCHAFT  
THE DEUTSCHE FORSCHUNGSGEMEINSCHAFT AND  
THE WORLD FEDERATION OF NEUROLOGY

EDITED BY  
K. J. ZÜLCH AND A. L. WOOLF  
COLOGNE SMETHWICK

WITH 71 FIGURES



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## Preface

The report which follows constitutes the proceedings of a symposium on the classification of brain tumours held in Cologne in 1961. It contains the contributions and discussions reported as far as possible in a word-for-word manner, in the hope not only of providing out of the thoughts of the participants stimulation for further research, but also to indicate the atmosphere which prevailed during the symposium in which many completely opposed views were able to be expressed without any feeling of embarrassment. This freedom of expression is already obvious in the discussion of a proposed classification of brain tumours for the *Unio Internationalis Contra Cancrum* (UICC). The symposium endeavoured here to produce a positive criticism in order to arrive at a significant and practical conclusion viz a general, internationally acceptable classification. It was necessary to accept a degree of compromise even if the classification suggested did not in every point correspond to all the personal views of the various participants.

The second part of the symposium was concerned with a critical discussion of numerous brain tumour problems, for example the scientific delineation of tumour groups; the discussion was started by general reviews on the biology of brain tumours so that the later discussion could cover as wide a ground as possibly. Here also we all felt that a great stimulus for future work arose from the discussion.

The contributions of the individual participants could be presented in the original form with illustrations. In the discussion it has only been necessary to discard obvious repetitions or errors of speech otherwise as far as possible a word-for-word rendering has been made with the help of tape recording. As all the participants were fluent in English, the proceedings have been recorded in this language so that as wide a possible distribution of the contents may be obtained.

We have to thank the editor and publishers of *Acta Neurochirurgica* for making possible the publication to a wide audience. We are also indebted to Dr. *Lüthy* and Frau *Kortekamp* for their skilled deciphering of the discussion recorded on tape.

The participants in the symposium have later come together as the Working Group for Neuro-oncology in the World Federation of Neurology. We hope that this first fruitful symposium will be followed regularly by others and in conclusion thank once more the organisations who have made possible the symposium: the Deutsche Forschungsgemeinschaft, the World Federation of Neurology and the Max-Planck Society.

November 1963.

*K. J. Zülch, Cologne*

*A. L. Woolf, Smethwick*

## Vorwort

Der vorliegende Bericht gibt die Verhandlungen eines Symposiums in Köln 1961 über die Klassifikation der Hirngeschwülste wieder. Er enthält die Vorträge und Diskussionen in möglichst wortgetreuer Form in der Hoffnung, aus den Gedanken der Teilnehmer Anregungen für die weitere Forschung zu geben, aber auch um den Geist der Zusammenarbeit zu zeigen, der die Teilnehmer selbst bei völlig gegensätzlicher Meinung in dieser Aussprache leitete. Diese Einstellung zeigte sich bereits bei der Besprechung eines Klassifikationsvorschlages der Hirntumoren der Unio Internationalis Contra Cancrum (UICC). Das Symposium versuchte hier eine positive Kritik, um dies bedeutsame und praktisch erreichbare Ziel zu fördern: eine allgemeine, international annehmbare Klassifikation zu schaffen. Ein solcher Kompromiß schien wichtig, selbst wenn das vorgesehene Schema nicht in allen Punkten der eigenen Meinung entsprechen konnte.

Der zweite Teil des Symposiums diente einer kritischen Aussprache zahlreicher Fragen der Hirntumoren, unter anderem der wissenschaftlichen Abgrenzung der Geschwulstgruppen; er wurde aber durch einige allgemeine Referate über die Biologie der Hirntumoren eingeleitet, um diese Diskussion in einen möglichst breiten Rahmen zu stellen. Auch hier scheint uns aus der Diskussion eine Fülle von Anregungen für zukünftige Arbeiten hervorzugehen.

Die Referate der einzelnen Teilnehmer konnten in der breiten Originalfassung und mit Bildern wiedergegeben werden. Aus der Diskussion wurden nur offensichtliche Wiederholungen oder Sprechfehler ausgemerzt, sonst aber eine möglichst wortgetreue Wiedergabe auf Grund der Bandaufnahmen angestrebt. Da alle Teilnehmer das Englische beherrschten, wurden die Verhandlungen in dieser Sprache geführt und auch in der schriftlichen Wiedergabe beibehalten, um eine möglichst weite Verbreiterung des Inhaltes zu ermöglichen.

Wir haben Herausgeber und Verlag der Acta Neurochirurgica zu danken, die den Druck in dem breiten Rahmen möglich machten, Dr. Lüthy und Frau Kortekamp gebührt Dank für die nicht immer ganz leichte Entzifferung des Textes aus dem besprochenen Band.

Die Teilnehmer des Symposions haben sich später zur Arbeitsgemeinschaft für Neuro-Onkologie in der Weltvereinigung für Neurologie zusammengefunden. Wir hoffen, daß diesem ersten fruchtbaren Symposion regelmäßig weitere folgen werden und danken zum Schluß noch einmal den Organisationen, die das Symposion gefördert haben: der Deutschen Forschungsgemeinschaft, der World Federation of Neurology und der Max-Planck-Gesellschaft.

November 1963.

*K. J. Zülch*, Köln

*A. L. Woolf*, Smethwick

# Contents

	Page
<b>Zülch, K. J.</b> Introduction . . . . .	1
<b>Zülch, K. J.</b> The Classification of Brain Tumours . . . . .	3
<b>I. Classification of Brain Tumours</b>	
a) General Remarks on Classification	
<b>Hamperl, H.</b> The Nomenclature of Tumours of the Nervous System . . . .	5
Discussion . . . . .	9
b) The Contribution of Different Techniques to Classification	
1. <i>Genetics</i> . . . . .	24
<b>Koch, G.</b> The Genetics of Cerebral Tumours . . . . .	24
Discussion . . . . .	28
2. <i>Cerebral Tumours in Animals</i> . . . . .	30
<b>Luginbühl, H.</b> A Comparative Study of Neoplasms of the Central Nervous System in Animal . . . . .	30
Discussion . . . . .	42
3. <i>Experimental Production of Brain Tumours</i> . . . . .	46
<b>Netsky, M. G.</b> Experimental Induction and Transplantation of Brain Tumours in Animals . . . . .	46
Discussion . . . . .	56
<b>Schlefer, B.</b> Morphology of Experimental Brain Tumours . . . . .	57
Discussion . . . . .	63
4. <i>Tissue Culture</i> . . . . .	68
<b>Kersting, G.</b> Tissue Culture and the Classification of Brain Tumours . .	68
Discussion . . . . .	72
5. <i>Electron Microscopy</i> . . . . .	75
<b>Woolf, A. L.</b> Remarks on the Electronmicroscopical Appearances of Brain Tumours . . . . .	75
Discussion . . . . .	78
6. <i>Histochemistry</i> . . . . .	80
<b>Müller, W.</b> Remarks on the Histochemistry of Brain Tumours . . . .	80
Discussion . . . . .	84
7. <i>Metallic Impregnation</i> . . . . .	85
<b>Calvo, W.</b> Observations on the Metallic Impregnations of Brain Tumours	85
Discussion . . . . .	93
<b>II. The Malignancy and Grading of Tumours</b>	
<b>Sayre, G. P.</b> The System of Grading of Gliomas . . . . .	98
Discussion . . . . .	106
<b>Zülch, K. J.</b> Grading of Malignancy of Brain Tumours . . . . .	117
Discussion . . . . .	119



**III. Spongioblastoma**

<b>Zülch, K. J.</b> Some Remarks on the Spongioblastoma of the Brain . . . . .	121
Discussion . . . . .	125
<b>Rubinstein, L. J.</b> Discussion on Polar Spongioblastomas . . . . .	126
Discussion . . . . .	132

**IV. Polymorphous Oligodendroglioma**

<b>Rubinstein, L. J.</b> Morphological Problems of Brain Tumours with Mixed Cell Population . . . . .	141
Discussion . . . . .	158
<b>Zülch, K. J.</b> On the Definition of the Polymorphous Oligodendroglioma . .	166
Discussion . . . . .	168
<b>Luginbühl, H.</b> Oligodendrogliomas in Animals . . . . .	173
Discussion . . . . .	181

**V. Sarcoma and Related Processes**

<b>Zülch, K. J.</b> Primary Sarcomas of the Brain . . . . .	185
<b>Bingas, B.</b> On the Primary Sarcomas of the Brain . . . . .	186
<b>Brucher, J. M.</b> The Classification and Diagnosis of Intracranial Sarcomas .	190
<b>Rubinstein, L. J.</b> Microgliomatosis . . . . .	201
Discussion . . . . .	212

List of the Participants . . . . .	218
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## Introduction

By

K. J. Zülch

Gentlemen!

I open this Symposium and bid you all a hearty welcome. The Symposium should have two objects:

1. it should clarify by scientific discussion a series of controversial problems. This is its academic significance.

2. I hope that its results will lead to an improvement of the classification of cerebral tumours and that thereby practical benefits will emerge which will help the clinician with his work and in this manner aid the sick.

First I must thank the Deutsche Forschungsgemeinschaft and the World Federation of Neurology which have supported the preparations of the Symposium financially. I would like also to thank the Springer-Verlag, Wien, which has promised to provide publication of our proceedings. It is envisaged that the present group will be established as a working commission for Neuro-Oncology within the World Federation. In this way the contact that is being made will be preserved for the future and further fruitful collaboration will be made possible.

Next I would like to welcome the participants who have agreed to contribute reports to the discussion. First of all I would like to welcome Professor *Hamperl*, Bonn, Chairman of the Nomenclature Commission of the International Union against Cancer who has kindly agreed to provide the introduction to our Symposium. I have been particularly anxious that this Symposium should achieve practical results. One I have already mentioned, I would now like to mention another: I hope that the classification which we shall have worked out will be of value to the International Union against Cancer as a basis for their further endeavours to achieve a uniform international classification. I am very happy that Professor *Hamperl* should also as a general pathologist participate in our discussion. It has always seemed important to me that we should not lose contact with our alma mater and that our discussion should always

remain within the frame work of general cancerology. I am therefore most happy that you have joined us. May I then welcome

Dr. *J. M. Brucher* (Louvain),  
Dr. *W. Calvo* (Valencia),  
Dr. *G. Kersting* (München),  
Dr. *G. Koch* (Münster),  
Dr. *H. Luginbühl* (Bern),  
Dr. *W. Müller* (Köln),

Dr. *M. G. Netsky* (Winston-Salem),  
Dr. *N. Ringertz* (Stockholm),  
Dr. *L. Rubinstein* (New York),  
Dr. *G. P. Sayre* (Rochester),  
Dr. *B. Schiefer* (München),  
Dr. *A. L. Woolf* (Smethwick).

# The Classification of Brain Tumours

By

K. J. Zülch

Before introducing the first speaker may I say a few words of introduction to our subject. I stressed at the beginning that I hoped our discussion would not remain academic but would achieve a practical importance. Of course academic discussion is interesting, inspiring and also important. But those who have worked in close collaboration with neurosurgeons or are actually themselves clinicians feel constantly the need to make their results of value at the bedside. Of what value is the best and most enlightened classification if it has no biological significance, that is if it is not helpful to the clinician in his daily treatment of patients with tumours? We must therefore also take into account the view point of the neurosurgeon at the bedside and I believe this was the special value of the Bailey-Cushing work, that it was formed by the fusion of work carried out in collaboration by the laboratory and the clinic. This approach should and must also underline our own efforts: The survival period for successfully operated patients is the final test as to the correctness of our classification. And it is by this criterion that our classification should be orientated. A purely morphological classification may be absolutely correct from the theoretical angle but if it has no biological significance i. e. if it does not throw light on the prognosis it is for us of little value. But I believe we are all agreed on this and I need not argue the point.

I think I should however enlarge on one point and would like to make a short digression on the history of the classification of brain tumours. It seems to me that the following rule is of the greatest importance: When *Bailey* and *Cushing*\* published their classification, they particularly stressed the demonstration of the most frequently occurring cell types by different methods and particularly by impregnation. By comparison with the cytogenetic stages of maturation they produced a series of groups of apparently mature or immature gliomas in accordance with which the tumour material could be quite comprehensively classified. The number of unclassified cases was small and varied around 5%. They called this a histogenetic classification, although according to their first book it was a pure cytogenetic classification. If one reads the papers of

\* See: *Bailey, P., and H. Cushing, A classification of the glioma group on a histogenetic basis with a correlated study of prognosis.* Lippincott, London, 1926. — *Bailey, P., and H. Cushing, Die Gewebsverschiedenheit der Gliome und ihre Bedeutung für die Prognose.* Fischer-Verlag, Jena, 1930.

*Bailey* which followed there can be no doubting that it was in fact a histogenetic description, because in all his works you will find that he has not been predominantly concerned with descriptions of cells, but with the architecture, with the stroma and with the degenerative changes, in short with all that could be seen in the tumour tissue. This view point has in many schools remained in the background and I believe that it has been the weakness of the *Hortega* school: *Hortega* himself dwelled — as *Bailey* first did in his book with *Cushing* — predominantly on the cell type and based his classification on the individual cell. He arrived in this way at a grouping which was far removed from the actual overall morphological picture and which often had no bearing on the biological behavior. In mitigation one should remember that he received his material from the French neurosurgeon *Vincent* and it was virtually impossible for him to control his classification biologically. This applied equally to his later work in South America.

In general pathology we are used to taking into account the "ensemble" of the characteristics of a tumour when we wish to classify it. We are also used in neuropathology to analyse a tissue according to its individual components and then base our diagnosis on the global picture. Thus we can tell what the cells, the axons, the myelin sheaths and the vessels have contributed to the picture and what degenerative or reparative changes have taken place in these tissue components. I would like once more to stress that it seems important to me that the diagnosis should not only be based on a characteristic of the predominant cell, but on the global picture. The glioblastoma is a particularly good example for such a survey: Here it is not the type of cell, whether it will be round or spindle shaped or polymorphous which is important because these we find in many tumours. What is decisive is the overall picture, i. e. the cellularity, the number of mitoses, the tendency to growth, the degenerative changes, particularly the tendency to necrosis, the participation of the stroma in the form of the pathological vessel changes which we know so well and also the reaction of the stroma and the degenerative processes which give rise to the variegated appearance on the basis of which we make our diagnosis of a multiform glioblastoma.

I will not deny that the nature of definite cells can play an important part in the classification. I even believe that I could lead you in a — considering what I have said — almost paradoxical manner in the course of our Symposium when it comes to the classification of definitely polymorphous oligodendrogliomas. Then I may come back to this point. But I believe we have had enough theoretical introduction and I will now ask our first contributor to speak.

# **I. Classification of Brain Tumours**

## **a) General Remarks on Classification**

### **The Nomenclature of Tumours of the Nervous System**

By

**H. Hamperl**

It has always been clear that the histological types of tumour in man remain the same whatever the epoch and whatever the region. Definite differences affect at the most the incidence — and the name. However, in order to establish differences in the incidence of tumours, it is important to agree on generally recognized names, i. e. a nomenclature which permits a comparison and thereby definite establishment of regional and temporal differences. The International Union against Cancer (UICC) has accordingly undertaken this task and already between the two world wars a Committee of experts was dedicated to this end. The work of the Committee was interrupted through the second world war and was again resumed in 1950. Since 1954 I have had the honour to be the Chairman of this Committee of the UICC which is composed of 8 scientists from all parts of the world. As a result of experience, acquired in the numerous meetings of this body one became convinced that a common histological nomenclature of tumours of the brain could be of value\*.

Firstly all the members of the Committee were amazed at the extent to which the nomenclatures in use at the time differed from one another. This applied not only to the different language groups, but also within a language group to the schools existing at the time. Historical development, the dominating effect of one personality, and similar factors can be reflected during long periods locally in a nomenclature, which, however, outside a particular circle, if not incomprehensible will in the final analysis appear ungrounded.

To alter such national and local peculiarities as it were by decree from above is a heavy and thankless task, because each circle is ultimately persuaded of the rightness of the name it has introduced. One must therefore often content oneself with bracketing together the designations in use in so far as they concern one and the same

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\* See: Unio Internationalis Contra Cancrum: Histological Nomenclature of Human Tumors. "Acta", Vol. XIV, 1958. — Histologische Nomenklatur menschlicher Tumoren. Zschr. Krebsforsch. 63 (1959), 75—98.

tumour type and in this way obtain a better understanding. In this way it is to be hoped that the list of synonyms will in time become narrowed in favour of a single generally accepted name.

It can immediately be appreciated that there can scarcely be any doubt that a classification introduced in the USA will already have the greatest possibility of general acceptance because the excellently edited and cheap American journals have the greatest circulation throughout the world. We should however not hold back from holding fast to another classification if we have used it previously and find it more correct than the American, a view point that our American colleagues have always recognized.

With the passage of time outstanding investigators have put forward for many pathological tumour types names which from their point of view are completely correct but have the disadvantage that they have not become accepted into the language of the country concerned. Under these circumstances nothing remains but to reject such a name. When, however, can one assume that a name has become naturalized? We believe that this is actually the case if such a name becomes taken over in a large collected work or text book — mere recognition of the name by one or another investigator in a communication to a scientific journal does not therefore satisfy us.

The volumes of the tumour atlas produced by the Armed Forces Institute of Pathology, Washington 25, D. C. have been particularly valuable in the creation of a common tumour nomenclature because one can use the excellent microscopical pictures as an aid to understanding, in that one can be persuaded of the similar significance of terms from different classifications where a picture is available. In this respect one must mention the handbook monographs of Zülch\* and Henschen\*\*.

In general, agreement can be easily obtained as to the significance of a classification if it concerns tumours which occur frequently; difficulties appear principally in regard to rare tumours concerning which the individual investigators possess only a small experience. Here it has sometimes been impossible to obtain agreement so that it is better to leave the final clarification and naming to the future, rather than establish now a name likely to be the subject of criticism.

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\* See: Zülch, K. J., Biologie u. Pathologie d. Hirngeschwülste. Hdb. Neurochir., Bd. III, S. 1—702, Springer-Verlag, 1956.

\*\* See: Henschen, F., Tumoren d. Zentralnervensystems u. seiner Hüllen. Hdb. spez. path. Anat. u. Histol. Bd. XIII, Teil 3, p. 438—1040, Springer, Berlin, 1955.

IV. Tumors of nerve tissues and associated structures<sup>1</sup>.

## 1. Nerve cells

Ganglioneuroma }  
 Gangliocytoma }  
 Ganglioglioma }  
 Ganglioneuroblastoma }  
 Malignant ganglioneuroma }  
 Malignant gangliocytoma }  
 Malignant ganglioglioma }  
 Sympathicogonioma }  
 Sympathicoblastoma }  
 Neuroblastoma }

## 3. Eye

Medulloepithelioma of ciliary }  
 epithelium }  
 Diktyoma }  
 Neuroepithelioma }  
 Retinoblastoma }  
 with true rosettes }  
 without true rosettes }

## 5. Peripheral and cranial nerves

Neurinoma. }  
 Neurilemoma }  
 Schwannoma }  
 Neurofibroma \* }  
 Malignant Neurinoma }  
 Malignant Schwannoma }  
 Malignant Neurilemoma }

## 7. Vascular structures of central nervous system

Haemangioma of cerebellum }  
 v. Hippel-Lindau's disease }

## 2. Neuroepithelium

Ependymoma }  
 epithelial }  
 papillary }  
 cellular }  
 Malignant ependymoma }  
 Ependymblastoma }  
 Papilloma of choroid plexus }  
 Plexuspapilloma }  
 Olfactory neuroepithelioma }

## 4. Glia

Astrocytoma }  
 fibrillary }  
 protoplasmatic }  
 gemistocytic }  
 Astrocytoma of the nose }  
 Nasal glioma }  
 Oligodendroglioma }  
 Multiform glioblastoma }  
 Polar spongioblastoma }  
 Medulloblastoma }

## 6. Meninges

Meningioma }  
 epithelioid }  
 meningotheliomatous }  
 endotheliomatous }  
 fibroblastic }  
 fibromatous }  
 psammomatous }

## 8. Paraganglia

Non-chromaffin paraganglioma, }  
 includ. }  
 Carotid body tumor }  
 Glomus caroticum tumor }  
 Chemodectoma }  
 adenomatoid }  
 angiomatoid }

P. S. Some of the very rare and therefore controversial tumors and terms have not been included such as "astroblastoma", "malignant meningioma", "malignant plexus papilloma", "monstrocellular sarcoma" etc.

\* For sarcomas arising from neurofibromas see V/1.

<sup>1</sup> Copied from Pamphlet of the UICC.



From this point of view the commission of the UICC seeks to devise a histological tumour nomenclature which can serve as a means of understanding between the individual investigators and language groups. In this nomenclature are naturally included the tumours of the nervous system. It lies before you in a form modified after consultation with Professor Zülch and it is there only as a basis for your discussion. It is of course natural that the proposed classification as well as the individual names will not satisfy any completely. Each will find defects in one place or another. One should however consider a classification as a compromise that must also be acceptable for all members of the Committee of the UICC.

I would ask you to bear in mind a few general points in relation to any considerations and objections: the whole medical nomenclature is full of classifications, which have arisen from a particular interpretation of a phenomenon. Only too frequently it has later been demonstrated that the interpretation was false when the true nature of the phenomenon became recognised. To the phenomenon however the name with its incorrect implication remained attached. As a classical example we may cite the hypernephroma which we know today without any doubt is not a suprarenal but a renal tumour. I would like therefore first to warn against changing names that have already been introduced simply because we know their basis to be incorrect. Who can guarantee that our own interpretation on which we wish to base the new name will be so correct that it will not be again deemed unsatisfactory by future generations so that a further change of name will again be necessary? If we however all designate the same phenomenon with the same name and the same term we will then have attained the object of every linguistic understanding though we should not light-heartedly introduce new names upon the scene.

The remarks just made apply above all to the repeated histogenetic approaches to the tumours of the nervous system which lie at the basis of the classification brought forward many times by Bailey. If we all for example envisage by medulloblastoma the same type of tumour, then I see no obvious and pressing need to change the name even if the origin of these tumours from medulloblasts is doubtful.

It is very common to apply to the tumours of the nervous system the suffix "blastoma", which usually implies that the tumour cells correspond to the formative cells at a certain stage of embryonic development. Basically the use of the term does not imply that we are dealing with a particularly malignant tumour though, of course,