

History of Peptide Chemistry in Warsaw

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Wydział Chemii
Uniwersytet Warszawski

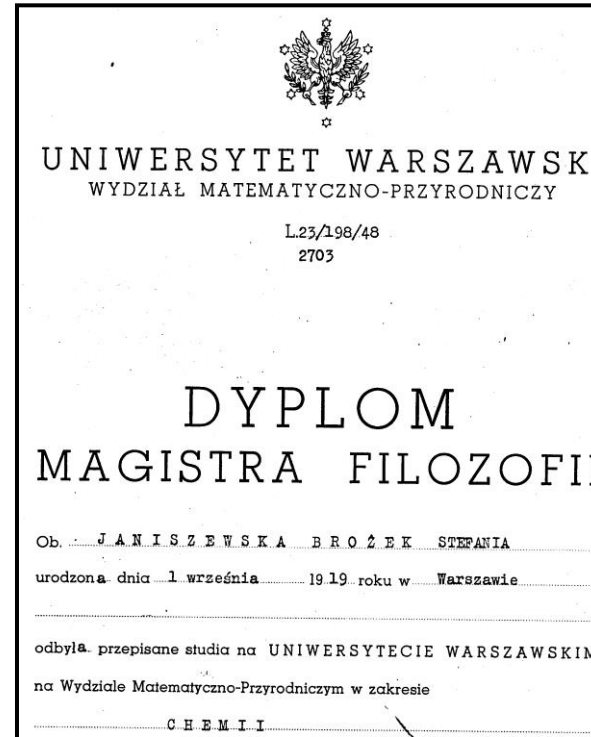
Peptide research at the University of Warsaw began in 1966 with the return of doctor **Stefania Drabarek** from her postdoctoral stay at the Cornell Medical University in New York at Vincent du Vigneaud laboratory

Professor Stefania Drabarek

- 1919 Sept. 1st. - born in Warsaw
- 1937 Graduation of a well-known high school in Warsaw
(Liceum im. Królowej Jadwigi)
- 1937 Acceptance to the University in Warsaw
Department of Mathematics and Natural Sciences
- 1939 Sept. 1st. - beginning of the World War II
- 1942-44 Chemist in Pharmaceutical Company (*ASID*, previously *KLAWE*)
- KLAWE* was the world-famous Polish pharmaceutical company, which at the beginning of the WW II, in 1940, was taken over by the German company *ASID*.
- Klawe's family recovered the company after the war in 1945, but only for a short time because *KLAWE* was nationalized in 1946 and became *POLFA*
- 1944 Aug 1st. - The outbreak of the Warsaw Uprising - she managed to escape from the transport to a concentration camp
- 1944 Secret teaching (tajne nauczanie) in a high school in Żyrardów
- 1945-48 Continuation of studies at the University of Warsaw
- 1946 Assistant at University of Warsaw, Medical Department
- 1948 Master degree (July 13th)



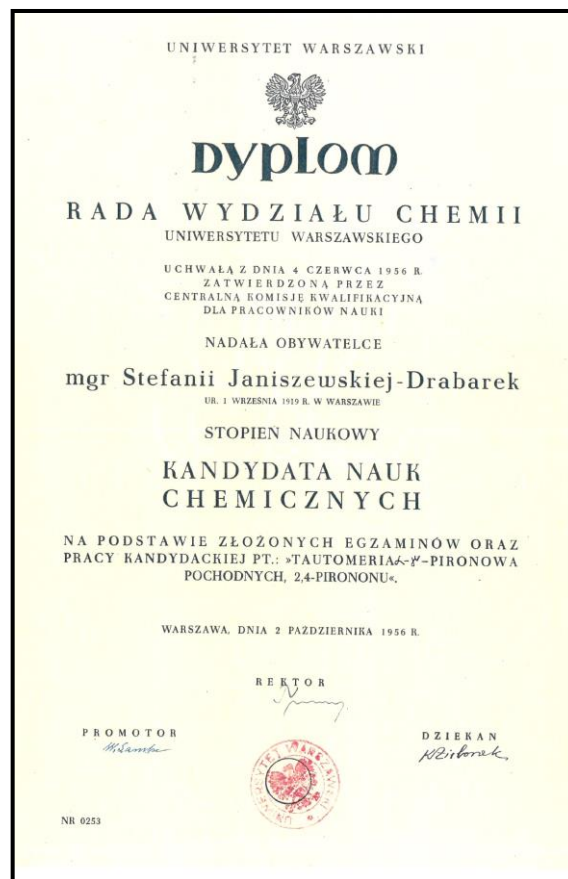
Stefania Drabarek, master certificate



Master degree certificate

Department of Mathematics and Natural Sciences

Stefania Drabarek, PhD – 1956



PhD certificate (Kandydat Nauk Chemicznych)
„Tautomerism of 2,4-pironon derivatives”

Promotor – Professor Lampe

Stefania Drabarek, PhD

1961 She received grant under the Government of the United States Educational Program and Fulbright Travel grant

1961-63 post-doc position in Vincent du Vigneaud laboratory



On the “Batory” – ship, which ran on the Gdynia-New York line

Vincent du Vigneaud

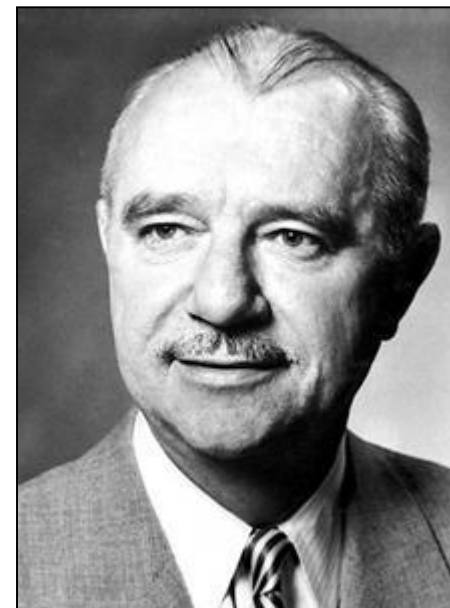
Cornell Medical University in New York

Vincent du Vigneaud (1901-78)

Laureate of Nobel Prize in Chemistry in 1955 - *"for work on biochemically important sulphur compounds, especially for the first synthesis of polypeptide hormones oxytocin and vasopressin"*

Stefania Drabarek worked in Vincent du Vigneaud (VdV) laboratory with:

Maurice Manning,
Georges Flouret,
Iphigenia Photaki,
Victor J Hruby,
Miklos Bodanszky,
and others



Stefania Drabarek, PhD

1961-62 post-doc position in du Vigneaud laboratory
results were published in 5 publications
first 3 publications were presented in habilitation thesis

J Biol Chem. 1963 238(4):1560-1561

Effect of replacement of carboxamide group by hydrogen in glutamine or asparagine residue of oxytocin on its biological activity

Du Vigneaud V, Denning GRS, **Drabarek S**, Chan WY.

J Am Chem Soc. 1964 86(120):4477-81

Analogs of oxytocin containing glycine in place of tyrosine isoleucine or glutamine

Drabarek S.

J Biol Chem. 1964 239:472-78

The synthesis and pharmacological study of 4-decarboxamido-oxytocin (4-alpha-aminobutyric acid-oxytocin) and 5-decarboxamido-oxytocin (5-alanine-oxytocin).

Du Vigneaud V, Denning GRS jr, **Drabarek S**, Chan WY.

J Am Chem Soc. 1965 87(17):3974-78.

2-D-tyrosine-oxytocin and 2-D-tyrosine-deamino-oxytocin diastereoisomers of oxytocin and deamino-oxytocin.

Drabarek S, Du Vigneaud V.

J Biol Chem. 1966 241(11):2572-75.

The synthesis and pharmacological properties of deamino-4-decarboxamido-oxytocin (1-beta-mercaptopropionic acid-1-alpha-aminobutyric acid-oxytocin).

Branda LA, **Drabarek S**, Du Vigneaud V.

Stefania Drabarek, PhD, DSc.

1964 DSc "Structure activity relationship of peptidic hormone oxytocin"

1965 Award for habilitation (Minister of Higher Education)

(GODŁO PAŃSTWOWE) ODPIS

POLSKA RZECZPOSPOLITA LUDOWA

UNIWERSYTET WARSZAWSKI

WYDZIAŁ *Chemii*

DYPLOM


OBYWATELKA *Stefania DRABAREK*
DOKTOR *nauk chemicznych*
URODZONA DNIA *1 września* 1919 ROKU
W *Warszawie*


NA PODSTAWIE OCENY OGÓLNEGO DOROBKU NAUKOWEGO
I PRZEDŁOŻONEJ ROZPRAWY HABILITACYJNEJ POD TYTUŁEM
*"Badania zależności pomiędzy budową chemiczną a
działaniem biologicznymi hormonu peptydowego oksytocyny."*
UZYSKAŁA STOPIEŃ NAUKOWY


DOCENTA

W ZAKRESIE *chemii organicznej*
NADANY UCHWAŁĄ RADY WYDZIAŁU *Chemii Uniwersytetu
Warszawskiego*
Z DNIA *26 października* 1964 ROKU

Warszawa, DNIA *4 grudnia* 1968 ROKU

REKTOR 
PROF. DR. STANISŁAW TLUŚCY



DZIEKAN 
PROF. DR. JAN ŚWIERCKI


NR *12*

NAGRODA

MINISTRA SZKOLNICTWA WYŻSZEGO
INDYWIDUALNA STOPNIA *trzeciego*
PRZYZNANA ZOSTAŁA

OBYWATELCE
Doc. dr Stefani Drabarek
ZA SZCZEGÓLNE OSIĄGNIĘCIA
W DZIEDZINIE
*badani naukowych
za pracę habilitacyjną pt.
"Badania zależności pomiędzy budową
chemiczną a działaniem biologicznym
hormonu peptydowego oksytocyny"*

WARSZAWA, DNIA *1* MIESIĄCA *października* 1965 ROKU

MINISTER


Peptide Laboratory 1966

The Peptide Laboratory was officially established in 1966, the first members of this group were:

Jan Izdebski, PhD

Alicja Orłowska, M.Sc.

Stefania Klimkiewicz, M.Sc.

Jacek Pełka, M.Sc.

It was a difficult time, not many chemicals were available, amino acids had to be extracted from natural sources (e. g. cysteine from hair), next protecting groups had to be introduced what allowed peptide synthesis in solution, and later on solid support.

Slowly, under the supervision of Professor Drabarek members of Peptide Laboratory have gained knowledge and experience in the synthesis of peptides.

Next new members joined the peptide group:

Krzysztof Bańkowski

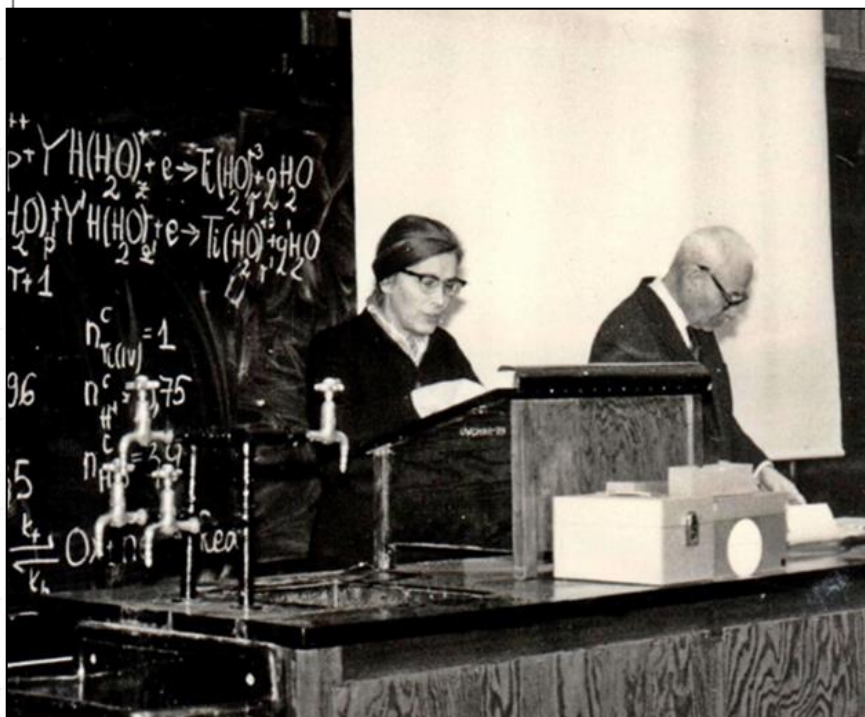
Andrzej W. Lipkowski

Teresa Wachal

Teresa Kubiak

and others...

Professor Stefania Drabarek



1966 – Head of the Peptide Laboratory

1969-1973, 1978 - 80 Head of the Organic Chemistry Department

1967-1972 Vice-Dean of the Chemistry Department

8th European Peptide Symposium, The Netherlands 1966

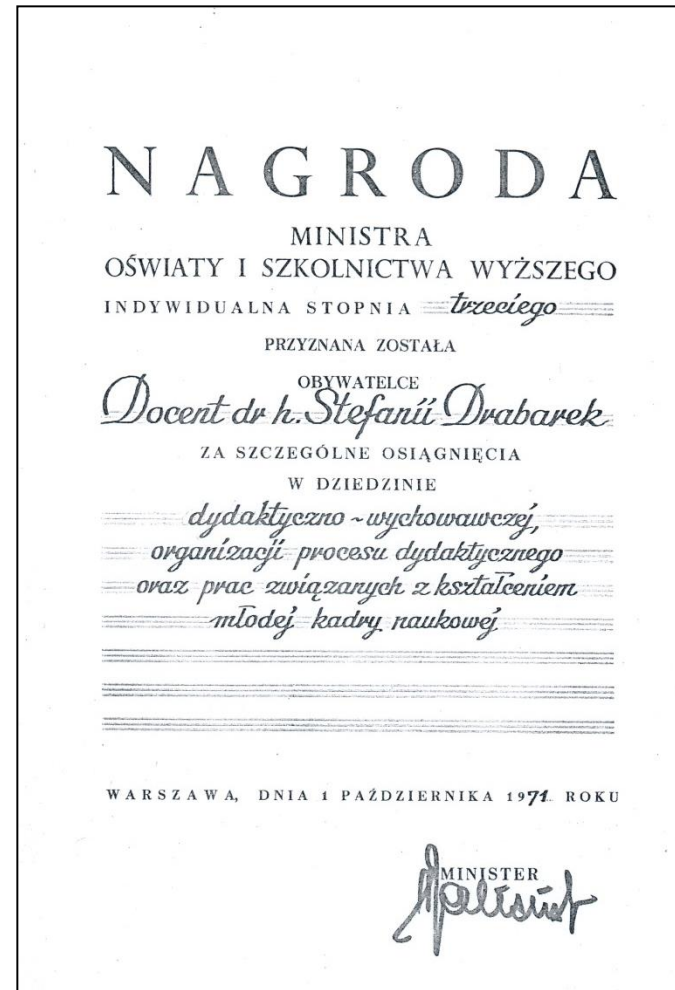
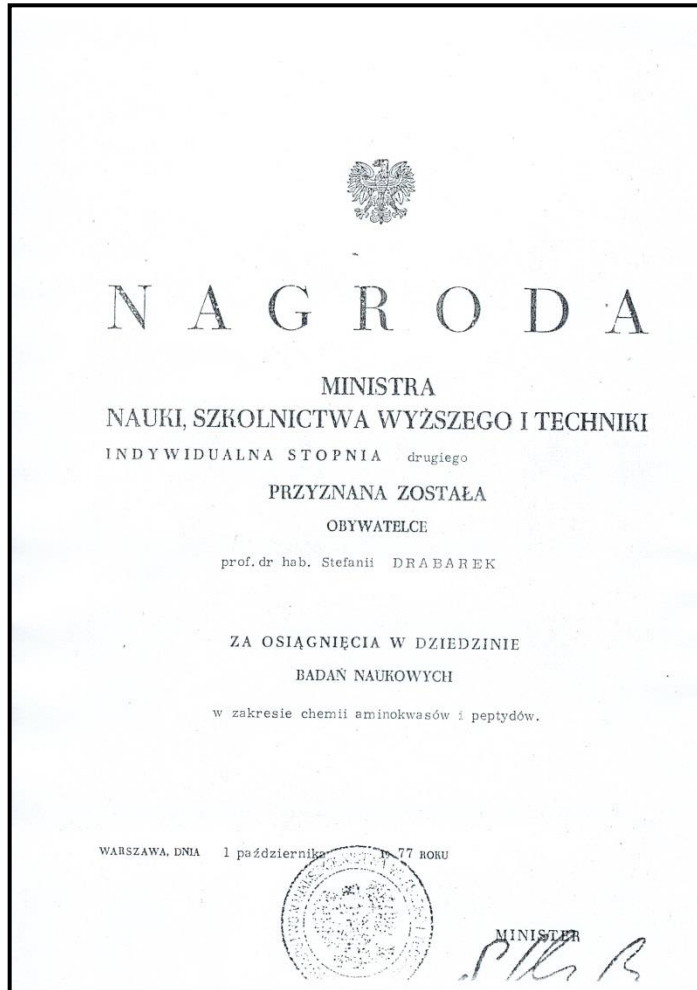


Stefania
Drabarek

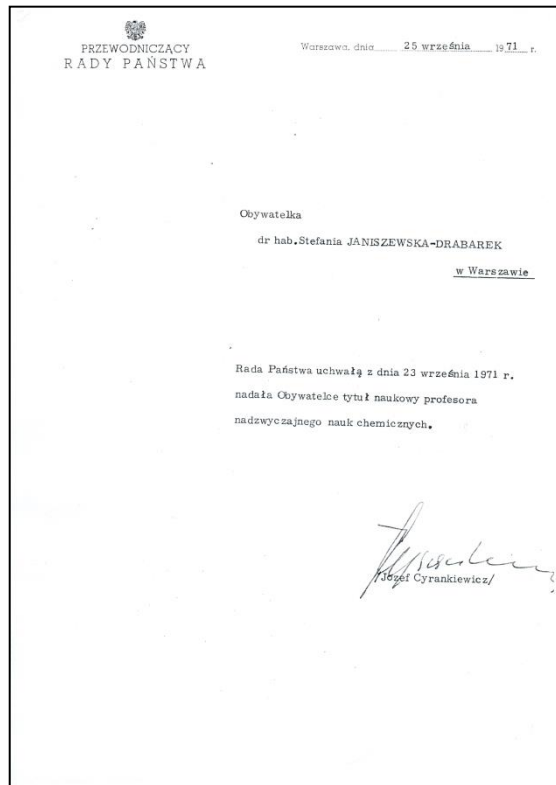
Iphigenia
Photaki

Miklos
Bodanszky

Ministry Awards for Research and for Teaching



Professor Stefania Drabarek, 1971



State Council certificate for Professor Nomination (title) signed by the Prime Minister (Cyrankiewicz)



Stefania Drabarek, PhD, DSc
Visiting Professor in Karl Hoffman Laboratory 1972-73

**Protein Research Laboratory, University of Pittsburgh,
School of Medicine, Pittsburgh, US**

She participated in the trials of the extremely ambitious project at that time – a total chemical synthesis of the protein - consisting of 104 amino acids of the ribonuclease T1, her successful synthesis was the 39-amino acid peptide of the enzyme fragment 66-104.



Photo by Associated Photographers, Pittsburgh, Pennsylvania.

Karl Hoffman

Int J Pept Protein Res. 1974, 6(6):435-45.

Studies on polypeptides. LIII. Synthesis of a cysteine protected nonatricontapeptide corresponding to positions 66-104 of the peptide chain of ribonuclease T1.

Romovacek H, **Drabarek S**, Kawasaki K, Dowd SR, Obermeier R, Hofmann K.



19th European Peptide Symposium, Gdańsk 1978

First EPS held in Poland organized by prof. Kupryszewski



PhD's mentored by Professor Drabarek



1974 Krzysztof Bańkowski

1974 Alicja Orłowska

1975 Stefania Klimkiewicz

1976 Marianna Kańska

1976 Andrzej W. Lipkowski

1976 Teresa Wachal

1977 Elżbieta Baran

1977 Krystyna Midura-Nowaczek

1978 Teresa Kubiak

1978 Maria Pachulska

1980 Tadeusz Majewski

1980 Aleksandra Misicka



First scientific experiences abroad...

Professor Drabarek had contacts with her colleagues from the du Vigneaud laboratory and with her recommendation several of her students could get post-doc positions in different US Universities.

Dr Jan Izdebski - Case Western Reserve University (Cleveland, Ohio), with Professor **Miklos Bodanszky**

Dr Krzysztof Bańkowski - Medical College of Ohio (Toledo, Ohio), with Professor **Maurice Manning**

Dr Andrzej W. Lipkowski - Northwestern University (Chicago, Illinois), with Professor **Georges Flouret**

Dr Teresa Kubiak - Texas University (Austin, Texas), with Professor **Karl Folkers**

Dr Marianna Kańska - University of Arkansas (Fayetteville, Arkansas), with Professor **Artur Fry**

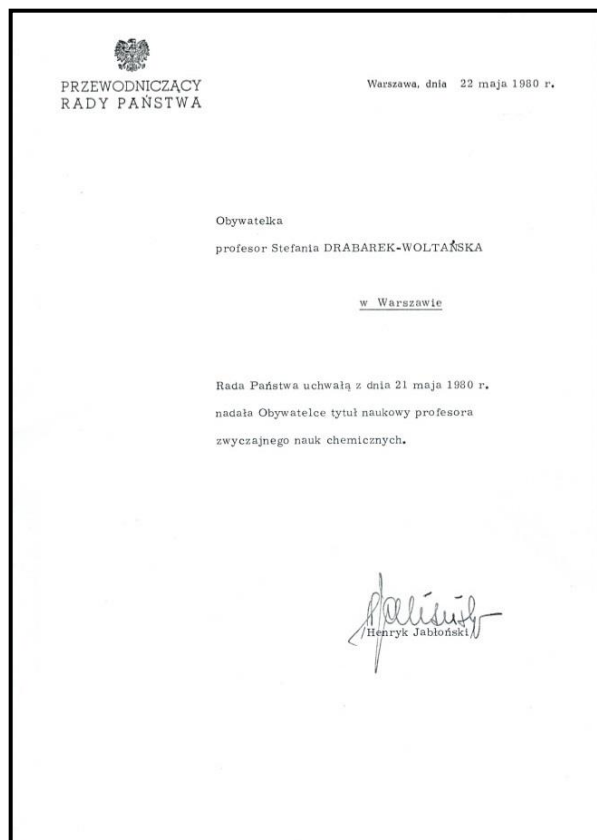
Professor Stefania Drabarek and Solidarity movement

Professor Drabarek strongly supported Solidarity movement since its very beginning (1980), and during the martial law.

As a Solidarity member, she participated in a memorable strike that took place at the Universities.

Krzysztof Bańkowski recalled that she gave us, at the beginning of the martial law, her private typewriter, which was used for typing various leaflets and Underground Solidarity newspapers.

Professor Stefania Drabarek



State Council Certificate of Full
Professor Nomination (title)

Professor Drabarek retired in 1981 and due to her personal reason she moved to Chicago.

Many of us had the opportunity to meet the hospitality of her home in Chicago, where she always waited for news from Poland and from Chemistry Department.

Sometimes she was visiting us during our stays in US.

Visit in Maurice Manning laboratory in Toledo, USA (1985)



Scientific experience of some peptide laboratory members

Teresa Kubiak – PhD 1978, post-doc at Austin University with Professor Folkers (1980-83), next Rockefeller University with Professor Merrifield (1983-87), next scientist in The Upjohn Company, Farmacia, Pfizer, now retired

Krystyna Midura-Nowaczek – PhD 1977, post-doc at Texas University with Professor Folkers, she next moved to the branch of Warsaw University in Białystok, **1988 DSc, 2011 Professor Nomination**, now a Head of Department of Organic Chemistry at Białystok Medical University

Elżbieta Baran – PhD 1979, post-doc at Texas University with Professor Folkers, next was a chemistry teacher in Botswana

Marianna Kańska PhD-1977 post-doc at University of Arkansas with Professor Fry, **1992 DSc, 2004 Professor Nomination**, now retired

Tadeusz Majewski – PhD 1979, post-doc at Northwestern University in Chicago with Professor Flouret, now at The University of Texas MD Anderson Cancer Center, Houston, Texas, US as a MS specialist

Maria Pachulska – PhD 1980, post-doc at Austin University with Professor Folkers, now at the Didactic Laboratory at Warsaw University

Aleksandra Misicka, PhD 1981, post-doc at Medical College of Ohio with Professor Manning, next research associate at University of Arizona with prof. Victor J. Hruby, at Vrije Universiteit Brussels with Professor Georges Van Binst, and at Kyoto University with Professor Masaaki Yoshikawa, **1999 DSc, 2013 Professor Nomination**,

Recently - invited professor at Université Paris 13, Paris, France with Professor Gerard Perret
visiting scholar with Professor Manning at University of Toledo

Now: Head of The Peptide Laboratory at Warsaw University (from 2008) and Head of The Neuropeptide Laboratory in Medical Research Centre Polish Academy of Sciences (from 2015)

Professor Jan Izdebski

Head of Peptide Laboratory 1981-2008

1965, PhD – Promotor Professor Jan Świdorski, 1979 DSc, Professor Nomination 1991

1967-68 Post-doc at Case Western Reserve University, Cleveland , with Professor **Miklos Bodanszky**

1980-81 Research associate at University California, San Francisco with Professor **Cho H. Li**

1994-95 Visiting professor at Tulane University, New Orleans with Professor **Andrew W. Schally**



Research Interests:

Synthesis of growth hormone-releasing hormone (GH-RH) agonist

Cyclic analogs of opioid peptides containing ureido bridge

Studies on DCC coupling method with the use of different additives –

ethyl 2-hydroximino-2- cyanoacetate (now OXYMA)

Professor Andrzej W. Lipkowski (1946-2014)

PhD 1976, DSc 1984, Professor Nomination 2001

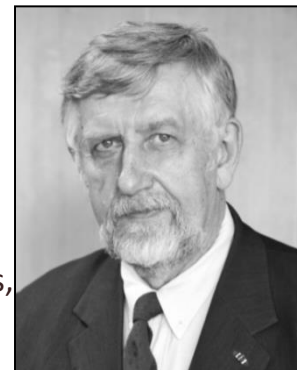
1977-78 Post-doc at Northwestern University (Chicago, USA) with Professor **George Flouret**

1983 Research fellow at the Max Planck Institute for Psychiatry (Munich, Germany) with Professor **Albert Herz**

1986-88 Research fellow at University of Minnesota with Professor **Philip Portoghese** (Minneapolis,

1988 Research fellow at University of Arizona (Tucson, USA) with Professor **Victor Hruby**

1990 Visiting scholar at Tufts University School of Medicine (Boston, USA) with anesthesiologist **Dan Carr**



Andrzej designed and synthesized "biphalin" - a dimeric enkephalin analogue, which is 1000 times more potent than morphine when administered intrathecally.

While working in Portoghese's lab, Andrzej synthesized the famous norbinaltorphimine (norNBI), a κ -selective antagonist used in most laboratories involved in opioid research to the present day.

1993-2010 Head of the Biotechnology Department at the **Industrial Chemistry Research Institute** in Warsaw

1991 Head of the Department of Neuropeptides in **Medical Research Centre Polish Academy of Science** and from 2010 a **Director** of this Institute.

Andrzej had extensive knowledge of chemistry, pharmacology and medicine and was an extremely kind and modest person with an outstanding mind.

We miss Him a lot...

Dr Krzysztof Bańkowski (1945-2017)

1974 PhD

1977-78 post-doc in Medical College of Ohio, Toledo with Professor **Maurice Manning**
Working in synthesis of oxytocin and vasopressin analogs

After returning to Poland, Krzysztof shared with all of us his experience and knowledge about solid phase peptide synthesis, which was at that time new for us.

Krzysztof returned to Professor Manning several times what resulted in over a dozen publications. The last one (2015) concerned the future perspective of peptide therapeutics.

1992-2016 Farmaceutical Institute in Warsaw

Development of production technologies for several active drugs, including Leuprolid, an anticancer drug.

Krzysztof had been an excellent teacher and scientist, for many years involved in the work of the Chemistry Olympiad, always friendly and helpful in solving chemical problems...

We will miss Him a lot...



Professor Stefania Drabarek (1919-1999)

Krzysztof Bańkowski
Alicja Orłowska
Stefania Klimkiewicz
Andrzej Lipkowski
Teresa Wachal
Marianna Kańska
Krystyna Midura-Nowaczek
Elżbieta Baran
Teresa Kubiak
Maria Pachulska
Tadeusz Majewski
Aleksandra Misicka
Ewa Witkowska



Professor Drabarek was a pioner of peptide chemistry in Warsaw, but she will be remembered not only because of her peptide achievements but because she was a good boss, always taking care of her collaborators, always elegant and charming, until the end...