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Asima Chatterjee: India’s First Woman with a Doctorate of Science

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Asima Chatterjee: India’s First Woman with a Doctorate of Science

How did a chemist from Calcutta turn forest plants into medicines? Asima Chatterjee studied the chemicals inside Indian medicinal plants. In 1944 she became the first woman to earn a Doctorate of Science from an Indian university. Her work led to drugs that doctors still use.

1 Who was Asima Chatterjee?

Asima Chatterjee was an Indian organic chemist. She worked on natural products, which are chemicals made by plants. Her maiden name was Mukherjee.



Bust of Dr. Asima Chatterjee at the Birla Industrial and Technological Museum, Kolkata. No free photograph of her is available, so the memorial bust is shown. CC BY-SA 4.0, via Wikimedia Commons.

Where did she come from?

- She was born in Calcutta on 23 September 1917.

- She graduated with honours in chemistry from Scottish Church College in 1936.
- She took her MSc from the University of Calcutta in 1938.
- Her research guide was Prafulla Kumar Bose, a pioneer of natural product chemistry in India.

When did she die?

She died in Kolkata in November 2006. Sources give 22 and 24 November, so the exact day is not fixed.

What is the memory hook?

Think “1917 born, 1944 doctor”. Plants were her laboratory.

> **Quick check 1.** Asima Chatterjee was born in Calcutta in 1917. *(True or False?)* See answer ↓

Sources: insaindia.res.in; feminisminindia.com

2 Why was 1944 a first?

In 1944 Asima Chatterjee earned the Doctorate of Science of the University of Calcutta. Sources call her the first woman to earn that degree from an Indian university.

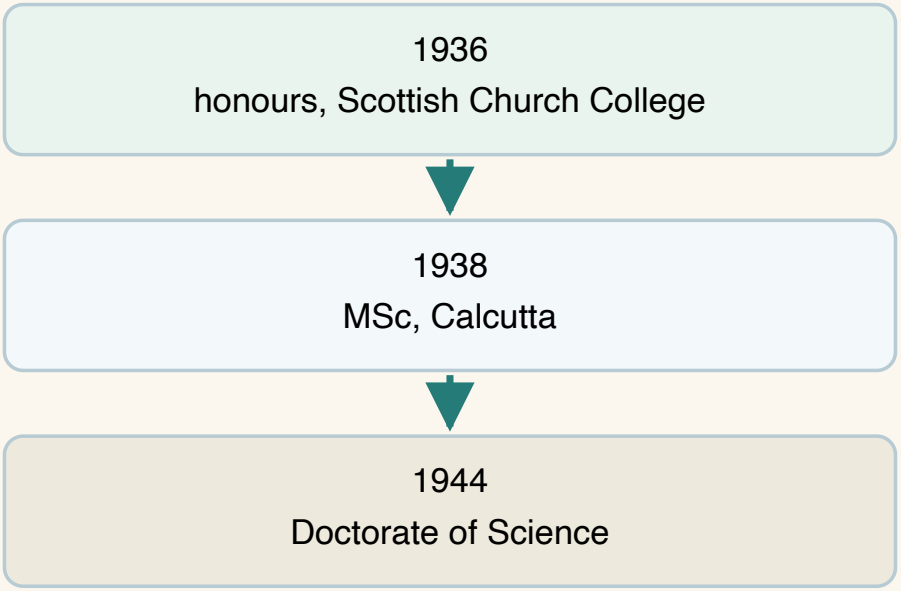
What was her thesis about?

Her work covered indole alkaloids and coumarins. Both are groups of chemicals found in plants.

What is a Doctorate of Science?

It is a higher degree than the usual doctorate. A university gives it for a body of research work. Do not mix it up with a PhD.

Where did she teach first?



Three steps to the doctorate. Original explanatory diagram.

- In 1940 she became the founder head of the chemistry department at Lady Brabourne College, Calcutta.
- In 1944 she also became an honorary lecturer at the University of Calcutta.

What is the memory hook?

Think “DSc, not PhD”. The degree was Indian, and the year was 1944.

> **Quick check 2.** Her 1944 degree was a Doctorate of Science from the University of Calcutta. *(True or False?)* See answer ↓

Sources: insaindia.res.in; artsandculture.google.com; cmeindia.in

3 What did she study?

Her main field was alkaloids. Alkaloids are bitter chemicals found in plants. Many of them act on the body, so they make useful medicines.

Which plants did she work on?

Her pioneering work covered the alkaloids of Rauwolfia, Vinca, Alstonia, Rhazya and Kopsia. Vinca is the Madagascar periwinkle.

What did she do abroad?

- She went to the USA on study leave in 1947.
- She worked on plant glycosides at the University of Wisconsin.
- She then worked on carotenoids at the California Institute of Technology.
- In 1949 and 1950 she worked with Paul Karrer at Zurich on indole alkaloids.

What did she add to the field?

She worked out the structures of several alkaloids. She also found a new way to make some of them in the laboratory.

What is the memory hook?

Think “plants, then pills”. She first found the chemical, then tested it as a drug.

Quick check 3. Her main field was the study of plant alkaloids. *(True or False?)* See answer ↓

Read further: INSA memoir; Feminism in India

4 Which drugs did she make?

Chatterjee developed two plant-based drugs. They are known by the codes Ayush-56 and Ayush-64.

What is Ayush-56?

- It is an anti-epileptic drug.
- It comes from the water fern *Marsilea minuta*, together with *Nardostachys jatamansi*.
- Its active chemical in the water fern is called marsilin.
- Marsilin is a sedative that helps control fits.

What is Ayush-64?

- It is an anti-malarial drug.
- It combines parts of four herbs.
- It is a mixture, not a single chemical.

Who owns the patents?

The Central Council for Research in Ayurveda and Siddha holds the patents. It works under the Ministry of Health and Family Welfare. Several companies sell the drugs.

What is the memory hook?

Think “56 for fits, 64 for malaria”. Both come from plants.

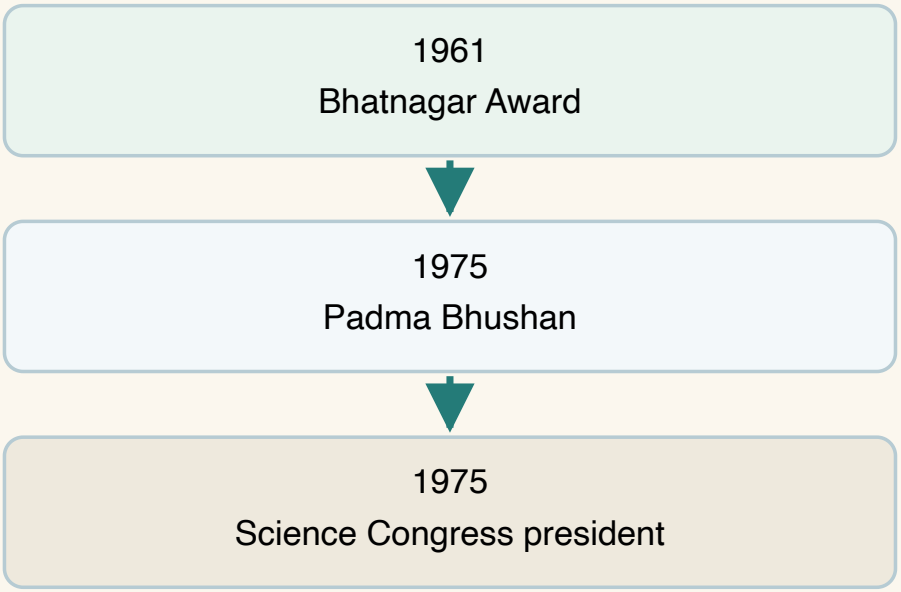
Quick check 4. Ayush-56 is an anti-malarial drug. *(True or False?)*

See answer ↓

Sources: insaindia.res.in; cmeindia.in

5 What honours did she win?

She won the top science prize of India in 1961. Other honours came in 1975.



Three honours in two years. Original explanatory diagram.

Which honours came when?

- **1960:** she became a Fellow of the National Institute of Sciences of India, now the Indian National Science Academy.
- **1961:** she won the Shanti Swarup Bhatnagar Award for chemistry.

- **1975:** she received the Padma Bhushan.
- **1975:** she was General President of the 62nd Indian Science Congress.
- **1982 to 1990:** she sat in the Rajya Sabha as a nominated member.

Which of these were firsts?

Sources call her the first woman to win the Bhatnagar award in chemistry. They also call her the first woman General President of the Indian Science Congress.

What is the memory hook?

Think “61 prize, 75 two honours”. Bhatnagar first, then Padma Bhushan and the Congress.

> **Quick check 5.** She won the Shanti Swarup Bhatnagar Award in 1961. *(True or False?)* See answer ↓

Sources: insaindia.res.in; cmeindia.in; artsandculture.google.com

6 How did she lead others?

She spent most of her working life at the University of Calcutta. She trained scores of research students there.

What posts did she hold?

- In 1954 she became Reader in chemistry.
- In 1962 she became the Khaira Professor of Chemistry. She held this chair until she retired in 1982.
- From 1969 to 1979 she headed the chemistry department.

What did the department gain?

Under her the department became a leading centre for natural product research. In 1972 the University Grants Commission began a special assistance programme there. She was its coordinator. It grew into a Centre of Advanced Studies on Natural Products.

What else did she write?

She edited a six-volume Bengali work on Indian medicinal plants, called *Bharater Bonousadhi*. It won a gold medal of the University of Calcutta in 1981.

What is the memory hook?

Think “Reader 1954, chair 1962”. She led the department for ten years.

> **Quick check 6.** She held the Khaira Professor chair of chemistry from 1962 until 1982. *(True or False?)* See answer ↓

Sources: insaindia.res.in; thebetterindia.com

7 What are the common exam traps?

Four mix-ups come up again and again. Learn each pair.

What are the traps?

- **DSc or PhD?** Her 1944 degree was a Doctorate of Science, from an Indian university.
- **Which drug?** Ayush-56 is for epilepsy. Ayush-64 is for malaria.
- **Which plant?** Ayush-56 comes from the water fern *Marsilea minuta*. Do not confuse it with periwinkle.

- **Which year?** The Bhatnagar award came in 1961. The Padma Bhushan came in 1975.

How do you remember them?

Think “DSc 44, Bhatnagar 61, Padma 75”. Fits and malaria stay in order.

> **Quick check 7.** Asima Chatterjee won a Nobel Prize for her work on drugs from plants. *(True or False?)* See answer ↓

Sources: insaindia.res.in; cmeindia.in

Practice MCQs

1. Asima Chatterjee is known for becoming the first Indian woman to achieve what, in 1944?

A. A seat in Parliament

B. A Nobel Prize

C. An Olympic medal

D. A Doctorate of Science, from the University of Calcutta

See answer ↓

2. Which plant gave Asima Chatterjee the anti-epileptic drug Ayush-56?

A. Rauwolfia serpentina

B. Vinca rosea

C. Alstonia scholaris

D. Marsilea minuta

See answer ↓

3. In which year did Asima Chatterjee win the Shanti Swarup Bhatnagar Award?

A. 1961

B. 1944

C. 1975

D. 1982

See answer ↓

4. Ayush-64, developed by Asima Chatterjee, is used against which disease?

A. Tuberculosis

B. Epilepsy

C. Cancer

D. Malaria

See answer ↓

5. In 1975 Asima Chatterjee became General President of which body?

A. Indian Science Congress

B. Council of Scientific and Industrial Research

C. Indian Chemical Society

D. Indian National Science Academy

See answer ↓

Answer Key

1. **D.** The answer is a Doctorate of Science from the University of Calcutta, in 1944. Sources call her the first woman to earn that degree from an Indian university. A Nobel Prize, an Olympic medal and a seat in Parliament are not what the question asks. Memory hook: DSc in 1944. ↑ Q1
2. **D.** The answer is the water fern Marsilea minuta. It gives a sedative called marsilin, which helps control fits. Rauwolfia, Alstonia and periwinkle were studied for alkaloids, not for this drug. Memory hook: fern for fits. ↑ Q2
3. **A.** The answer is 1961. She won it for chemistry. 1944 is the year of her doctorate. 1975 brought the Padma Bhushan. 1982 is the year she retired. Memory hook: Bhatnagar 61, Padma 75. ↑ Q3
4. **D.** The answer is malaria. Ayush-64 combines parts of four herbs. Ayush-56 is the one for epilepsy. The other two diseases are not linked to these drugs. Memory hook: 56 for fits, 64 for malaria. ↑ Q4
5. **A.** The answer is the Indian Science Congress. She led its 62nd session in 1975. Sources call her the first woman in that role. Memory hook: 1975, Congress and Padma. ↑ Q5

Quick-check answers

1. **True.** She was born on 23 September 1917. ↑ 1
2. **True.** Sources call her the first woman to earn it from an Indian university. ↑ 2
3. **True.** She worked on Rauwolfia, Vinca, Alstonia and other plants. ↑ 3
4. **False.** it is false. Ayush-56 is for epilepsy. ↑ 4
5. **True.** It was for chemistry. ↑ 5
6. **True.** She retired from it in 1982. ↑ 6
7. **False.** it is false. She never won a Nobel Prize. ↑ 7

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