

Information Sheet for Teachers: Marie Maynard Daly (1921–2003)

This information sheet is designed for teachers only.

Marie Maynard Daly (1921–2003) was the first African American woman to obtain a PhD in chemistry in the United States. She was passionate about increasing the numbers of minority students in medical school and graduate science programmes. In 1988, to honour her father, she set up a fund for African American science students at Queens College (New York). This was because her father had to drop out of his bachelor's degree in chemistry at Cornell University due to a lack of funds.

Marie Maynard Daly's early research included studying the effects of cholesterol on the arteries. Later, she studied how proteins are produced and organised within the cell.

In the KS5 chemistry national curriculum, students' study 'reactions classified as... addition polymerisation and condensation polymerisation'. This aspect of the curriculum has a direct link to Marie Maynard Daly's work on proteins as amino acids undergo condensation reactions to form proteins. Her work also links to the biology curriculum.

Marie Maynard Daly's work shows a clear link to the national curriculum and her contributions can be incorporated without difficulty.

Marie Maynard Daly (1921-2008)

Marie Maynard Daly was born in Queens, New York in 1921. Watching her father study for his bachelor's degree in chemistry at Cornell University sparked her interest in chemistry. However, due to lack of funds, he had to drop out and returned to New York City, where he worked as a postal clerk.

Marie Maynard Daly studied at Hunter College High School. She then went to Queens College, New York, and graduated *magna cum laude* (with great distinction) in 1942 with a bachelor's degree in chemistry. She was offered a fellowship by the college to study for a master's degree in chemistry and completed it in just one year. Whilst studying for her masters, she also worked part-time as a laboratory assistant at Queens College.



Marie Maynard Daly working in her lab, ca. 1960
Picture Credit: Archives of the Albert Einstein College

After completing her masters, she worked for a year tutoring chemistry students at Queens College. She then

started her PhD at Columbia University, where Mary L. Caldwell, who was known for working on the digestive enzyme amylase, instructed her. The title of Marie Maynard Daly's thesis was "A Study of the Products Formed by the Action of Pancreatic Amylase on Corn Starch." She researched how compounds produced in the body affect and participate in digestion. In 1947, in just three years, she completed her PhD. She became the first African American woman to obtain a PhD in chemistry in the United States.

Marie Maynard Daly taught for two years at Howard University in Washington, DC, after she had completed her PhD. The American Cancer Society offered Marie Maynard Daly a grant to join the Rockefeller Institute in New York, where she worked on the composition and metabolism of components of the cell nucleus, among other studies for seven years. She worked alongside Alfred E. Mirsky, a pioneer in molecular biology. In 1960 Marie Maynard Daly became a professor at the Albert Einstein College of Medicine, where she remained until her retirement in 1986. Marie Maynard Daly was passionate about increasing the numbers of minority students in medical school and graduate science programmes. In 1988, to honour her father, she set up a fund for African American science students at Queens College.

Reference:

<https://www.sciencehistory.org/historical-profile/marie-maynard-daly>

Marie Maynard Daly

First African American woman to obtain a PhD in chemistry in the United States

ABOUT

Marie Maynard Daly was born in Queens, New York in 1921. Watching her father study for his bachelor's degree in chemistry at Cornell University sparked her interest in chemistry. However, due to lack of funds, he had to drop out and returned to New York City, where he worked as a postal clerk. During her PhD at Columbia University, she researched how compounds produced in the body affect and participate in digestion. In 1947, in just three years, she completed her PhD. She became the first African American woman to obtain a PhD in chemistry in the United States. In 1960 Marie Maynard Daly became a professor at the Albert Einstein College of Medicine, where she remained until her retirement in 1986.



Columbia University in the United States

Did you know?

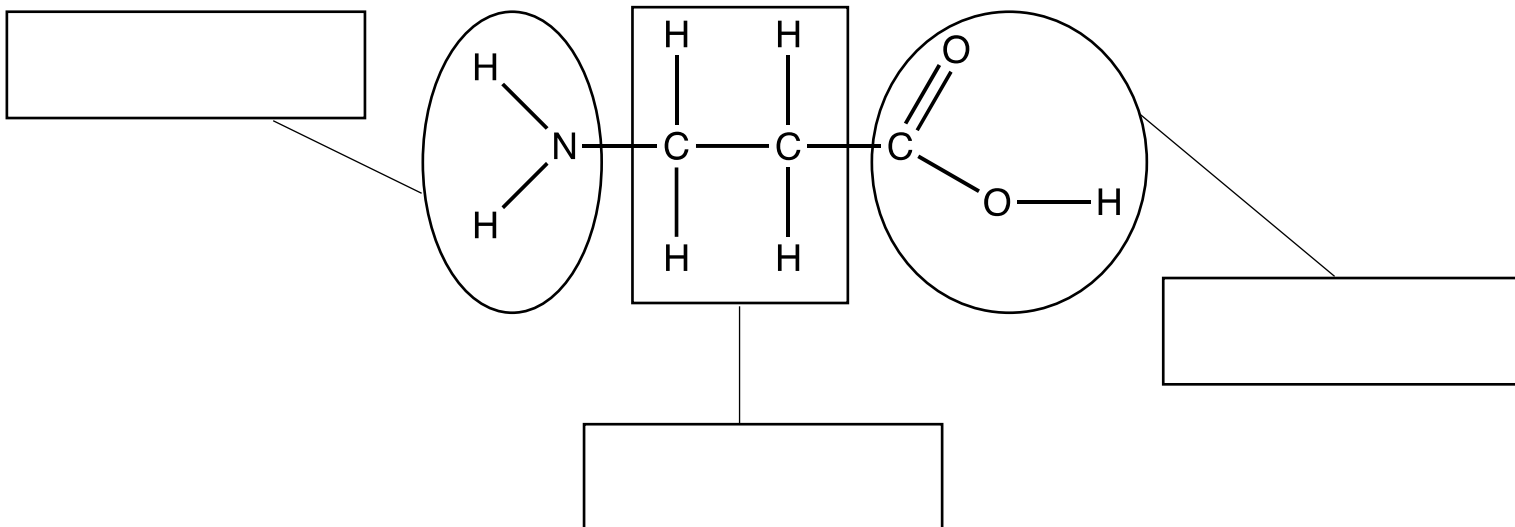
In 1942 she went to Queens College, New York, and graduated magna cum laude (with great distinction) with a bachelor's degree in chemistry.

She was offered a fellowship by the college to study for a master's degree in chemistry and completed it in just one year.

In 1988, to honour her father, she set up a fund for African American science students at Queens College.

Amino Acids Activity (easy)

1. The structure shown below, is an amino acid. Label the functional groups present in this molecule.



2. What is the name of reaction that amino acids undergo, to become proteins?

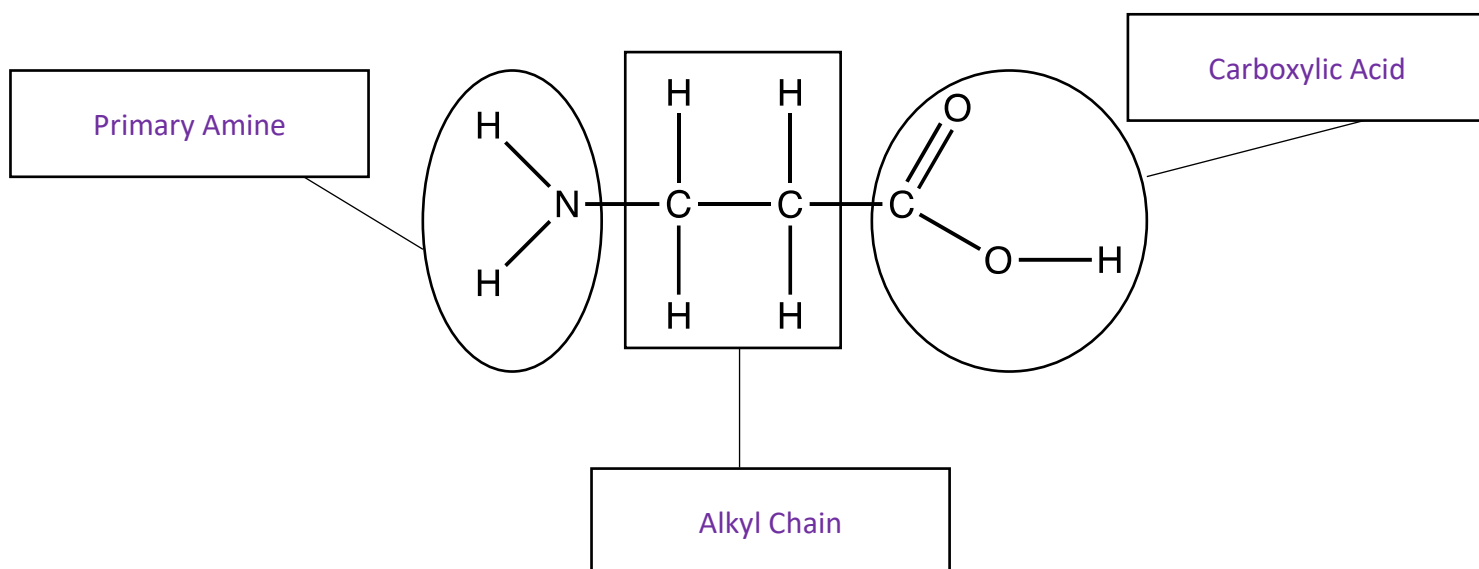
3. What is the name of the bond formed when two or more amino acids are joined together?

Marie Maynard Daly (1921-2003) was an African American biochemist who was the first African American woman to earn a PhD in America. Her research focused on proteins, sugars, and cholesterol. She was passionate about increasing the numbers of minority students in medical school and graduate science programs. In 1988, to honour her father, she set up a fund for African American science students at Queens College in New York.



Amino Acids Activity Answers (easy)

1. The structure shown below, is an amino acid. Label the functional groups on this molecule.



2. What is the name of reaction that amino acids undergo, to become polypeptides?

Condensation polymerisation

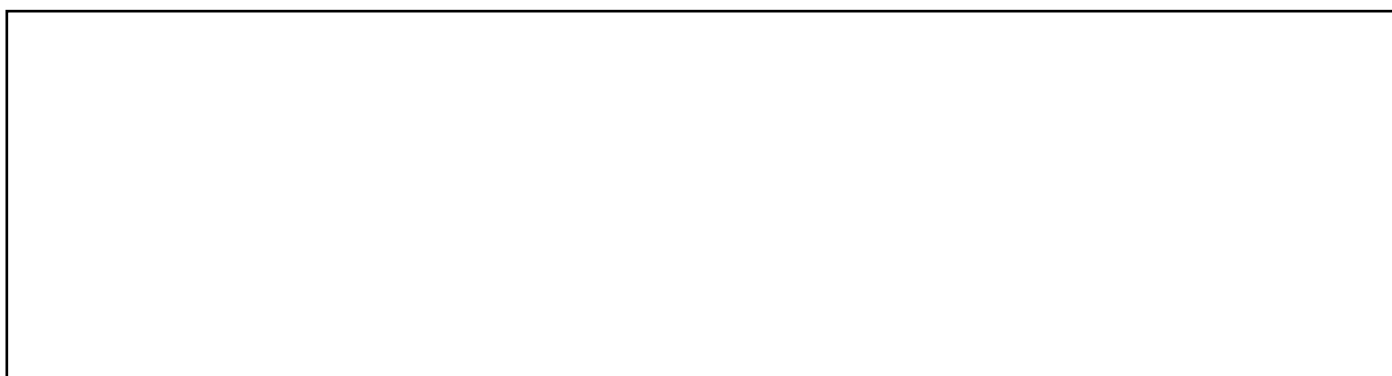
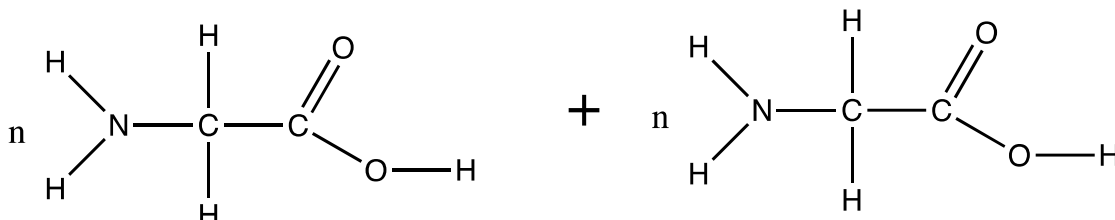
3. What is the name of the bond formed when two or more amino acids are joined together?

Peptide bond

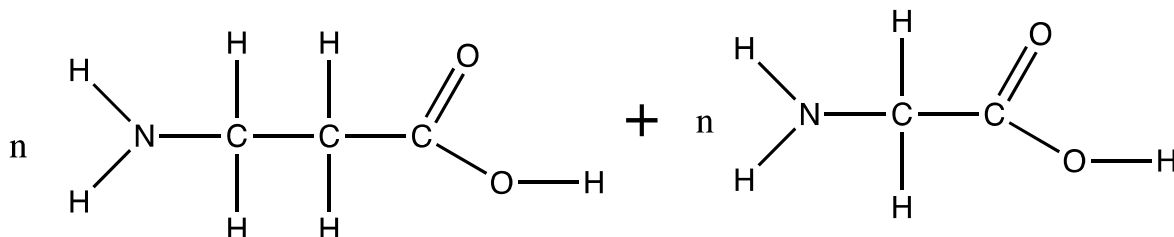
Amino Acids Activity (medium/ hard)

Two amino acids can undergo condensation polymerisation to form a dipeptide. Draw the polypeptide of the following reactions:

1.

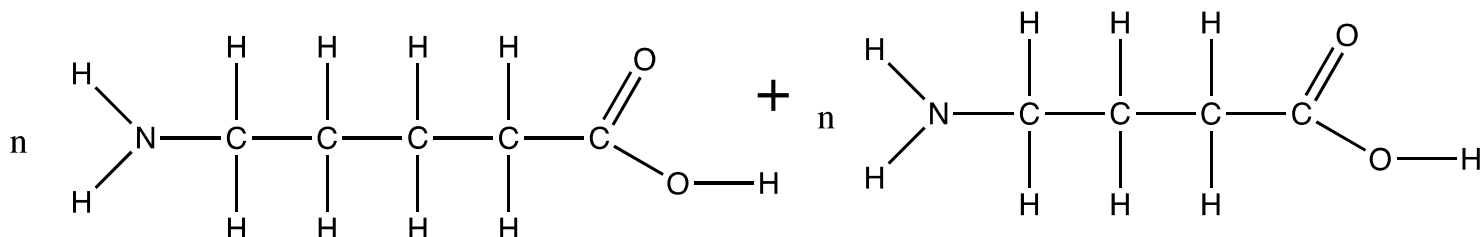


2.



Amino Acids Activity Continued (medium/ hard)

3.



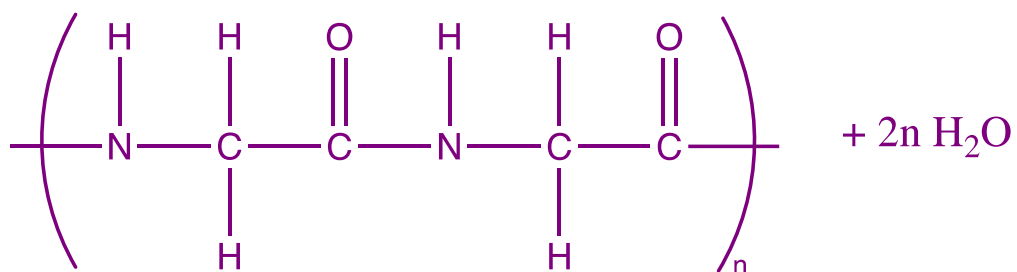
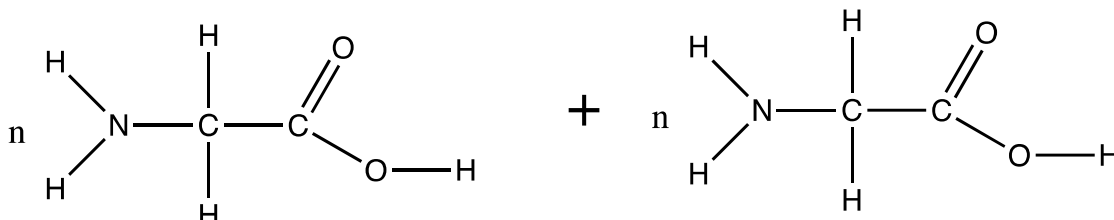
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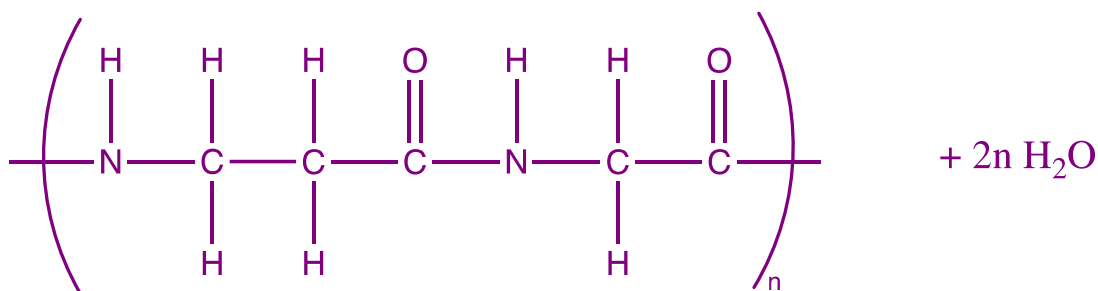
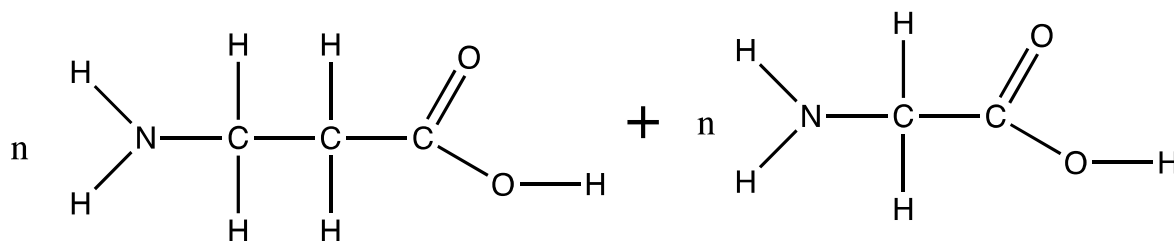
Amino Acids Activity Answers (medium/ hard)

Two amino acids can undergo condensation polymerisation to form a dipeptide. Draw the polypeptide of the following reactions:

1.



2.



Amino Acids Activity Continued (medium/ hard)

3.

