

## GÜNTER BLOBEL

*Omnis cellula e cellula*, that each cell derives from a pre-existing cell by division, is the culmination of a profound insight of the late 19th century and a dictum articulated by the German pathologist Rudolf Virchow.

It is estimated that the earth is 5 billion years old that the first cell arose 3.5 billion years ago. Since that time, cells have continuously divided. At first they existed as single cells. Over time they got together and formed ever more complex organisms, culminating in man.

Each of us starts life by the joining of one cell from our father and one cell from our mother. Likewise, our father and mother began their lives from the union of a single cell from each of their parents. If we continue to trace our ancestors back in time we will eventually arrive at the cells that developed 3.5 billion years ago. So as we sit here, each of us represents 3.5 billion years of *continuous cellular life!* All of us are 3.5 billion years old!

Because all forms of life evolved from cells that developed 3.5 billion years ago, we are all related to each other!

This kinship among cells of bacteria, plants, animals and man is reflected in their organization as revealed by the modern tools of molecular biology and cell biology. Many of the organizational features and of the machineries in these cells have been highly conserved.

My own studies have touched on one of these highly conserved mechanisms, namely the intracellular targeting of protein molecules. An average mammalian cell possesses about one billion molecules of proteins. Proteins are polymers consisting of 20 building blocks (amino acids) up to 10,000 building blocks in length. Proteins are steadily degraded and therefore have to be continuously synthesized *de novo*. Newly synthesized proteins are transported out of the cell, or are shipped to various cellular compartments or are woven into intracellular membranes, each in a specific asymmetric orientation. We found that this is achieved by short sequence elements built into each protein. Each of these address-specific 'zip codes' is recognized by specific recognition factors followed by targeting and routing. These processes are aided by other accessory elements, such as receptors, channels, tracks, motors etc. We found that the zip codes as well the cognate sorting machineries are highly conserved in all cells.

Besides science, I am interested in the arts, particularly music and architecture.

I was born in 1936 in the small Silesian village of Waltersdorf near Sprottau. In February 1945 we fled from the approaching Red Army. On our

way to relatives in Saxony, in the centre of Germany, we stopped briefly in Dresden. As a nine-year-old, I was very impressed by the beauty of this city, by its many palaces and churches, particularly by the huge cupola, the 'Stone Bell', of the Frauenkirche. A few days later, from about 60 km away, we witnessed the destruction of this magnificent city. The midnight sky turned red from the raging firestorm that killed tens of thousands of people and destroyed one of the world's most beautiful cities. It was one of the saddest days of my life. I decided then: I will contribute to the reconstruction of that city. More than fifty years later this dream came true, when I was able to donate the proceeds of my 1999 Nobel Prize in Medicine to the reconstruction of the Frauenkirche. It was one of the happiest days of my life.

A smaller portion of the proceeds of the Nobel Prize, I donated to the rebuilding of the Synagogue in Dresden and to the restoration of two churches in the historic center of Fubine, Alessandria in Piemonte. The Synagogue of Dresden was destroyed on Kristallnacht in November 1938. Fubine is the hometown of the parents of my wife, Laura Maioglio, who preserves their ancestral 17th century home.

Presently, I am campaigning for the reconstruction of the Paulinerkirche in Leipzig. This magnificent, over 800-year-old church was, for hundreds of years, also used as the Aula of the University of Leipzig and was witness to many of the most important events in German cultural history. The Paulinerkirche survived the Second World War completely intact. In an act of barbarism, the Paulinerkirche and its surrounding buildings were blown up in 1968 by the East German dictator Ulbricht in order to obliterate religion. The buildings that replaced the Paulinerkirche are now in disrepair and have to be torn down. The University Administration and the Mayor of Leipzig, however, campaign against the reconstruction of the Paulinerkirche. More than 80% of its interior had been saved before the wanton destruction by Ulbricht. I hope that by 2009, on the occasion of the 600th anniversary of the University of Leipzig, the Paulinerkirche will be rebuilt.