

# CIA, MoSSAD, NKGB and SURETE in medical research: The RAW truth

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## ABSTRACT

**Background.** We aimed to categorize the types of productivity among published scientists and correlate them with the Nobel Prize.

**Data source.** Nobel Foundation website ([www.nobelprize.org/nobel\\_organizations/nobelfoundation/](http://www.nobelprize.org/nobel_organizations/nobelfoundation/)) and PubMed database.

**Inclusion criteria.** Scientists born from 1867, the year in which Alfred Nobel patented dynamite to accumulate his fortune, which in turn led to the establishment of Nobel's famous will in 1895.

**Design.** Retrospective analysis of the Nobel awards since 1901.

**Results.** We propose an eponymous formulation called Pai-Kan Footprints (PKF) each with an alphabet tag of a recognized gumshoe agency.

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## INTRODUCTION

A quarter of a century ago, one of us (SS) proposed a term Kilo Base Goliaths ('KBG') for scientists who were extremely prolific and had published over a thousand papers.<sup>1</sup> Six scientists included in this group were Paul Karrer (1889–1971), Giulio Natta (1903–1979), Hans Selye (1907–1982), Herbert Brown (1912–2004), Tetsuji Kametani (1917–1988) and Carl Djerassi (1923–2015).

We now propose a classification of the types of scientists in biology-cum-medicine, based on their productivity and their Nobel Prize recognition (which is linked to their productivity). We recognize four such groups (Fig. 1).

Group one consists of scientists who have prodigious research outputs (as recorded by PubMed) and have been either awarded or have been nominated for the Nobel Prize. These scientists, not surprisingly, form a subset of the KBG club mentioned above. As the KBG group includes researchers from all areas of science, technology and anthropology, and is not restricted to biology and medicine, we now have a Nonpareil Knowledgeable Giants in Biology (NKGB). Apart from Hans Selye, members of this exclusive club include Tadeusz Reichstein (1897–1996), Linus Pauling (1901–1993), Carleton Gajdusek (1923–2008), Andrew V. Schally (b. 1926) and Robert C. Gallo (b. 1937).

Another group consists of those who authored relatively fewer papers but contributed vastly to science. This group is recognized as members of the Club of Incomparable Authors (CIA). Scientists who fall into this category are eight, in all. They

Nobel Prize	CIA type (+) (few papers, Nobel prize)	NKGB type (+) (many papers, Nobel prize or nomination)
	MoSSAD type (-) (few papers, no Nobel prize)	SURETE type (-) (many papers, no Nobel prize)

FIG 1. Nobel prizes and number of papers  
CIA Club of Impeccable Authors NKGB Nonpareil Knowledgeable Giants in Biology MoSSAD Members of Society Supporting Ambiguous Discoveries SURETE Superlative Unrecognized Research Evolving Towards Enlightenment

are Lawrence Bragg, Frederick Sanger, James D. Watson, Geoffrey Hounsfield, Barbara McClintock, Charles Pedersen, Kary Banks Mullis and Edward B. Lewis (Table I).

What is common among the members of the CIA group is that all have been awarded the Nobel Prize. Beyond this fact, we note that 3 had the UK citizenship (Bragg, Sanger and Hounsfield); the other 5 are from the USA (Watson, McClintock, Pedersen, Mullis and Lewis). Scientists from other nations are not members of the CIA! Among these 8 scientists, 4 (Sanger, Hounsfield, McClintock and Pedersen) were self-effacing and modest and 2 (Watson and Mullis) were assertive, opinionated and extroverted. We are not sure if the remaining 2 (Bragg and Lewis) were modest or not, though they had much to brag(g) about.

Remarkably, 7 of the 8 members of CIA received the Nobel Prize after 1958—a notable year as it marks the halfway point in the history of the Nobel awards (1901–2017). Further, 4 of the winners are in medicine while 3 are in chemistry, but with strong links to medicine (Sanger, Mullis and Pedersen). Although technically, Lawrence Bragg (1890–1971) was a physicist, his X-ray crystallography technique was important in elucidating the helical structure of DNA, and the structure of the tobacco mosaic virus.<sup>2</sup> In this regard, Bragg's contribution to medicine is unquestionable. At the age of 25 years, he remains the youngest Nobelist in the sciences. Interestingly, Pedersen at 83 years and McClintock at 81 years were among the oldest to be awarded the Nobel Prize in chemistry and medicine, respectively. McClintock is the sole woman member in this group.

There are two more groups (Table II). One is that of scientists who have few papers and have few awards. These authors form the vast majority of researchers and constitute the Members of Society Supporting Ambiguous Discoveries (MoSSAD). Notable individuals in this group include Trofim Lysenko and Arthur Koestler. Lysenko has 7 papers listed (all in Russian), and Koestler has 3 papers listed on the PubMed database. Although Koestler has gained a reputation as an author, he was also considered as a 'specialist' in the field of psychiatry, psychoanalysis and science criticism. His classic novel *The Call Girls* (1972), a parody on the behaviour of elite scientists who attend international conferences on invitations can be thought of as his prime contribution to the sociology of scientists.

The last quadrant (Fig. 1)—scientists who have published plenty of profound and path-breaking papers but without a

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TABLE I. Club of incomparable authors (CIA) who won the Nobel Prize with fewer number of papers\*

Nobel prize†	Scientist	Year of birth– year of death	Nobel Prize recognition	
			Age at	Number of papers prior to
1915 Physics	William Lawrence Bragg	1890–1971	25	13
1958 Chemistry	Frederick Sanger	1918–2013	40	33
1962 Medicine	James Dewey Watson	1928–	34	29
1979 Medicine	Geoffrey Hounsfield	1919–2004	60	8
1983 Medicine	Barbara McClintock	1902–1992	81	39
1987 Chemistry	Charles J Pedersen	1904–1989	83	4
1993 Chemistry	Kary Banks Mullis	1944–2019	48	1
1995 Medicine	Edward B Lewis	1918–2004	77	35

\* 'paper' is an arbitrary unit for a publication; it includes original paper, review, commentary, letter to an editor, editorial, delivered lecture or any item which is indexed in the PubMed database †Arranged in chronological order of the award

TABLE II. Scientists of members of society supporting ambiguous discoveries (MoSSAD) and SURETE type

MoSSAD type	SURETE type
Friedrich E. Krukenberg (1871–1946)	Vincent B Wigglesworth (1899–1994)
Trofim Lysenko (1898–1976)	Ernst Mayr (1904–2005)
Arthur Koestler (1906–1983)	Oliver H. Lowry (1910–1996)
Margie Profet (b.1958)	Denis Parsons Burkitt (1911–1993)
	Alex Comfort (1920–2000)
	William D. Hamilton (1936–2000)
	Stephen J. Gould (1941–2002)

SURETE Superlative Unrecognized Research Evolving Towards Enlightenment

Nobel Prize, fall into the Surete group—Superlative Unrecognized Research Evolving Towards Enlightenment. Some members of this exclusive club include Denis Parson Burkitt (1911–1993) of Burkitt's lymphoma fame, and the citation superstar Oliver Lowry (1910–1996).

A unique case can be made out for Fibiger and Moniz, who could belong to the Research Absolutely Wrong (RAW) club. Johannes Fibiger (1867–1928), was the sole recipient of the 1926 Nobel Prize, for his (ultimately erroneous) cancer discovery of *Spiroptera* causing gastric carcinoma in cockroaches. Likewise, Egas Moniz was awarded the Nobel Prize in 1949 for his discovery of the therapeutic value of leucotomy in certain psychoses.

Friedrich Ernst Krukenberg (1871–1946, not a nominee for the Nobel Prize in Physiology or Medicine), who physicians will

recognize because of the eponymous ovarian tumours, thought he had discovered a new primary tumour of the ovary—which we now know represents a metastatic tumour and not an ovarian primary! According to William Ober, this was the only paper Krukenberg published in his life.<sup>3</sup> However, we note that the same Krukenberg name also prevails in what is now called Krukenberg's spindle, a vertical deposit of pigment formed in the inner surface of the cornea by pigmented iris cells in the eyeball.<sup>4</sup> Thus, Krukenberg receives recognition as belonging to RAW and MoSSAD groups.

We do realize that the terms CIA, MoSSAD, NKGB, SURETE and RAW have been used elsewhere in an entirely different sphere of activity. However, these are appropriate terms because scientists as well as detectives do essentially the same thing: hunt for clues to seek answers to perplexing questions.

Because of these similarities between gumshoe agencies and scientists, we propose an eponymous acronym called Pai-Kan Footprints (PKF) to classify scientists and their productivity.

*Conflicts of interest.* None declared

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