

Current Comments

The 300 Most-Cited Authors, 1961-1976,
Including Co-Authors. 3A.
Their Most-Cited Papers — Introduction
and Journal Analysis

Number 47

November 20, 1978

In earlier essays on the 300 most-cited authors we explained how the names were selected.¹ We also showed the relationship between citedness, awards, and academy memberships.² In this and the next two editorials, we will list the authors' most-cited publications. Approximately 100 articles will be listed in each essay.

In earlier portions of this study we arranged authors' names by their disciplines. However, we soon realized that it would be absurd to list publications by the authors' disciplines. Many of the authors work on interdisciplinary research. Thus, publications are often in fields other than those indicated by the authors' disciplines. For example, the author may be a biochemist, but his or her most-cited paper could be in physiology, endocrinology, etc. Consequently, we have categorized the papers by subject matter rather than the authors' discipline.

Categorizing papers in this way may be quite arbitrary, too. For instance, G. Klein's article on tumor antigens could be categorized under oncology or immunology. In cases like this, we used the journal in which the article was published

and/or the author's organization to make a judgment. Nevertheless, some authors may feel that their papers have been misclassified.

The group of papers presented this week cover the fields of biochemistry, endocrinology, pharmacology, and physiology.

For each discipline, the papers are listed alphabetically by the most-cited author whose name is shown in bold face. Following the bibliographic data for each article is the affiliation of the author at the time the paper was published. Some of the papers on the list have been described in the *Citation Classics* section of *Current Contents*[®]. This is noted below the affiliation.

As we were compiling this list we discovered that several pairs of authors shared the same most-cited publication. In these cases, we have shown for the second author his or her second most-cited publication. A "see" cross-reference directs the reader to the most-cited article.

In this first portion of the list, the following authors shared the same most-cited publication: D. S. Fredrickson and R. S. Lees, O.H. Lowry and J. V. Passoneau, C. N. Hales and P. J. Randle, A. Sjoerdsma and S. Udenfriend, F. C. Greenwood

Figure 1: Part I of the list of the 300 most-cited authors' most-cited publications, 1961-1976. Publications are listed by discipline, then alphabetically by most-cited author in bold-face type. Authors' affiliations at the time the papers were written are included in parentheses.

| | |
|--|---------------------------|
| Total Citations 1961-1976 | Bibliographic Data |
|--|---------------------------|

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- 495 **Allfrey V G**, Littau V C & Mirsky A E. On the role of histones in regulating ribonucleic acid synthesis in the cell nucleus. *Proc. Nat. Acad. Sci. US.* 49:414-21, 1963. (Rockefeller Inst. (University), New York, NY 10021)
- 3,024 **Martin R G** & **Ames B N**. A method of determining the sedimentation behavior of enzymes: application to protein mixtures. *J. Biol. Chem.* 236:1372-9, 1961. (NIH, NIAMDD, Bethesda, MD 20014)
- 2,321 **Andrews P**. Estimation of the molecular weights of proteins by sephadex gel-filtration. *Biochem. J.* 91:222-33, 1964. (Nat. Inst. Res. Dairying, Shinfield, Reading RG2 9AT, Berkshire, England)
- 576 **Cuatrecasas P**, Wilchek M & **Anfinsen C B**. Selective enzyme purification by affinity chromatography. *Proc. Nat. Acad. Sci. US.* 61:636-43, 1968. (NIH, NIAMDD, Lab. Chem. Biol. Bethesda, MD 20014)
- 336 **Matsuo H**, **Baba Y**, **Nair R M G**, **Arimura A** & **Schally A V**. Structure of the porcine LH- and FSH-releasing hormone. I. The proposed amino acid sequence. *Biochem. Biophys. Res. Commun.* 43:1334-9, 1971. (VA Hospital, New Orleans, LA 70118)
- 187 **Steele W J**, **Okamura N** & **Busch H**. Effects of thioacetamide on the composition and biosynthesis of nucleolar and nuclear ribonucleic acid in rat liver. *J. Biol. Chem.* 240:1742-9, 1965. (Baylor Univ. Coll. Med., Dept. Pharmacol., Houston, TX 77025)
- 942 **Cleland W W**. The kinetics of enzyme-catalyzed reactions with two or more substrates or products. 1. Nomenclature and rate equations. *Biochim. Biophys. Acta* 67:104-37, 1963. (Univ. Wisconsin, Coll. Agriculture, Madison, WI 53706) [Citation Classic. *Current Contents* (28):8, 11 July 1977.]
- 923 **Cuatrecasas P**. Protein purification by affinity chromatography. Derivations of agarose and polyacrylamide beads. *J. Biol. Chem.* 245:3059-65, 1970. (NIH, NIAMDD, Lab. Chem. Biol., Bethesda, MD 20014)
- 259 **Blunt J W**, **DeLuca H F** & **Schnoes H K**. 25-hydroxycholecalciferol. A biologically active metabolite of vitamin D₃. *Biochemistry USA* 7:3317-22, 1968. (Univ. Wisconsin, Dept. Biochem., Madison, WI 53706)
- 1,042 **Marmur J** & **Doty P**. Determination of the base composition of deoxyribonucleic acid from its thermal denaturation temperature. *J. Mol. Biol.* 5:109-18, 1962. (Harvard Univ., Dept. Chem., Cambridge, MA 02138)
- 415 **Edelman G M** & **Poulik M D**. Studies on structural units of the γ -globulins. *J. Exp. Med.* 113:861-84, 1961. (Rockefeller Inst. (University) New York, NY 10021)
- 433 **Greenfield N** & **Fasman G D**. Computed circular dichroism spectra for the evaluation of protein conformation. *Biochemistry USA* 8:4108-26, 1969. (Brandeis Univ., Grad. Dept. Biochem., Waltham, MA 02154)
- 278 **Green D E** & **Fleischer S**. The role of lipids in mitochondrial electron transfer and oxidative phosphorylation. *Biochim. Biophys. Acta* 70:554-82, 1963. (Univ. Wisconsin, Inst. Enzyme Res., Madison, WI 53706)

Widespread occurrence of adenosine 3', 5'-monophosphate-dependent protein kinase in various tissues and phyla of the animal kingdom.

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Figure 1 (continued)**BIOCHEMISTRY (continued)**

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(NIH, NIAMDD, Chem. Lab., Bethesda, MD 20014)
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- 899 **Herbert V, Lau K S, Gottlieb C W & Bleicher S J.** Coated charcoal immunoassay of insulin. *J. Clin. Endocrinol. Metab.* 25:1375-84, 1965.
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PHARMACOLOGY

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Figure 1 (continued)**PHARMACOLOGY (continued)**

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and A. Arimura, N. E. Anden and K. Fuxe, J. Glowinski and L. L. Iversen, R. W. Butcher and E. W. Sutherland, D. H. Hubel and T. N. Wiesel. J. Roth, R. Yalow, and S. Berson — three authors on the list—shared one most-cited article. J. J. Brown, A. F. Lever, and J. I. S. Robertson also shared a single most-cited paper.

In eight of these twelve cases, both authors also appeared on the second most-cited paper. This is not surprising since the research team is a common phenomenon. We expected the "all-author" data to include members of teams, since each author was given equal treatment just as though he or she had been the first author.

However, we sometimes ran into trouble assigning each of our 300 authors a unique paper. For example, Arimura and Schally shared a most-cited paper. But Schally's second most-cited paper was the *most-cited* article by another author on the list, A. J. Kastin. So we had to go to Schally's third most-cited paper. The purpose of all this was to have an equal number of highly cited papers and authors.

As you look over the list, you will observe a considerable "overlap" in authorship. For example, P. Cuatrecasas appears in the list for his paper on protein purification by affinity chromatography. But he was co-author on C. B. Anfinsen's most-cited paper. Many of these 300 most-cited authors have worked

same most-cited article listed.

Since this is the first of three in stallments it may be well to discuss the list as a whole.

All 300 publications on the list are journal articles. This is because the data bank used for this study was the source material covered by the *Science Citation Index*[®] 1961-1976. From 1961-1976 the *SCI*[®] indexed only journal literature. In most cases, the most-cited journal article shown is in fact the author's most-cited publication from the time period. But in some instances an author's book (not on the list) may be more highly cited than the article shown. For example, C. Tanford's most-cited article received 354 citations. But his 196 book, *Physical chemistry of macromolecules*, received 1,283 citations during the same time period. Since it was not a source publication in the 1961 *SCI*, it does not appear on the list.

Some readers may be surprised by the relatively low number of citations certain papers received. After all, on the average these 300 authors were each cited 5,000 times. These 1,500,000 citations constitute a substantial percentage of the entire file. Yet many items on this list received "only" a few hundred citations. The reason is that most of the 300 authors published a large number of papers during the time period studied. For example, F. Sorm's most-cited publication received only 86 citations. But

3000 published 307 papers, 472 as first author, 17 as co-author.

Since the data bank for the study included only information on papers published between 1961-1976, it is not surprising that most of the 300 articles are from the early '60s. In fact, over half the articles were published prior to 1966, three-quarters before 1969. Next year, we plan to publish a list of the most-cited authors, 1965-1978. We can expect to see some significant changes. If certain fields were under-represented in our files from 1961 to 1964 then their *relative* status should improve significantly.

The 300 articles appeared in 86 journals. Five journals accounted for more than one-third of the articles, ten for about half. These journals appear in Figure 2. They emphasize the bio-medical bias of the list. This bias can be corrected only by compiling lists based on categories.

The average number of authors per paper is three. This is *very*

Figure 2: The 10 journals which accounted for about half the most-cited articles.

| | |
|---|----|
| Proceedings of the National Academy of Sciences - USA | 26 |
| Journal of Biological Chemistry | 23 |
| Journal of the American Chemical Society | 23 |
| Science | 16 |
| Journal of Experimental Medicine | 15 |
| Nature | 11 |
| Journal of Cell Biology | 9 |
| Journal of Molecular Biology | 9 |
| New England Journal of Medicine | 9 |
| Journal of Clinical Investigation | 8 |

significant since our methodology gives equal weight to all co-authors. Only 35 papers out of the 300 are authored by one person. Figure 3 shows the number of authors per paper. On a little over half the papers the most-cited author was *not* the first author. This emphasizes the need to take into account all-author citations data when doing evaluations.

Figure 3: The number of authors on most-cited papers.

| Number of Authors | Number of Papers |
|-------------------|------------------|
| 1 | 35 |
| 2 | 110 |
| 3 | 78 |
| 4 | 42 |
| 5 | 19 |
| 6 | 8 |
| 7 | 2 |
| 8 | 3 |
| 9 | 1 |
| 10 | 1 |
| 11 | 1 |

It is of interest to note that one of the 1978 Nobelists in physiology or medicine, D. Nathans, appears as the primary author on F. Lipmann's most-cited paper in the biochemistry section. If we had extended our all-author list to the first 500 authors, Nathans and another winner in physiology of medicine, H. O. Smith, would have appeared on the list. If we extended our list to the top 700 authors, P. Mitchell, the 1978 Nobelist in chemistry, would have also been included. (Mitchell did appear on our earlier list of the 250 most-cited primary authors.³) Again, it is apparent that

in the future we must publish lists of at least the 1,000 most-cited authors.

The choice of two of the 1978 winners in physics — A. Penzias and R. Wilson — underlines the need which I have mentioned before for lists of the most-cited authors in various disciplines. Penzias and Wilson do not appear even among the top 1,000. This is not expected because the field of radio astronomy is relatively small. We checked our “cluster” data for this field and verified that their respective citation counts of 1235 and 1412 are quite high.

W. Arber, who shared the prize in medicine, and P. L. Kapitsa, who shared the physics award, probably do not appear on our list for another reason. Much of Arber's work was done in the late 1950s; Kapitsa's in the 1930s. Since our data are based on articles published since 1961, citations to their earlier work were not counted.

In the second part of this study we will list 100 most-cited papers in immunology, molecular biology, cell biology, oncology, histology, pathology, as well as physics and biophysics.

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