

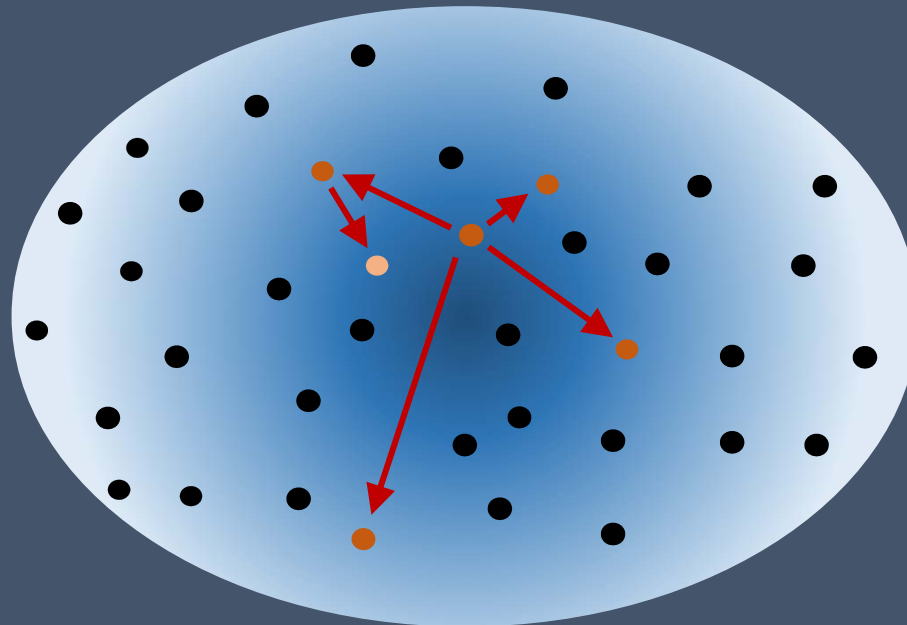
THE IMPACT OF PUBLISHED  
INCORRECT SCIENTIFIC INFORMATION  
ON THE KNOWLEDGE PRODUCTION  
OF SCIENTIFIC COMMUNITIES

# POSSIBLE IMPACT OF INCORRECT INFORMATION

①

**Substantial**

Used throughout community & distorts knowledge production



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①

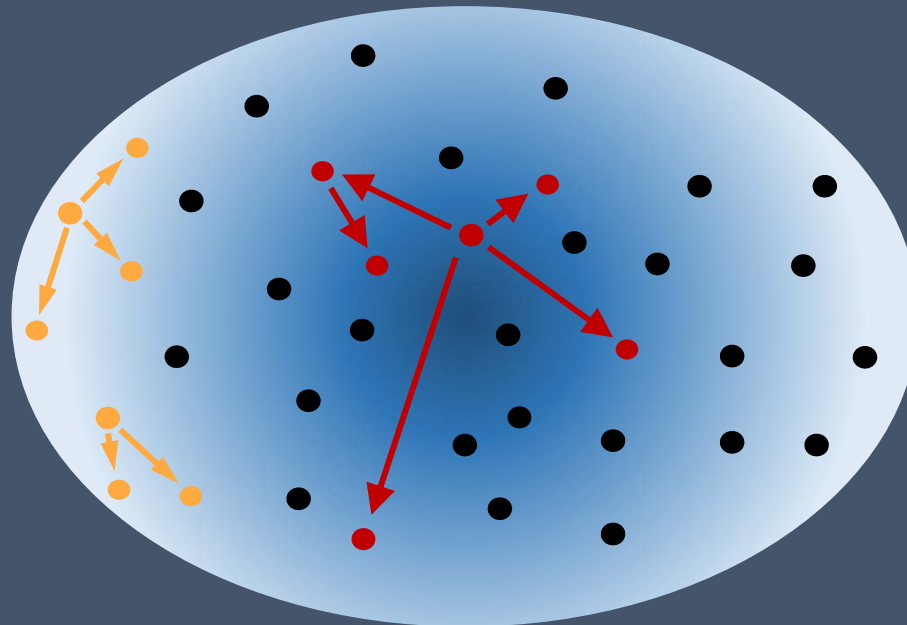
## Substantial

Used throughout community & distorts knowledge production

②

## Circumscribed

Used only in the  
periphery



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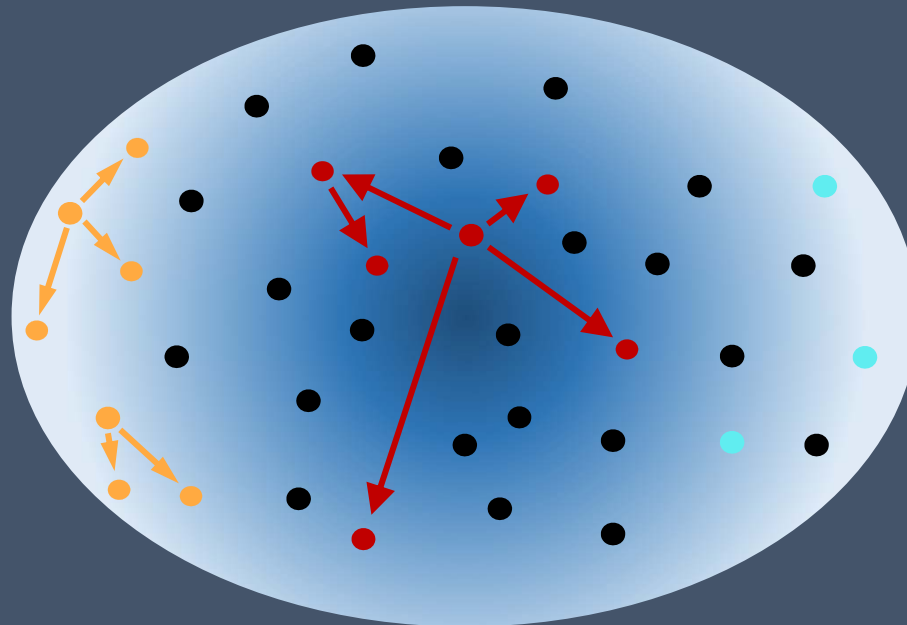
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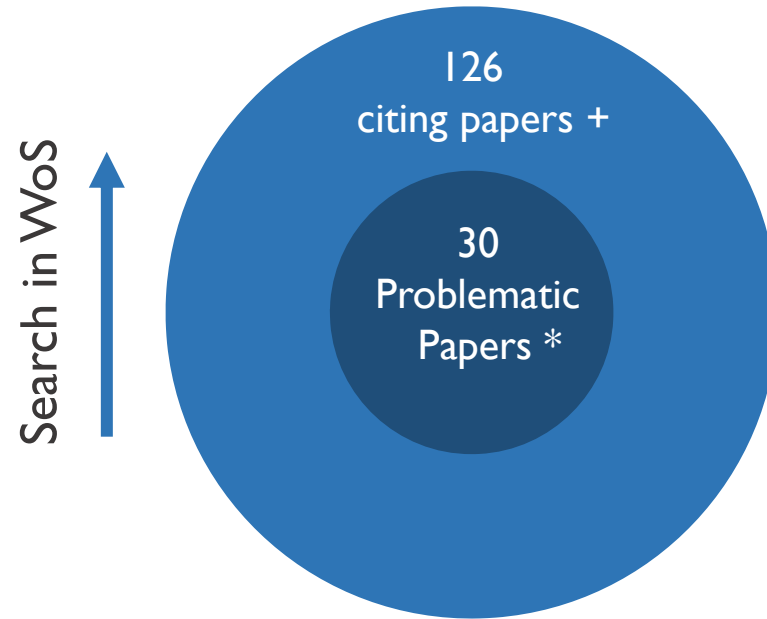
③

## Negligible

- publications are overlooked
- rarely cited
- cited only perfunctorily

Does incorrect knowledge diffuse  
into the scientific community ?

# ANALYSIS OF CITATIONS



*\* List of papers containing incorrect information about the use of gene sequences identified by Byrne and Labbé (2017)*

*+ (Downloaded Okt. 2018)*

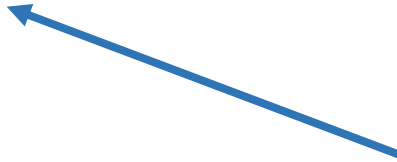
How is knowledge taken from incorrect papers  
and used by the citing authors ?

## EXAMPLE: ANALYSING CONTEXT

Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation [2, 14, 15, 30–33]. Therefore, inhibition of CDKs offers a promising therapeutic strategy in the defense against human malignancies.“ Zhou et al. (2015)

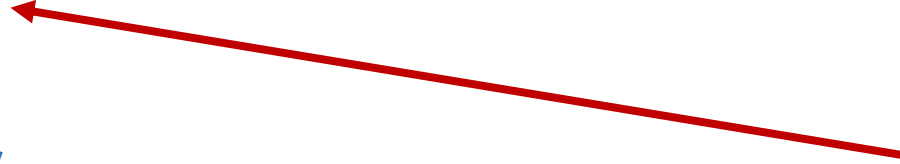
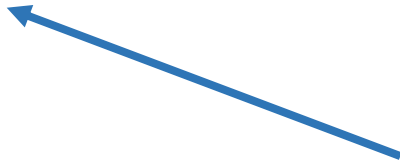


## **Knowledge Claim**



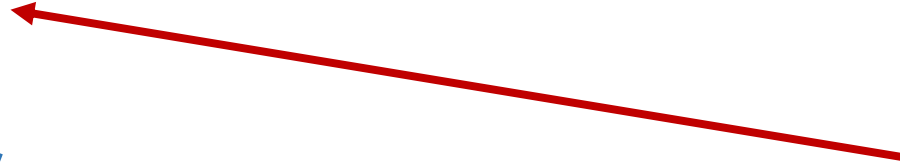
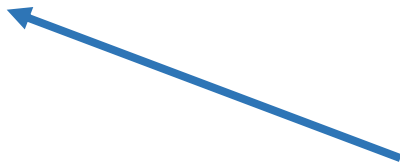
**Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation 12,14,15,30–33.** Therefore, inhibition of CDKs offers a promising therapeutic strategy in the defense against human malignancies.“ Zhou et al. (2015)

**Knowledge Claim (affirmative, without justification)**



**Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation 12,14,15,30–33.** Therefore, inhibition of CDKs offers a promising therapeutic strategy in the defense against human malignancies.“ Zhou et al. (2015)

**Knowledge Claim (affirmative, without justification)**



**Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation 12,14,15,30–33.** Therefore, inhibition of CDKs **offers a promising therapeutic strategy** in the defense against human malignancies.“ Zhou et al. (2015)



**Explicit recommendation**

## CODING SCHEME (EXAMPLE)

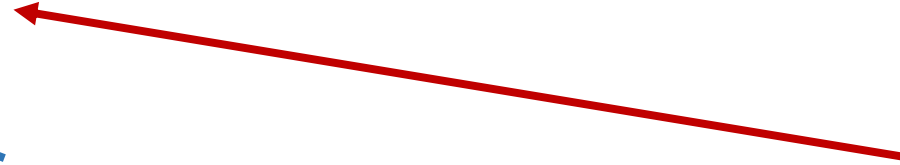
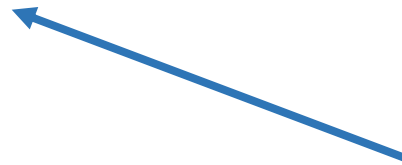
Type of Knowledge Claim
1.1 Research idea / question, theory
1.2 Methods
1.3 Empirical finding
1.4 Other
1.5 Undistinguishable
Evaluation of KC
2.1 affirmative
2.1.0 Without justification
2.1.1 Confirmation by s.o. else's research
2.1.2 Confirmation by own study
2.1.3 Cited and own results fit
2.2 neutral
2.3 negative
2.3.3 Disputed status in community
2.3.4 Challenging results
2.3.5 Awareness of a larger problem in the community
2.3.6 Specific counter argument
2.3.7 Own results contradict cited results
2.3.8 Other

*For the methodology and full coding scheme see: Schmidt (2019). „A Citation Context Analysis of Retracted Publications“ (forthcoming).*

## EXAMPLE: CODING

**1.3**  
**Knowledge Claim** (affirmative, without justification)

**2.1.0**



**Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation [2,14,15,30–33].** Therefore, inhibition of CDKs **offers a promising therapeutic strategy** in the defense against human malignancies.“ Zhou et al. (2015)



**4.2.5**  
**Explicit recommendation**

Type of Knowledge Claim (KC)	Evaluation of KC	Position in Text	Techn. aspects	Use of KC	Citation no.	Citation & Context
1.3 Empirical finding	2.1.0 Without justification	Discussion	Part of a list	4.2.5 Explicit recom.	31	Zhou_2015_Crucial: Aberrant expression or altered activity of CDKs results in escape of cells from the cell cycle control and leads to malignant transformation [2, 14, 15, 30–33]. Therefore, inhibition of CDKs offers a promising therapeutic strategy in the defense against human malignancies.

## RESULTS

- Empirical finding (92%)
- Evaluated as affirmative, but without justification (75%)
- Reporting the state of the art (58%) or justifying their current study (23%)
- Recommendations for therapeutic application occur in a rare 12 cases (10%)

## RESULTS

- Empirical finding (92%)
- Evaluated as affirmative, but without justification (75%)
- Reporting the state of the art (58%) or justifying their current study (23%)
- Recommendations for therapeutic application occur in a rare 12 cases (10%)
- **Cited and own results fit in 38 cases (30%)**



Do citing authors recognize problems with papers ?

**NO.**

**NO.**

...well, there is this case:

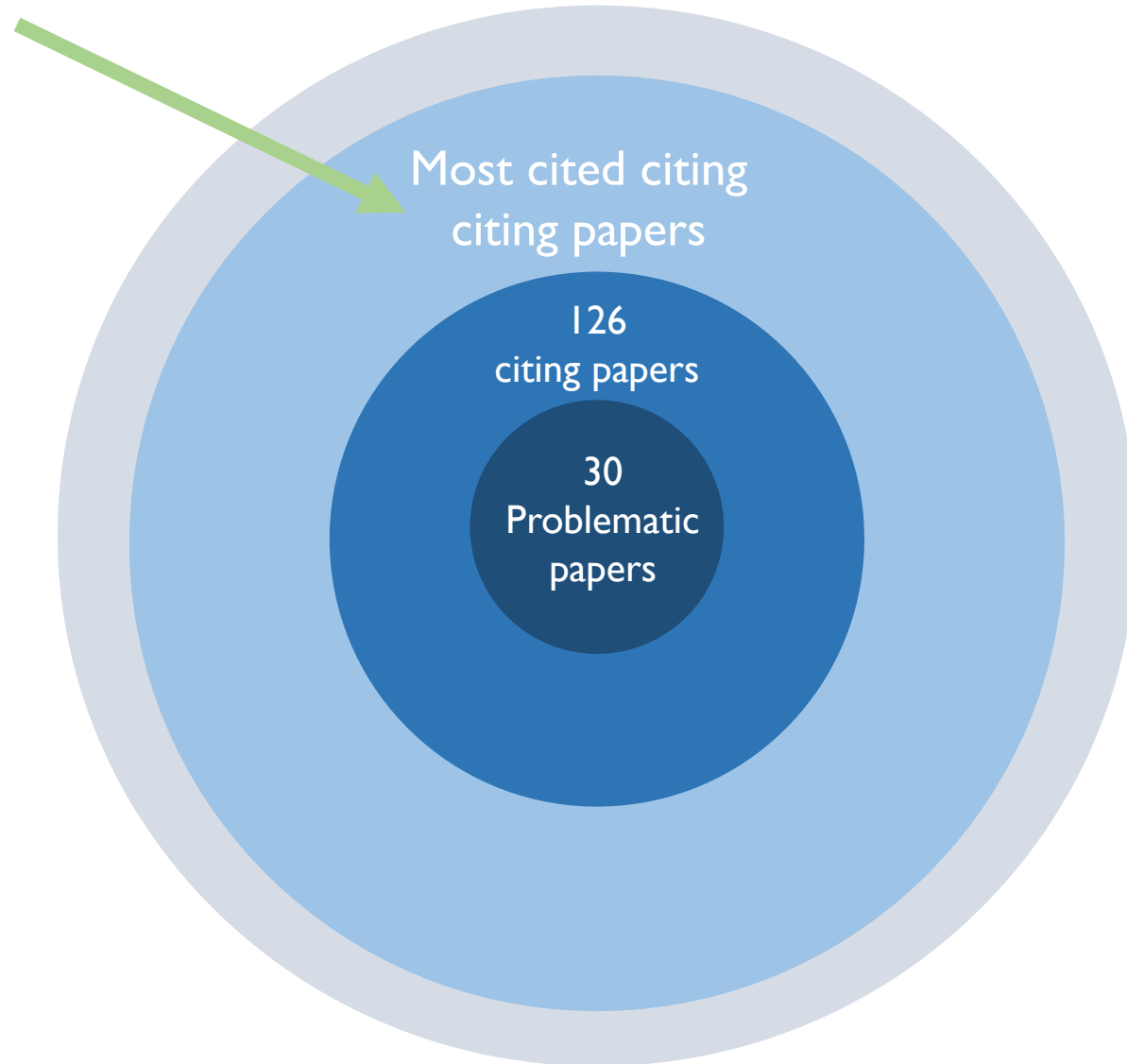
**„Such difference may be due to the specific cell type.“ Wang et al. (2015)**

How far does the incorrect knowledge travel ?

# TYPOLOGY

	Communication on validity	
Function of KC	weak	confirmatory
<i>Landscape</i>	56	10
<i>Justification</i>	22	10
<i>Synthesis</i>	14	1
<i>Recommendation</i>	8	3
<i>Method</i>	8	0
<b>Gesamt:</b>	<b>108</b>	<b>24</b>

# THE CHAINS OF CITATIONS



# T TYPOLOGY

	Communication on validity		
Function of KC	weak	confirmatory	
<i>Landscape</i>	56	10	
<i>Justification</i>	22	10	
<i>Synthesis</i>	14	1	( If published < 2016 )*
<i>Recommendation</i>	8	3	
<i>Method</i>	8	0	
<b>Gesamt:</b>	<b>108</b>	<b>24</b>	

*\* Initially there were 12 papers identified, but two had to be excluded, as one was a duplicate and the other could not be found on the WoS. A third was not cited at all.*

## RESULTS

- 9 remaining papers were cited between 1 and 38 times (30.05.2019)
- all citations were reporting the state of the art in its weakest form



## **CONCLUSION:**

**Usually, incorrect information dies in the periphery**

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**Usually, incorrect information dies in the periphery, but :**

- Papers lead on scientific community about possibly rewarding research areas

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## CONCLUSION:

**Usually, incorrect information dies in the periphery, but :**

- Papers lead on scientific community about possibly rewarding research areas
- Papers could steer future research in the wrong direction
- Allocate resources to exhausted research areas

QUESTIONS ?

### Research team:

Jochen Gläser, Therese Kienemund, Lydia Liesegang, Marion Schmidt



### Literatur:

Byrne, J.A. and C. Labbé (2017). "Striking similarities between publications from China describing single gene knockdown experiments in human cancer cell lines." *Scientometrics* 110(3): 1471-1493.

For the methodology and full coding scheme see: Schmidt (2019). „A Citation Context Analysis of Retracted Publications“ (forthcoming).



## TYPOLOGY: CATEGORIES

KC	Codes
Reporting state of the art („ <i>Landscape</i> “)	1.1, 1.3, 1.4, 1.6 2.1.0, 2.2 4.2.1
<i>Justification</i> for own research	1.1, 1.3, 1.4, 1.6 2.1.0, 2.2 4.2.2.1, 4.2.2.2
<i>Synthesis</i> of cited results and own conclusion in scientific argument	1.1, 1.3, 1.4, 1.6 2.1.0, 2.2 Some of: 4.2.2, 4.2.3, 4.2.4
<i>Recommendation</i> for therapy-oriented research	1.1, 1.3, 1.4, 1.6 2.1.0, 2.2 4.2.5, some of 4.2.2
<i>Confirmation</i> - cited and own findings fit together	2.1.3
<i>Method</i>	1.2 or 1.3 Methods or „other“ 4.2.0, 4.4.2